Postpartum care and postpartum morbidity in Morocco: a mixed methods study

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Postpartum care and postpartum morbidity in Morocco: a mixed methods study

Asmaa HABIB

College of Nursing, Midwifery and Healthcare

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not have the chance to receive a formal education and who always provided me with unwavering support. This PhD journey has helped me to cope with her loss.

Abstract

The postpartum period is high-risk for women's physical and psychological health. This is why the World Health Organisation recommends that women receive four postpartum consultations within six weeks of giving birth, particularly in low-and-middle income countries (LMIC) where maternal mortality and morbidity remain a concern. In Morocco, the use of postpartum care (PPC) has stagnated at a low level (21%) since 2011, while the prevalence of postpartum morbidity (PPM) remains high (28.1%). Very few studies have investigated PPC and its potential relation to PPM in Morocco. In addition, the relationship between the non-utilisation of PPC and PPM has not been systematically researched. This thesis addresses this public health problem in order to understand the factors associated with the low rate of PPC utilisation in Morocco, as well as the relationship between PPC and the occurrence of PPM. The overarching aim of the research is to offer practical recommendations to increase PPC uptake and, ultimately, improve women's health.

The research answered five objectives: 1) to describe PPC uptake in LMIC, 2) to determine the patterns of PPC uptake in Morocco and the factors associated with it, 3) to investigate the relationship between PPC uptake and PPM occurrence in Morocco, 4) to explore women's experience and perception of PPC and PPM in Morocco, and finally, 5) to examine healthcare professionals' experience in providing PPC in Morocco.

These objectives were addressed using a pragmatic approach based on the use of mixed methods. Three studies were conducted: 1) a systematic review and meta-analysis, 2) a secondary data analysis of a nationally representative database on Moroccan maternal health representing 5593 women of childbearing age, and 3) a qualitative study in two phases: the first one focusing on 17 women's experiences of PPC and the second one on 19 health professionals' perceptions and experiences of delivering it. The qualitative data were collected through semi-structured interviews conducted face-to-face in diverse health facilities, at women's homes in Morocco or via phone calls.

Concerning PPC uptake and the factors associated with it, the systematic review and meta-analysis presented an overview of the uptake of PPC in 35 LMIC, which provided

the context within which to explore and understand the findings relating to the Moroccan situation. Altogether, the prevalence of PPC utilisation in LMIC within six weeks post-delivery was 55.4%. Twenty-one sociodemographic, environmental, and obstetric factors were reviewed. Among them, urban place of residence, education, exposure to mass media, antenatal care check-ups, wanted pregnancy, primiparity, and delivery in a health facility by caesarean section all facilitated PPC utilisation. Conversely, other factors hindered PPC utilisation namely the lack of knowledge about PPC, poverty, women's unemployment, women's low level of autonomy in decision-making, disrespectful maternity care and young age (15-19 years old). From this dataset, a meta-analysis based on 9 population-based studies analysing the Demographic Health Survey concluded that the positive associations of urban place of residence, women's education level and employment as well as middle and higher socioeconomic level were more strongly associated with PPC uptake within six weeks after delivery (later PPC) than PPC provision within 48 hours post-delivery (early PPC). Based on these findings, several hypotheses on the association between sociodemographic, environmental, and obstetric factors and PPC uptake were tested in the Moroccan context.

The sequential data analysis of the Moroccan data (quantitative and qualitative) produced interesting results that corroborated some of the findings related to PPC uptake in other LMIC. The quantitative study showed that in Morocco, between 2013 and 2017, the proportion of women who received early PPC before discharge (EPPC) was 62.6% and 21.3% later within six weeks post-delivery (LPPC). The logistic regression findings indicated that PPC utilisation before discharge was more likely to occur for women who gave birth by caesarean section and those who received postnatal care for their newborn baby. LPPC uptake was also more likely to be associated with these two factors as well as women's age (30-39), level of education (some education versus none), socio-economic status (rich(er) vs poorer socioeconomic status) and the frequency of antenatal consultations (at least one vs none). Conversely, the multivariate analysis revealed that assisted delivery with only nurses or midwives present (without doctor) was a barrier to LPPC uptake. Other barriers were identified with the univariate analysis namely the absence of PPM, the lack of knowledge and awareness of PPC, financial constraints, and the unavailability of PPC provision.

These findings were partly corroborated by the qualitative investigations which highlighted that the mode of delivery (caesarean) and place of delivery (private setting), good relationship between women and health professionals (HPs) and good quality of care were important factors for women when choosing to attend PPC consultations. On the other hand, the reasons explaining the non-utilisation of PPC reported by women were related to the absence of knowledge and awareness of PPC importance, not feeling PPM symptoms, the shortage of financial resources, and the lack of PPC provision in public health centres. Finally, cultural barriers were also reported by HPs as hindering women's PPC utilisation.

With regards to PPM and their development, at the national scale, the quantitative analyses showed that the prevalence of PPM (at least one) reached 28.3%, including pelvic infections (76.2%), breast issues (51%), postpartum haemorrhage (16.7%) and oedema (14.4%). The risk factors for developing PPM included vaginal delivery with instruments and the occurrence of morbidities during pregnancy. Conversely, PPM were less likely to occur among women with secondary and higher education and those who attended antenatal consultations (at least one). The qualitative analysis also highlighted the occurrence of psychological PPM, but these were largely under-reported by women and under-diagnosed by HPs. Other factors contributing to PPM onset included women's negative delivery experience as reported by the women, and family's influence and cultural practices as stated by HPs.

Finally, in this thesis the relationship between PPC uptake and PPM occurrence in Morocco was also investigated and the results indicate that EPPC provided before discharge was associated with LPPC utilisation and lower PPM onset. The results also show that women seem to use LPPC if they experience PPM. In fact, the provision of PPC was perceived as preventive by HPs, whereas it was seen as a curative recourse by women.

The contribution to knowledge of this work is to provide insights into a wider range of factors, compared to existing literature, associated with the low rate of PPC utilisation in Morocco. The research also identified novel inter-personal and 'softer' factors that are hindering or contributing to PPC utilisation including family's influence, cultural beliefs and practices, relationship between HPs and women, alongside differences in

quality of care between public and private health structures. These are in addition to demographic and socio-economic factors, which constitute a social gradient and result in health inequalities. The research also brings new insights into the women's and HPs' perceptions of PPC – with the former viewing it as a curative measure while the latter consider it to be preventive. In addition, the research contributes new knowledge by furthering our understanding of the way psychological PPM are disclosed and managed. It also sheds light on the relationship between PPC uptake and PPM occurrence, with the association between the two variables relating to the timing of PPC use, that is to say that receiving EPPC before discharge prevents PPM onset whereas receiving LPPC within six weeks post-discharge was associated with PPM symptoms.

The research has important practical implications with a need for a holistic approach including the views of women, HPs and policymakers to increase PPC uptake and prevent PPM. This implies a need for behaviour change from all parties, a need to change some healthcare practices and organisation of care, and a need for health promotion interventions to raise the awareness of women and their families about the importance of PPC to prevent or treat PPM. Measures aimed at women, HPs and policymakers could positively contribute towards Morocco's aim to comply with the WHO recommendations on PPC utilisation and, by extension, to decrease maternal mortality and morbidity.

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List of Abbreviations

ANC	Antenatal Care
AOR	Adjusted Odds Ratios
CASP	Critical Appraisal Skills Programme
CHI	Compulsory Healthcare Insurance
COR	Crude Odds Ratios
DHS	Demographic and Health Survey
EPHPP	Effective Public Health Practice Project
EPPC	Early Postpartum Care (within 48Hours after delivery)
GBP	Great Britain Pound
GDP	Gross Domestic Product
GNI	Gross National Income
HDI	Human Development Indicator
HF	Health Facility(ies)
HPs	Health Professionals
IEC	Information Education Communication
LMIC	Low-and-middle income countries
LPPC	Late Postpartum Care (within six weeks after delivery)
MEDAS	Medical Assistance Scheme *(RAMED)*
MENA	Middle Eastern and North African countries
MeSH	Medical Subject Headings
MICS	Multiple Indicator Cluster Surveys
MMR	Maternal Maternity Ratio
NGO	Non-Governmental Organisation
OR	Odds Ratio
PAC	Percentage Accuracy Classification
PAPFAM	Pan Arab Project for Family Health
PICO	Population, Intervention, Comparison, and Outcome
PNC	Postnatal Care (for babies)
PPC	Postpartum Care (for women)
PPM	Postpartum Morbidity
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analyses

SBA	Skilled Birth Attendant
SES	Socioeconomic Status
VIF	Variance Inflation Factor
WHO	World Health Organisation

Chapter 1
Introduction to the research

This chapter introduces the research topic i.e. postpartum health by presenting briefly maternal mortality and morbidity in low-and-middle-income countries (LMIC), including Morocco. Indeed, this research focuses on postpartum care and morbidities in Morocco. To provide context to the research, the demographic and economic situation of the country is described as well as its health system. This chapter also outlines the Moroccan maternity care pathway within which postpartum care is provided. Finally, the rationale for the research as well as its aims and objectives are presented.

1.1. Background

1.1.1. The postpartum period

Romano et al. (2010) reported that the postpartum period consists of three continuous phases. The first one occurs between the 6th and 12th hours after delivery. It is also called the “acute period” because sudden severe metabolic changes can occur such as haemorrhage, uterine inversion, amniotic fluid embolism, and eclampsia. The second phase, or “sub-acute postpartum period”, lasts between two and six weeks after birth; during this phase, mild or severe metabolic and emotional changes might appear, for instance perineal discomfort or postpartum depression. The third phase is the “delayed postpartum period”, which lasts for up to six months after delivery and during which pregnancy-related diseases such as urinary incontinence, uterine prolapse might occur, although rarely. This research focuses exclusively on the first and second phases of the postpartum period – i.e. up to six weeks after birth, because it is the period during which postpartum care (PPC) should be delivered according to the recommendations of the World Health Organisation, (2013).

1.1.2. Maternal mortality and morbidity in low-and-middle income countries

As stated by the World Health Organisation (2023), even if the maternal mortality ratio (MMR) decreased by 34% worldwide between 2000 and 2020, in 2023, 800 daily maternal deaths induced by avoidable pregnancy and delivery causes, were reported globally. This public health issue occurred primarily (95%) in LMIC. Although maternal

mortality is a worldwide priority, maternal morbidity should not be neglected (Ashford, 2002; Hardee et al., 2012). Indeed, the incidence (i.e. number of new cases diagnosed over a given period) of pregnancy-related morbidity is higher than that of maternal mortality (Reichenheim et al., 2009). The most prevalent conditions of severe maternal morbidity worldwide are haemorrhage and hypertensive disorders (Geller et al., 2018).

Research has indicated that postpartum morbidity (PPM) and mortality occurrence is related to many factors, which can be social, obstetric, psychological, and physiological. These risk factors include overweight or obesity, older maternal age (>35 years), obstructed or prolonged labour (>8 hours), instrumental vaginal birth (use of forceps and vacuum), episiotomy (i.e. incision of the perineum made by a health professional to augment the vaginal orifice during difficult delivery), and primiparity (first birth). Significant associations have been shown between these determinants and postpartum haemorrhage, perineal lacerations and stress incontinence, genital prolapse, uterine rupture, nerve damage, and obstetric fistula (Ashford, 2002; Caughey et al., 2005; Davey et al., 2019; Korb et al., 2016; Legendre et al., 2010; Menard et al., 2008; Ménard et al., 2016; Naime-Alix et al., 2008; Roman et al., 2004).

In developing countries, cases of “near-miss” are frequent. “Near-miss” is a term that applies to “a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy” (World Health Organisation, 2011, p.7). Women in a “near-miss” situation are more at risk of PPM, such as hypertension, even in the delayed postpartum period (Filippi et al., 2010). A Moroccan study also showed that women who experienced “near-miss” were more likely to suffer physical and mental health issues eight months after delivery (Assarag et al., 2015).

PPM also encompass worldwide postpartum mental health disorders. These, such as postpartum depression, are globally related to low level of education, low socio-economic status, low support from healthcare professionals and partner, history of psychiatric disorder, undesired pregnancy, traumatic birth, obstetric emergencies, and complicated labour (Adewuya et al., 2006; Andersen et al., 2012; Ayers et al., 2016; Essam et al., 2012; Grekin and O’Hara, 2014; Hernández- Martínez et al., 2019; Lopez et al., 2017; Masmoudi et al., 2014; Modarres et al., 2012; O’Donovan et al., 2014; Schepper et al., 2016; Simpson et al., 2018). To identify postpartum psychological

distress, the WHO recommends screening for postpartum depression and anxiety using a validated tool. In addition, experts encourage the implementation of psychosocial and psychological interventions during pregnancy and the postpartum period to prevent psychological PPM (WHO, 2015).

The WHO classifies PPM according to the risk of mortality they may cause (see Appendix 1.1). Between 2003 and 2009, sepsis (including metritis which is the infection of the uterus during or after labour), haemorrhage, and hypertensive disorders (eclampsia) were the most life-threatening conditions and were responsible for over half of maternal deaths in the world (Say et al., 2014). More than two thirds of haemorrhage-related deaths occurred within six weeks after childbirth (Say et al., 2014). PPM can also cause long-term illnesses (Ashford, 2002) and have negative social and economic consequences for women, as seen in Figure 1.1 (Campbell and Graham, 2006; Filippi et al., 2006). Moreover, household members can be economically affected by a mother's illness due to a potential increase in expenses and decrease in earnings if she is no longer able to work (Storeng et al., 2008). Older children may compensate for the mother's unavailability, which may lead to them taking on more household responsibilities, which can have a negative impact on their education.

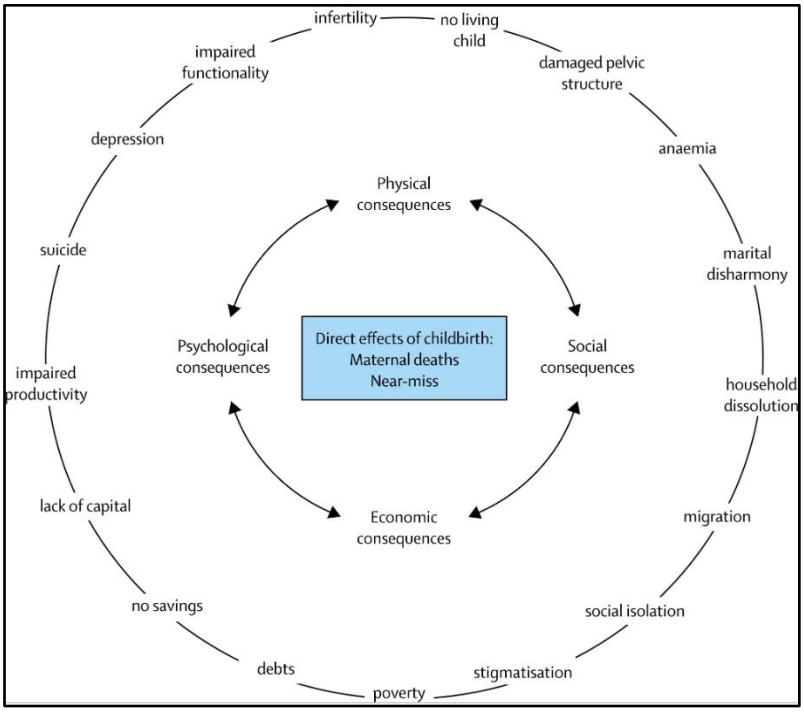


Figure 1. 1. Perinatal illnesses and their consequences (Filippi et al., 2006, p. 1537).

1.1.3. Postpartum care

The terms “postpartum care” (PPC) and “postnatal care” (PNC) are often used interchangeably in the literature to define the same concept, which is the effective screening of physical and psychological complications after delivery. However, each term relates to a specific group: PPC concerns women while PNC concerns newborn babies (World Health Organisation and Department of Making Pregnancy Safer, 2010). In this research, the topic of interest is the care provided to women, rather than the care provided to their newborn baby. Therefore, for more clarity, only the term PPC will be used.

PPC consists of a gynaecological examination to screen and provide care for eventual morbidities. It also aims to raise awareness of symptoms of the most common postpartum conditions and inform women about postpartum good practices. Indeed, according to the latest World Health Organisation (2015) guidelines, women should be counselled on postpartum contraception methods to encourage birth spacing. As regards to postpartum breast issues (engorgement, mastitis), breastfeeding is encouraged to prevent them, and pharmacological responses are not recommended.

In addition, the latest WHO (2015) guidelines recommends that healthcare professionals counsel women about postpartum lifestyle, in particular with regards to the prevention of nutritional deficiencies linked to anaemia, which can be addressed with oral supplementation of iron and folic acid for six to 12 weeks postpartum. Furthermore, in the absence of any contraindication, women are to be encouraged to practise physical activities for up to 150 minutes per week (which could represent 30 minutes five times per week). Preventive measures targeted at women's entourage are also recommended in ensuring that women do not become undernourished and do not undertake hard physical work.

After delivery, at least a 24 hour-stay in hospital is recommended (WHO et al. 2015). During the first hour post-delivery, early PPC (EPPC) should consist in continuous monitoring of the woman while assessment of vaginal bleeding is recommended to check the risk of postpartum haemorrhage. Women should be encouraged to eat, drink and pass urine. Pain management may be needed until women are discharged.

In 2013, the WHO updated its recommendation regarding the timing and number of PPC in LMIC, from three consultations (within three days and at six weeks post-delivery) to four postpartum follow-ups, as illustrated in Table 1.1: PPC 1) 24 hours after delivery, PPC 2) 72 hours post-delivery, PPC 3) between the seventh and the 14th day post-delivery, and PPC 4) six weeks after delivery (World Health Organisation, 2015a). The first two consultations should happen during the acute postpartum period (i.e. the first week after delivery), when sudden severe metabolic complications can occur, and the two others should take place during the second phase of the postpartum period (between the second and sixth weeks after delivery). Details of morbidities occurrence are displayed in Appendix 1.1.

Table 1.1. Distribution of postpartum care follow-ups during the three phases of the postpartum period.

Weeks after delivery	1	2	3	4	5	6	7 up to 6 months
Postpartum period	Acute phase	Sub-acute phase					Delayed phase
PPC follow-ups (WHO guidelines)	PPC 1 and PPC 2	PPC 3	-	-	-	PPC 4	-

As the setting research concerns the Moroccan population, the next sections will present the demographic and socioeconomic situation of the country as well as its health system and the state of maternal health.

1.1.4. The demographic and socioeconomic situation of Morocco

Morocco is located in Northern Africa, with a population of 37 million inhabitants as of 2023 (High Commission for Planning, 2023b). The country completed its demographic transition, with a decrease in the fertility rate from 7.2 to 2.1 children per woman between 1962 and 2021 (High Commission for Planning, 2018, 2023a; Sobhaz, 2009). According to the High Commission for Planning (2023), in 2021, the life expectancy at birth was 76.7 years (78.5 and 75.1 years for women and men respectively). The population is predominantly urban (64.3%) compared to rural (35.7%). This research focuses on women of childbearing age (15–49 years), who represent 26.3% of the total Moroccan population, amounting to 9,661,000 women.

The World Bank has classified Morocco as a low middle-income developing country (LMIC) (Data for Morocco, Lower Middle Income, Data, 2021). Its economy has

developed since 1990, with an annual increase in Gross Domestic Product (GDP) averaging 3% before the Covid-19 crisis. The larger economic sector is agriculture, followed by industry, energy, and tourism. The monthly Gross National Income (GNI) per capita in 2017 was 2518 Dirhams, amounting to £201 per month (Gross National Income per Capita (Current LCU) - Morocco | Data, 2021). Between 2019 and 2022, 3.2 million more people have fallen into poverty or vulnerability, 45% of this increase was due to the effect of the Covid pandemic and 55% related to the consumer price inflation. As a result, seven years of progress against poverty were lost in the last four years. Therefore, Morocco currently has the same level of poverty and vulnerability as in 2014 (Gauthier, 2023). In 2014, 4.8% of the population lived under the threshold for poverty, with 79.4% of them living in rural areas (The High Commission for Planning, 2016).

The level of development of Morocco can be measured and compared to other Middle East and North African (MENA) countries by using the Human Development Indicator (HDI). The HDI is a synthetic indicator used by the United Nations to represent the level of development of its member countries. The HDI takes into consideration three criteria: life expectancy, level of education measured by average length of education, and standard of living measured by GNI per capita. In the last 30 years, Morocco has progressed continuously, with an HDI score increasing from 0.457 in 1990 to 0.686 in 2019, with the country currently ranking 121st out of 189. Thus, Morocco is in the "medium human development" category, with an HDI above the average score for its category, but below the average HDI of MENA countries. Finally, as can be seen in Table 1.2, the Moroccan standard of living and mean years of schooling is below all other North African countries, and it currently is in the lowest position compared to these countries (United Nations Development Programme, 2020a, 2020b).

Table 1.2. Moroccan Human Development Indicator (HDI) and its parameters in 2019, compared to each North African country, mean HDI scores of Arab states (MENA), and mean HDI scores of medium human development category.

Country	HDI score in 2019	Rank according to HDI	Life expectancy at birth (years)	Expected years of schooling (years)	Mean years of schooling (years)	GNI per capita in 2017 (dollars)
Morocco	**0.686**	**121**	76.7	13.7	5.6	7 368
Algeria	0.748	91	79.9	14.6	8.0	11 174
Tunisia	0.740	95	76.7	15.1	7.2	10 414
Libya	0.724	105	72.9	12.9	7.6	15 688
Egypt	0.707	116	72.0	13.3	7.4	11 466

Middle Eastern states	0.705	_	72.1	12.1	7.3	14 869
Medium human development category	0.631	_	69.3	11.5	6.3	6 153

Moreover, although in Morocco education is free and compulsory at the primary level, the illiteracy rate of inhabitants over 10 years of age reached 38.7% in 2021. Among those who are illiterate, 50.2% lived in rural areas and 25.7% in urban areas. Women were more affected by illiteracy than men— with 43.9% of females and 24.1% of males classified as illiterate respectively. Finally, the rate of unemployment was 9.2% before the Covid-19 pandemic and reached 12.3% (10.9% for men and 16.8% for women) in 2021 (High Commission for Planning, 2023a).

1.1.5. The Moroccan health system

1.1.5.1. Healthcare governance

Morocco is a constitutional and democratic monarchy ruled by King Mohammed VI since 1999. The new constitution of 2011 recognises the fundamental right of access to healthcare with medical coverage. The Moroccan health system comprises all the human, financial, material, and institutional resources and activities intended to ensure the promotion, protection, restoration, and rehabilitation of the health of the population (The health system and the supply healthcare, 2011, p.1856).

Morocco is divided in 12 health regional directorates, as illustrated in Figure 1.2 (Ministry of Health, 2018).

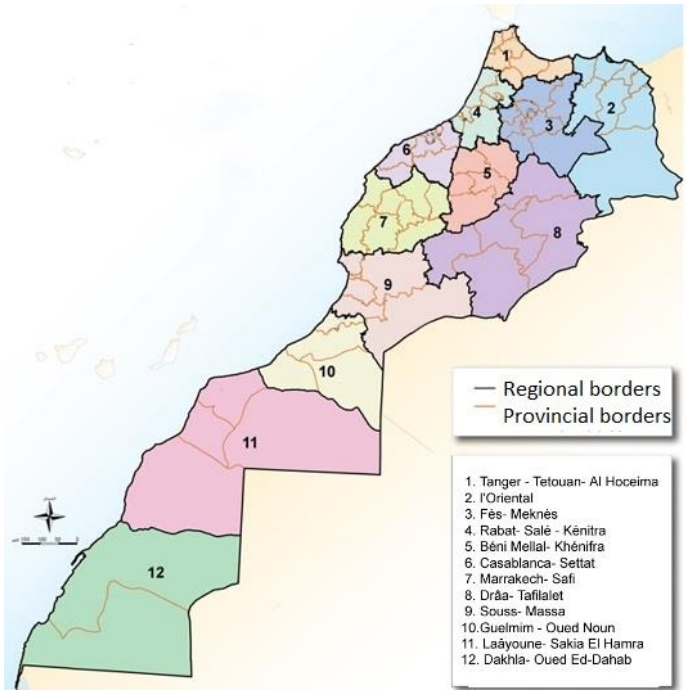


Figure 1.2. Map of the 12 health regional directorates of Morocco.

Between 2010 and 2017, the government invested annually around 1.4% of the GDP (in 2017, Moroccan GDP was at 118.54 billion US dollars (World Bank Group, n.d.)) in the health sector, or 4.8% to 5.7% of the government budget (Moroccan Ministry of Health, 2017). Despite a decentralisation effort at the regional level, the governance of the Moroccan health system remains largely centralised under the Ministry of Health, which is responsible for the financing and regulation of public-sector healthcare. Unlike Great Britain where the health monitoring is carried out by one unique institution (United-Kingdom Health Security Agency), in Morocco health monitoring is performed by the Ministry of Health and several institutions targeting specific fields. According to the WHO office in Morocco, this situation leads to a lack of coordination among the institutions and centres monitoring communicable diseases, radioprotection, pharmacovigilance, blood transfusion, and infectious and parasitic diseases (Ministry of Health and World Health Organisation, 2016). However, non-communicable diseases, such as postpartum morbidities, are solely monitored by the Ministry of Health.

1.1.5.2. Health coverage

The population coverage with healthcare insurance has progressed since 2002, when a law recognised the right to healthcare coverage for the population (The basic health

coverage, 2002, p. 65). This law was initially implemented through two insurance schemes: *l'Assurance Médicale Obligatoire (AMO)* [Compulsory Healthcare Insurance (CHI)] and le *Régime d'Assistance Médicale (RAMED)* [the Medical Assistance Scheme (MEDAS)] (Ministry of Health and WHO). Access to these two schemes depends on the individuals' professional status or level of poverty, as displayed in Figure 1.3.

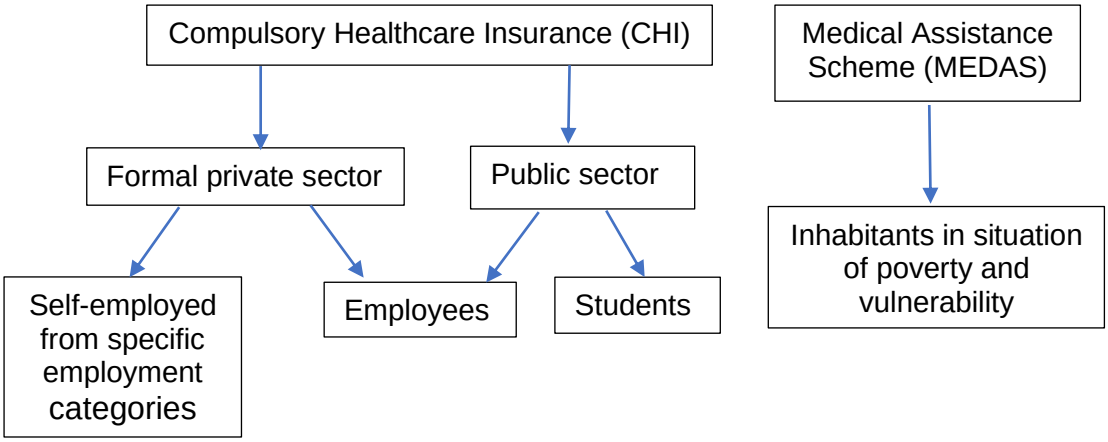


Figure 1.3. Moroccan healthcare coverage schemes and their accessibility according to professional and economic status.

Implemented since 2005, the CHI covered 7.2 million inhabitants, or 19.56% of the total population in 2020 (National Social Security Fund, 2019). This scheme covers employees from public and formal private sectors (i.e. employees declared by their employers to the government), and self-employed workers of specific employment categories (currently available only for physiotherapists, midwives, and legal assistants). In 2015, the scheme was extended to students (up to 30 years old) registered in public or private higher education establishments who do not benefit from another scheme or are not beneficiaries from one of their parents. In 2019, the programme counted 232 000 students (Insurance and Social Security Supervisory Authority, 2019).

Funding of the CHI is based on subscription fees paid by employers and employees. Subscription fees for students registered in public establishments are paid by the government. In practice, CHI's insured individuals and their beneficiaries (spouses and children) pay for their healthcare expenses related to accidents, diseases, maternity, and functional rehabilitation. These expenses are then reimbursed by the CHI, partially or totally, according to a scale.

The second healthcare scheme enforced by the government in 2008 is the MEDAS, whose objective is to provide social assistance, solidarity, and equity for citizens not eligible for the CHI. The eligible population for MEDAS comprises either those with low financial resources (up to 5650 Dirhams per year - equivalent to £460/year - for each person living in the household) (Moroccan Home Office, 2012) or vulnerable inhabitants. The vulnerability criterion includes households with total expenses between the poverty threshold and 1.5 times this threshold (*Glossary*, 2009). Since 2015, 99% of the population eligible for this scheme is using it, which represents 8.5 million inhabitants in 2019, or 18.6% of the total population. More than three quarters (84%) of these individuals were in a poverty situation, and 16% were vulnerable. Among the vulnerable population, 53% were urban dwellers and 47% rural inhabitants (International symposium on healthcare coverage of populations in precarity situations., 2015; Ministry of Health and WHO, 2016). This scheme covers specific health services, including consultations, screening tests, vaccinations, surgeries, medicines, and care (including maternal healthcare), provided in any type of public health facilities and following a specific healthcare pathway (see next section The healthcare pathway). Registration for the MEDAS is free for poor people, but vulnerable people have to pay.

Altogether, as displayed in Figure 1.4, in 2016, 54.6% of the Moroccan population had medical coverage under both schemes (36% by CHI and 18.6% by MEDAS). Nevertheless, healthcare coverage is not yet universal because 45.6% of the population, namely employees from the informal private sector (undeclared to the National Social Security Fund) and self-employed workers (except specific employment categories) and their families have currently no healthcare coverage (The Economic, Social and Environmental Committee, 2018, p. 80). Therefore, in April 2021, the government started a programme to extend the CHI to cover these population as well as MEDAS's insured individuals and their beneficiaries, hence allowing them to get total or partial refund of their healthcare expenses in the private sector (e.g. consultations, examinations, treatment, surgeries) (*Royaume du Maroc Ministère de la Solidarité, de l'Insertion Sociale et de la Famille*, 2021).

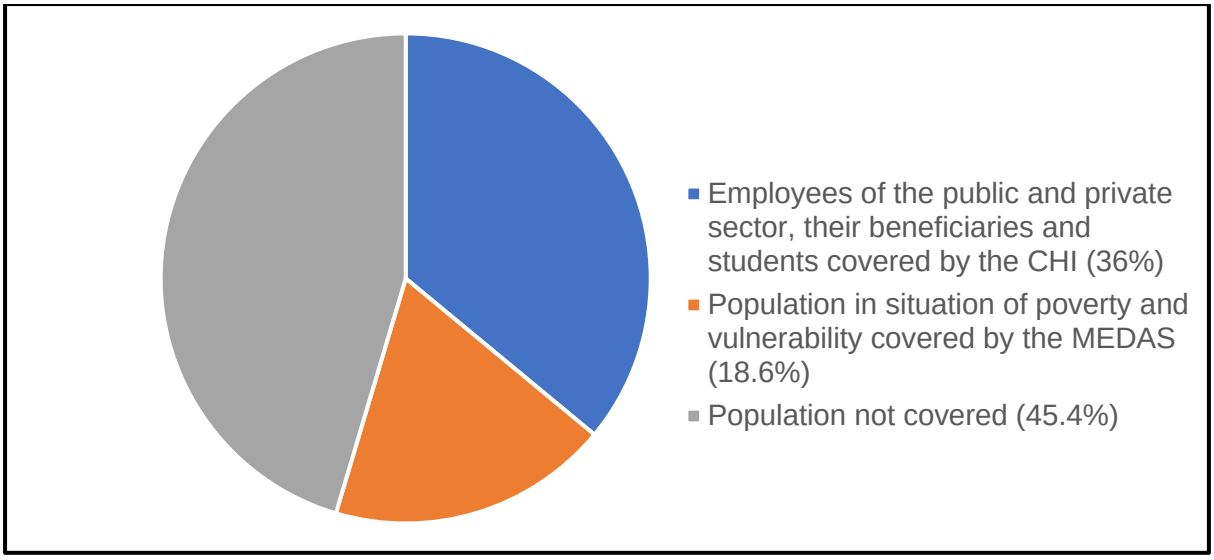


Figure 1.4. Distribution of the Moroccan population according to their affiliated medical coverage in 2016.

In addition to the basic healthcare coverage, a small part of the population -4.3 million inhabitants—were insured by private insurance companies in 2019 (Insurance and Social Security Supervisory Authority, 2019). Such companies take care of the remaining expenses not covered by CHI.

A. The healthcare pathway

The Moroccan healthcare pathway encompasses all health infrastructures and facilities (fixed or mobile), both public and private, and the human resources assigned to them. It also includes the means (i.e. tools, equipment) used to provide care and services to optimally meet the health needs of individuals and communities (The health system and the supply healthcare, 2011).

B. Health structures

The health facilities in Morocco encompass primary healthcare institutions (health centres and delivery centres), hospitals, and medico-social structures (palliative care centres, physical rehabilitation, addiction centres, health centres for teenagers and young adults, and health centres in universities). The public hospital network is categorised in four levels (proximity, provincial, regional, interregional) depending on the level of care provided. Outside emergency situations, the healthcare pathway is organised in the public sector according to the level of care needed. The more complex the issue is, and specific care required, the more likely the patient will be cared for in interregional hospitals. Primary healthcare facilities are the first entry in the health

system for the population, but their access is limited for 20% of inhabitants who live more than 10 km away from the nearest health centre (Siddiqi et al., 2012). If necessary, patients are directed to a more suited or a nearest hospital (provincial hospitals) to be treated. If these do not provide the required care, patients are referred to regional or interregional hospitals (Moroccan Home Office, 2021). This hierarchised pathway is identical for any patient seeking care in the public sector, regardless of their healthcare coverage.

In the private sector, which consists of clinics and healthcare professionals' surgeries, the pathway is flexible meaning that patients can seek care in any clinic and choose their general practitioner and specialists. In 2019, the population consulted private surgeries (60.8%) more often than public health facilities (31.9%) for general care (High Commission for Planning, 2023a).

C. Health professionals

According to a report assessing the Moroccan health system written by the WHO office in Morocco (Siddiqi et al., 2012), the country is facing a shortage of medical and paramedical health professionals. In 2021, with 7.4 doctors et 9.8 paramedical health professionals for 10 000 inhabitants, the medical density in Morocco is still below the WHO recommendation (i.e. 4.5 health professionals for 1000 inhabitants) (Haut-Commissariat au Plan, 2023, p.152). More than half of doctors (52.4%) are self-employed, especially in the regions of Rabat, Casablanca and Souss-Massa where more of them work in the private sector than the public (Haut-Commissariat au Plan, 2023, p.171-172). Thus, the qualitative study (cf. Chapter 8) that was conducted in these three regions included self-employed doctors. In case of serious psychological PPM, there is a significant shortage of psychiatrists with less than one (0.6) for 100 000 inhabitants (Haut-Commissariat au Plan, 2023, p.163).

Regarding the provision of routine PPC for the 9 661 000 women in childbearing age, the proportion of midwives more than doubled between 2005 and 2021, rising from 2,110 to 5,757 (Haut-Commissariat au Plan, 2023, p.171). Moreover, the 1223 gynaecologists and 11,165 general practitioners working in the public and private sectors were spread unevenly across the country, with a concentration of doctors in the Casablanca and Rabat regions in 2019 (Haut-Commissariat au Plan, 2023, p.153 and 173). Therefore, due to the disparity of health professionals in geographical

locations of the territory, access to healthcare is difficult for some of the population, especially in rural areas. According to a WHO report assessing the Moroccan health system, this shortage is explained by “an absence of motivation, underdeveloped regulations, inefficient decentralisation of staff management and emigration” (Siddiqi et al., 2012, p. 25). In addition, this report indicated that in the public sector, there are issues with low productivity of some health professionals and bribery. Despite the illegality of bribery, the report stated that the exchange of care in return for undeclared financial compensation demanded by health professionals, is a factor that hinders or even prevents access to care for poor people.

1.1.5.3. Maternal health in Morocco

The demographic transition in Morocco, namely the passage from a stage where mortality and fertility were high to a stage were mortality and fertility decreased and stabilised (see section 1.1.4.1.1.4. The demographic and socioeconomic situation of Morocco), has been paralleled by an epidemiologic transition, meaning an improvement in hygiene, a decrease in infectious diseases offset by an increase in chronic diseases. For this purpose, the country has engaged in international agreements, in particular the application of the WHO principles in its health system. This involves implementing the necessary means to reach the Millennium Development Goals, eight goals agreed by United Nations member states, by 2015 (WHO | Millennium Development Goals (MDGs), 2021). One of these goals was to decrease the maternal mortality ratio (MMR) to below 70 per 100,000 live births. Evidence has showed that the MMR in Morocco has been in progressive decline since 2003 from 227 deaths per 100,000 live birth to 72.6 per 100,000 live births in 2018 (High Commission for Planning, 2023a; Moroccan Ministry of Health, 2017). This decline is encouraging, but the rate is still slightly above the WHO goal. Similarly, utilisation of antenatal care has increased (from 32% in 1992 to 88.5% in 2018), as is the number of births attended by skilled health professionals (from 31% in 1992 to 86.6% in 2018). All these advances might have contributed to the decreasing rates of maternal mortality.

However, differences in MMR according to socio-demographic determinants persist. For example, in 2018, the MMR gap between urban and rural areas was large: 44.5

per 100 000 live births versus 111.1 per 100,000 live births respectively (High Commission for Planning, 2023a). In addition, although delivery in public health facilities should be free, patients usually have to pay for medicines, which can cost up to 200 Dirhams (i.e. namely 8% of the monthly average income in 2017) or £16 (Assarag et al., 2015). This sum represents an important additional expense for many patients and may constitute a significant barrier to access maternity care for many women. Therefore, women's socio-demographic status appears to be an important factor in maternal health inequalities.

Maternity care pathways

- **Type of facility**

Different types of health facility offer antenatal and postpartum care and assistance for delivery. In the private sector, there are clinics in which women can access maternity services from both hospitals and surgeries, while in the public sector, care is provided by several structures such as hospitals, health centres, delivery centres, and family planning centres. Maternity wards in public hospitals vary according to the equipment and the number of skilled professionals that can treat severe cases. Interregional hospitals have "level three" maternity wards, meaning that they can care for women who have severe complications during pregnancy or delivery. Regional hospitals have "level two" maternity wards, allowing them to handle regular pregnancy or delivery complications. Finally, there are local and provincial hospitals across Morocco, and whilst not all of them have maternity wards, they provide basic maternal care. In the absence of maternity wards, deliveries take place either in delivery centres or at home. The distinctive feature of delivery centres is that they were created to compensate for the lack of perinatal services, especially in rural areas. According to the Moroccan Ministry of Health (2017, 2018), 86.1% of deliveries in 2018 occurred in health facilities, representing 96% and 73.7% of childbirth in urban areas and rural areas respectively. In that year, public health facilities were most commonly chosen (70.2%) by women for childbirth, representing 81% of deliveries in hospitals and 19% in delivery centres. One quarter (15.7%) of childbirths occurred in private clinics, and the remainder (13.4%) occurred at home.

- **Mode of delivery**

Among all births in Morocco, in 2017, assisted vaginal delivery with forceps or vacuum was reported to be 41%, followed by a spontaneous vaginal childbirth (37.7%) and caesarean section (21.2%) (Moroccan Ministry of Health, 2017). The rate of caesarean sections in Morocco is higher than the WHO recommendation, which is 10–15% of deliveries (WHO Statement on Caesarean Section Rates, 2015). The Moroccan situation is more concerning in urban areas, where 26.3% of deliveries are caesarean sections, than in rural areas, where the caesarean rate (12.9%) remains within the WHO's recommendation. Since public hospitals have reported that 13% of all deliveries are by caesarean section, this overall increase in caesarean deliveries can be attributed to private clinics (Moroccan Ministry of Health, 2017). The proportion of caesarean deliveries in Morocco has risen by 72% in 10 years, since it represented 12.3% of deliveries in 2011 (Moroccan Ministry of Health, 2011a). Other LMIC reported the same trend with a decrease in vaginal deliveries offset by a 6% to 14% increase in caesarean deliveries (Harrison et al., 2019).

In summary, Morocco is a middle-income country in developmental process in regard to both economic and sanitary advances. Nevertheless, this development is not uniformly distributed within the population; inequalities persist, particularly in the area of health, and specifically maternal health. The provision of healthcare allows for medically supervised pregnancy monitoring and childbirth, which has contributed to a reduction in maternal mortality, especially in urban areas. However, maternal morbidity, particularly during the postpartum period, remains a public health issue.

1.2. Research focus and rationale for the study

This research focuses on the utilisation of postpartum care (PPC) and its relationship with postpartum morbidity (PPM) in Morocco.

1.2.1. Postpartum care in Morocco

The utilisation of PPC has remained low and stagnant in Morocco, since 2011 with only 21.8% of women reporting attending it (Moroccan Ministry of Health, 2011b, 2018). The prevalence of PPC utilisation in Morocco is much lower than in developed countries such as the United-Kingdom (78.7%) (Smith et al., 2020). This difference could be explained by the socio-economic development gap between the two

countries. In addition, the NHS maternal healthcare pathway is more structured, with a 10-day LPPC check-up at the woman's home provided by a health visitor or midwife and a last PPC at six weeks at an NHS surgery with a general practitioner(National Health Services, 2020a, 2020b).

In Morocco, during PPC consultations, which are provided in health facilities, several examinations are carried out: blood pressure measurement (73%), breast examination (45%), lochia examination (40%), body temperature (40%), and pulse measurements (11%), as well as a gynaecologic examination (5%) as per the WHO (cf. section 1.1.3. Postpartum care). However, these examinations are not conducted systematically, which leads to inconsistent quality of care (Elkhoudri et al., 2017).

The importance of using PPC (as mentioned in section 1.1.3. Postpartum care), is recognised not only by the WHO but also by the Moroccan law. The regulation in force stipulates that the first PPC should happen before discharge from the health facility, the second eight days after delivery, and the third follow-up between 40 and 50 days after delivery (Ministerial decree of 5 September 2005 defining the conditions and episodes of medical monitoring of pregnancy, childbirth and postpartum, 2005). However, there are no implemented systems of providing PPC, such as home visits after discharge from health structures. In this research project, PPC is defined as care provided by health professionals during the acute and subacute postpartum period which correspond to the first and second phases of the postpartum period (up to six weeks after discharge). This period relates to the time period upon which the WHO recommendations are based. This is why the delayed postpartum period is not considered in this study (Table 1.1).

There is little evidence regarding utilisation of the three last PPC follow-ups (Campbell and Graham, 2006) within six weeks after delivery. In 2017, according to ministerial data, Moroccan public health facilities provided 700,676 instances of PPC, when 478,956 childbirths were registered (Moroccan Ministry of Health, 2017). This observation does not permit to establish the timing of PPC delivery (i.e., whether women who gave birth in these facilities received at least one PPC consultation before being discharged or several consultations in the six weeks following their delivery).

Only four studies have examined PPC and the factors implicated in its utilisation in Morocco (Assarag et al. 2013; Assarag et al., 2015; Assarag et al., 2014; Elkhoudri et

al., 2017), and all are monocentric studies that took place either in Marrakesh or Rabat. Findings show that factors associated with the non-utilisation of PPC in Morocco include the lack of information on PPC (87% of women ignore the existence and importance of PPC), poor relationship with health professionals, living in rural areas, distance from health facility, illiteracy and low level of education, traditional practices, absence of health complications, women and spouses' unemployment, and financial difficulties. However, more research is needed to update and complete this limited evidence base by analysing more factors and on a larger scale.

1.2.3. Postpartum morbidity in Morocco

The prevalence of PPM reached 28.1% nationally (Moroccan Ministry of Health, 2018). According to the indexed literature, in Morocco, research on PPM started in 2005 but few studies have since investigated this topic. In these studies, the complications reported by women included haemorrhage (79.9%), fever (12.1%), pregnancy-related hypertension (10.6%), mental disorders (10%), genital infections (8%), and breast conditions (5%) (Assarag et al., 2013; Elkhoudri et al., 2015). Until recently, there was very little interest in psychological PPM. A 2005 study demonstrated that postpartum depression was associated with difficult pregnancy, lack of support from partner and baby's health issues (Agoub et al., 2005). More recently a pilot study using a tool designed by the WHO to detect PPM, showed that women experience psychological PPM and sexual and domestic violence during the postpartum period (Hababa and Assarag, 2023). Overall, the limited evidence suggests that further research is needed on PPM in Morocco including psychological PPM.

1.3. Rationale for the research

As seen previously, very few studies have investigated PPC and its potential relation to PPM in Morocco (Assarag et al., 2013, 2015; Elkhoudri et al., 2015, 2017). However, these studies have found that socio-demographic, financial, and healthcare factors are associated in this complex relationship. Whilst insightful, these studies have significant limitations. They are monocentric studies; thus, their results cannot be generalised to the whole population. In most cases, morbidity was self-reported without being

confirmed by a health professional. Additionally, mental health disorders were not taken into consideration, meaning that psychological distress might have been unreported or under-diagnosed. Furthermore, the type of health facility (public versus private) in the uptake of PPC and occurrence of PPM as an important variable has been largely ignored. Finally, the relationship between the non-utilisation of PPC and its effect on PPM has not been systematically researched.

Considering all of these factors in the Moroccan context, a study that would be nationally representative and that would bring new knowledge through scientific analyses is needed. Thus, this research sought to fill this gap and answer the following overall research question: “What are the factors contributing to the low uptake of PPC in Morocco, and how does PPC utilisation relate to PPM?”.

1.4. Research aims and objectives

The aim of the research is to further our understanding of the patterns of PPC uptake in Morocco, the factors contributing to its utilisation and the way PPC utilisation relates to PPM. It is also to obtain more granular insights as to how PPC is viewed and experienced by both women and healthcare professionals who provide it and how this may influence its uptake. The overarching aim of the research is to offer practical recommendations to increase PPC uptake and, ultimately, improve women’s health.

To reach these aims, the specific research objectives are as follows:

1) To describe PPC utilisation in low- and middle-income countries.
2) To determine the patterns of PPC utilisation in Morocco and the factors associated with it.
3) To investigate the relationship between PPC utilisation and PPM in Morocco.
4) To explore women’s experience and perception of PPC and PPM in Morocco.
5) To examine healthcare professionals’ experience in providing PPC in Morocco.

First, to answer research objective 1 a systematic review and meta-analysis will be undertaken (cf. Chapters 2 and 3). Second, to address objectives 2 and 3, a quantitative secondary analysis of a nationally representative Moroccan data set will be conducted (cf. Chapters 5 and 6). Third, to address objectives 4 and 5, a qualitative study exploring women (cf. Chapter 7) and healthcare’s attitudes towards and

experiences of PPC will be performed (cf. Chapter 8). Thus, the qualitative study will investigate the relationship between women and HPs during the pregnancy and postpartum period, the working conditions of HPs and how this may influence PPC provision and the quality of care provided, especially during delivery-led hospitalisations and PPC check-ups.

Figure 1.5 below shows a conceptual framework that represents the connections between variables of interest and outcomes. It illustrates the theoretical thread of this research.

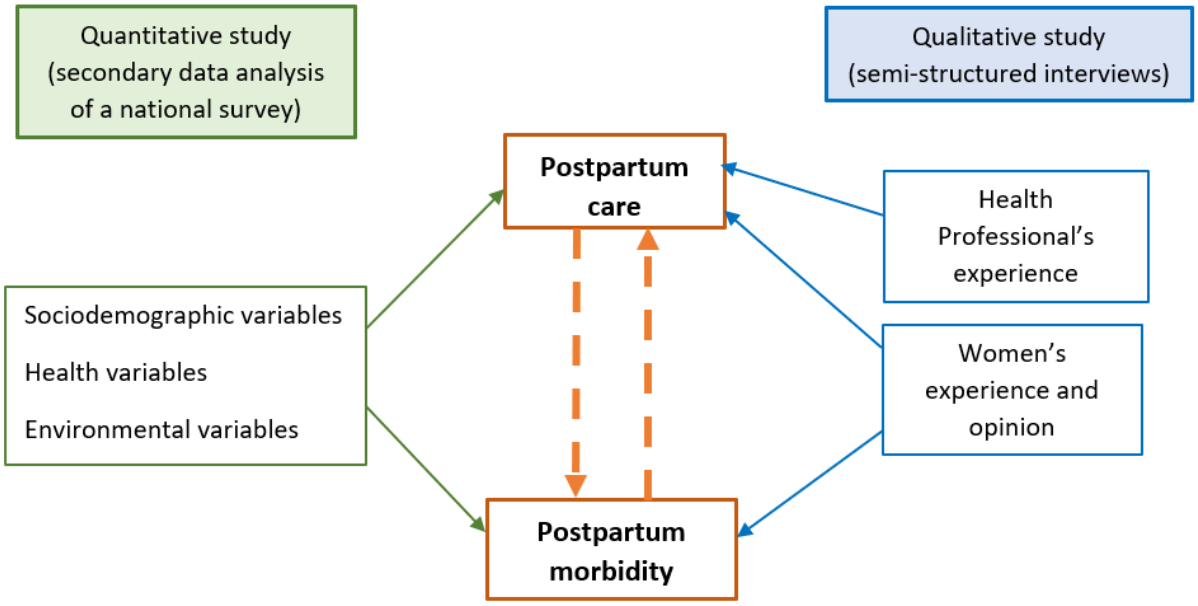


Figure 1.5. Conceptual framework of the research.

1.5. The organisation of the thesis

This chapter has provided the background to the thesis. In LMIC, maternal death remains an issue and despite advances, preventable pregnancy and delivery related deaths is still prevalent. PPM can cause maternal deaths. Regardless of their seriousness, PPM are still highly prevalent but can be prevented and treated through PPC. However, PPC remains stagnant and under-used.

Morocco is a country that has made social, and economic progress, improving thereby the life expectancy of its population, which is still predominantly young. However, the country remains marked by health inequalities due to geographical, economic, social, and health reasons, in particular in the perinatal period.

This research aims to investigate the factors contributing to the low PPC uptake and the relationship between utilisation of PPC and occurrence of PPM by using a mixed-method approach. The thesis comprises nine chapters. Chapter 2 presents a systematic review on the patterns of PPC utilisation in LMIC. Complementary findings are given in the meta-analysis in Chapter 3. The methodology utilised in this research is explained in Chapter 4. The analysis of the Moroccan nationally representative database is presented in Chapters 5 and 6. The attitudes to PPC and the experiences of women in receiving PPC is synthetised in Chapter 7 and healthcare professionals experience in providing PPC is synthetised in Chapter 8. Finally, the findings of the quantitative and qualitative studies are triangulated and discussed in Chapter 9, alongside public health recommendations based on the research results.

Chapter 2
Systematic review:
Barriers and facilitators determinants of postpartum care uptake in low-and-middle income countries

Since postpartum care (PPC) is offered to prevent and diagnose postpartum morbidity and avert maternal death, its utilisation is measured and analysed in LMIC where maternal mortality is a public health concern. The literature points to several health determinants involved in PPC uptake. This chapter presents a systematic review of the determinants (barriers and facilitators) of PPC uptake in LMIC. The results will be used to draw hypotheses that will be tested in the Moroccan context.

2.1. Introduction

Social determinants of health are related to individual characteristics (age, education, work, economic status, life experiences, place of residence) and community factors. The latter include the structure and organisation of a country in all sectors: health, economy, justice, culture, education, environment (Marmot et al., 2008). Therefore, the use of healthcare resources by women, such as PPC, varies according to these sociodemographic and environmental determinants, as well as obstetric factors.

In the past ten years, two systematic reviews with meta-analyses have been published on PPC uptake in LMIC. In 2015, Langlois et al. (2015) published a systematic review on inequities in PPC utilisation in LMIC based on 36 papers published before 2013. Although he did not report the prevalence of PPC utilisation, the findings indicated a growing gradient in PPC uptake depending on wealth status and women's level of education. In addition, when their partner was educated and employed as technician or manager, women were more likely to use PPC compared to those whose partners were farmers. On the other hand, the distance to the health facility was identified as a barrier to PPC utilisation when it was above two kilometres. No clear conclusion was drawn on the influence of religion and the proportion of PPC utilisation in LMIC was not reported.

The second systematic review by Chaka et al. (2019a) focused solely on Ethiopia and reported 32% PPC utilisation. Among the 13 determinants taken into consideration in this review, PPC utilisation was significantly positively associated with women's autonomy in decision-making related to health and within their household, the number of antenatal care (ANC) visits, at least two ANC visits, middle and rich socioeconomic status, health facility based-delivery, awareness of postpartum complications and partner's education above secondary school.

Although these two systematic reviews provided insightful findings, the need for another systematic review is clear because the Langlois study only described the effect of a few determinants and did not mention the percentage of PPC utilisation in LMIC. As for Chaka's study, it analysed 13 determinants and measured PPC utilisation rate, but only in the Ethiopian setting.

2.1.1. Objectives of the present review

To get thorough understanding of PPC uptake in LMIC, the present review takes account of a greater number of determinants. Moreover, it synthetises the available evidence between 2013 and 2020 to measure the evolution of PPC utilisation in LMIC since these two studies. The present systematic review addresses the following three research questions:

1) To what extent do women use PPC in LMIC? The expected outcome is the percentage of women who used PPC within 48 hours of birth, which corresponds to the Early Postpartum Care (EPPC) period, or later within six weeks following birth (LPPC). The outcome could also correspond to the percentage of women who attended full PPC, which refers to three or four visits during the six weeks of the postpartum period, as recommended by the WHO (2013) for healthy women without specific conditions.

2) What are the factors that significantly facilitate and prevent women from using PPC? In particular, the aim is to understand the social gradient of health related to PPC use by considering the association between health determinants and PPC uptake.

3) Do these determinants have different associations depending on when PPC is used – i.e. within 48 hours of birth (EPPC) or more broadly within six weeks after birth (LPPC)?

2.2. Method

2.2.1. Search strategy

The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) method designed by Moher et al. (2009) was used to conduct the systematic review as it is a standardised process, which consists of reporting 27 evidenced-based items in systematic reviews and meta-analysis. The method also includes a flow diagram to illustrate the four steps of study selection (identification, screening, eligibility, inclusion).

The search was carried out independently on five electronic databases (MEDLINE, Cochrane, Embase, Web of Science and CINAHL). These databases were chosen for the high-quality healthcare information they include. Four of them (MEDLINE, Cochrane, CINAHL and Embase) were recommended by an expert librarian in healthcare disciplines. Moreover, they were also used in the Langlois and Chaka studies. Web of Science was used because it is a database of peer reviewed journals in social sciences that could encompass literature on social determinants of PPC uptake. In addition, a hand search was conducted by reviewing the references list of all articles selected to find further relevant publications not referenced in the electronic bibliographic databases.

Search terms were selected from the thesaurus of each database. They were classified into four domains:

- Domain 1- ‘the healthcare setting’ – this included: health facilities, health professionals (nurses, midwives, doctors), and health equity alluded to equitable access to healthcare for all social class.

- Domain 2- ‘the type of care’ - this referred to the care provided during the postpartum period. This review focused on PPC for women, but depending on the authors, this could be called postpartum care or postnatal care, knowing that postnatal care is also used to define care for newborn babies.

- Domain 3- ‘the population of interest’ was women who experienced maternal care (e.g. antenatal, delivery, postpartum care)

- Domain 4- ‘the social factors’ referred to social determinants of health in LMIC (e.g. education, place of residence, socioeconomic status).

Given that there was no specific thesaurus for the Web of Science and Cochrane databases, Medical Subject Headings (MeSH) terms used in the MEDLINE database were applied for searches. In total, 42 terms including MeSH terms synonyms were selected from the thesaurus. The search terms for the study were selected according to the number of hits for each search using a particular item by each term. The sensitivity of each term was compared to the others and when there was little difference in the number of results obtained for synonyms terms, the one which achieved the greatest number of results was selected. Consequently, as can be seen in Table 2.1, 13 terms were selected and used for the searches using a combination of Boolean operators “AND” and “OR”.

Table 2.1. Selected MeSH terms that led to more hits during the preliminary search and used for the Boolean search in all databases.

Domain 1: Healthcare supply	Domain 2: Type of care	Domain 3: Population/Subject	Domain 4: Social factors
- Health services accessibility - Delivery of healthcare - Healthcare disparities - Health equity - Access to healthcare	- Postnatal care - Postpartum care - Postpartum period	- Women - Maternal health	- Social determinants of health - Sociological factors - Low- and middle-income countries

2.2.2. Study selection

2.2.2. 1. Inclusion and exclusion criteria

The inclusion and exclusion criteria were based on the widely used Population, Intervention, Comparison, and Outcome (PICO) (Eriksen and Frandsen, 2018) criteria and summarised in Table 2.2. The PICO model has three functions: first, it focuses on the single most important issue and outcome; second it facilitates the next step in the process by selecting language and key terms to be used in the search; third, it helps to clearly identify the problem, findings and outcomes related to the specific care provided (Miller and Forrest, 2001).

Table 2.2. Review PICO inclusion and exclusion criteria applied for all databases.

	Inclusion criteria	Exclusion criteria
Population	Women aged between 15 and 49 years old	- Newborn babies - Women under 15 years old - Studies with fewer than 385 participants
Interventions	Postpartum care (PPC)	- Not focused on PPC - Maternal healthcare in its entirety (antenatal care, mode of delivery, skilled birth attendant, PPC) - Postpartum health complications only - Interventions implemented to raise PPC utilisation - Payment schemes (vouchers programmes or insurance)
Determinants of interest	Socio-demographic, obstetric and environmental factors, defined at individual or community level (cf. Table 2.3)	- Not investigating the determinants of interest
Outcome	- PPC uptake, - Association between determinants and uptake of PPC	- Association between determinants and use of PPC for newborn babies, - Less than 50% of results concerning use of PPC for women, - No measure of association reported between PPC and determinants of interest.
Setting	Low- and-middle income countries	Higher income countries
Study design	- Observational studies (case studies, cross-sectional studies, case control studies), - Clinical trials - Randomised controlled trials, - Quasi experimental studies	- Qualitative studies - Ethnographic studies - Literature reviews - Systematic reviews and meta-analysis - Before and after (pre-post studies)
Time period	Papers published since 2013 to January 2021	Papers published before 2013 to avoid duplicates with the Langlois systematic review (Langlois et al., 2015).
Type of publication	Original articles from peer reviewed journals	- Editorials - Poster abstracts - Grey literature
Language	English	Other than English

Some of these criteria are self-explanatory. However, some warrant further clarification.

A. Minimum sample size

The minimum size of a representative sample to calculate proportions – here the prevalence of PPC utilisation – in a large population was defined by the Kish formula at 385 participants with 50% variability of the population, 50% confidence level and

5% of precision (Israel, 2003; Kish, 1965). Therefore, to extract representative data, studies with fewer than 385 women were excluded.

B. Outcome of interest

The outcome of interest was the uptake of PPC. Thus, studies that considered maternal healthcare globally, which referred to the healthcare provided to women regarding their pregnancy, including antenatal care, mode of delivery and postnatal care, were excluded.

Moreover, as the aim of the review was to establish PPC uptake in an ecological valid way, studies evaluating the effect of interventions implemented to increase PPC utilisation, such as mobile health interventions or payment schemes (private insurance or distribution of vouchers to get free PPC), were also excluded.

C. Determinants of interest

The determinants of PPC care indicated in Table 2.3 were defined according to the literature (Andersen and Newman, 2005) and classified into three categories: sociodemographic, clinical and environmental determinants.

Table 2.3. List of sociodemographic, clinical, and environmental determinants of postpartum care analysed in the present systematic review.

Sociodemographic factors	Clinical factors	Environmental factors
- Age - Women's education - Women's employment - Marital status - Partner's educational level - Partner's employment - Socioeconomic status - Women's autonomy to make decision - Religion	- Parity (number of children born alive) - Desired pregnancy - Attendance to antenatal care visit(s) - Number of antenatal care visit(s) - Place of delivery - Knowledge of pregnancy danger signs and postpartum care - Knowledge of childbirth preparedness plan - Mode of delivery (vaginal/ vaginal with instrument/caesarean) - Multiple birth (singleton or not) - Length of facility stay - Quality of care (including disrespectful maternity care) - Skilled birth attendant	- Place of residence - Distance from a health facility - Exposure to mass media (television, radio, journal)

Since barrier and facilitator determinants were defined by their association with PPC uptake, studies that did not report a measure of association between the two were excluded. In the case of studies investigating postnatal care for women and their

babies, they were excluded if their results were presented in a way that made the distinction between the effects of determinants on PPC uptake for mothers and those on PPC for their child impossible. Studies were also excluded if the results focusing on PPC use for women represented less than 50% of the findings. The latter criterion was applied because PPC uptake for women was the review's outcome of interest, so studies with few findings on PPC uptake would not provide enough information for the systematic review.

D. Other criteria

To avoid duplication with the Langlois systematic review (Langlois et al., 2015), articles published before 2013 were not eligible; likewise, systematic reviews and literature reviews were excluded, because individual studies would have already been included in these reviews. In addition, since the effect of determinants on PPC is measured by a quantitative approach, qualitative and ethnographic studies were also excluded.

2.2.2. 2. Quality assessment

The quality of the selected studies was assessed to put into perspective the results of the systematic review and discuss its strengths. For this purpose, several tools were considered, in particular the Effective Public Healthcare Panacea Project (2021) (EPHPP) and Critical Appraisal Skills Programme (CASP) (Brice, 2021). These two tools were tested, but some of their questions were not adapted to the design used in the included studies (e.g. cross-sectional design studies, secondary data analysis). Therefore, the Joanna Briggs Institute (JBI) critical appraisal checklist for analytical cross-sectional studies (Moola et al., 2017) was chosen as a validated tool compatible with the design of the included studies. The tool consists of eight questions regarding: inclusion criteria, study population and setting, tools used to measure the outcome (PPC uptake) and the exposure (determinants of PPC uptake), measurement of the condition (with a specific diagnosis or definition to determine the occurrence of a health issue), confounding factors, and statistical analysis. All questions were relevant to the studies selected, except for question 4 on the measure of the condition because this systematic review did not concentrate on any particular health condition. The research team had set up criterion to evaluate each paper very carefully. The questions were scored 2 (Yes) if studies met the requirement, 1 ("Unclear") and 0 (No) if studies did

not meet the requirements. The overall rating for each study was calculated by counting the total number of questions that scored 2 (meeting the requirements). As recommended by the JBI team, this cut-off score could be applied to give an overall idea of the quality of studies but not to decide on their inclusion or exclusion from the systematic review. The researchers defined the quality of studies as weak if four or fewer questions out of seven were scored 2, moderate if five out of seven questions scored 2, and good if six out of seven questions scored 2. The researcher, the supervisory team and an external reviewer assessed all the articles independently, compared their results and discussed discrepancies. The overall rating was obtained by averaging the assessments.

2.2.3. Data extraction

A standardised data extraction form was drafted and piloted on a sample of studies. Extracted data included: first author's last name, year of publication, study setting; study design and data source; study objective; population of study (inclusion and exclusion criteria) and characteristics of participants; variables of interest (dependent and independent variables); main results (percentage of PPC utilisation, significant positive and negative measures of associations between PPC utilisation and determinants (facilitators and barriers), and finally, study limitations. The data of 10% of the included studies were independently extracted by two supervisors and four articles were cross-checked by an external reviewer.

2.3. Results

2.3.1. Search findings

The PRISMA flowchart (Figure 2.1) summarises the literature search findings.

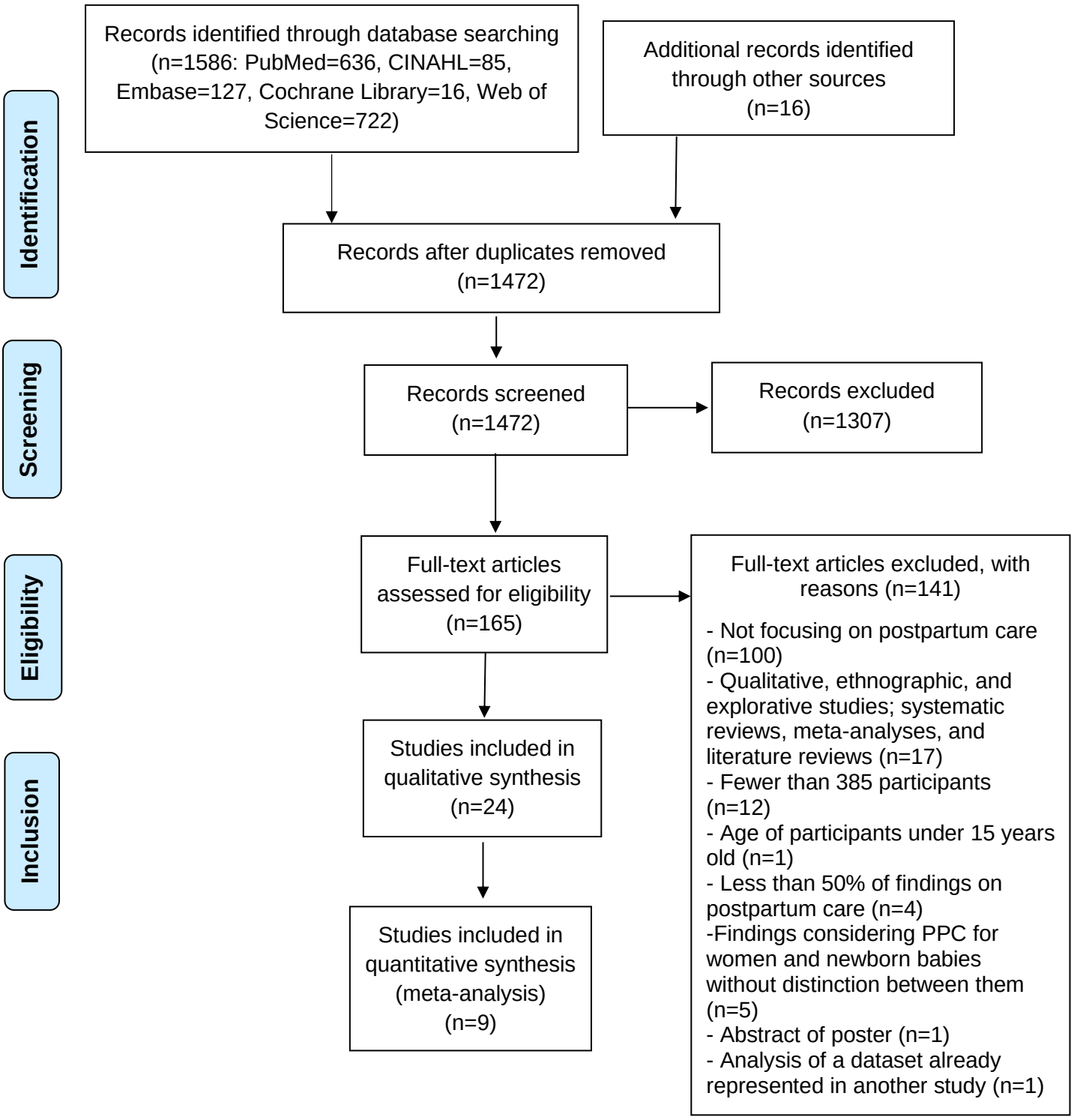


Figure 2. 1. PRISMA diagram of the study selection process.

Using the search strategy described in Table 2.2, 1602 records were retrieved. After the removal of 130 duplicates, 1472 records were screened according to their title and abstract independently by the student and one of the supervisors. Interrater agreement (κ=0.75) was deemed satisfactory (Viera and Garrett, 2005). Of those, 1307 were excluded (see Figure 2.1), which led to 165 articles being read entirely to assess their eligibility. At this stage, 141 records were excluded for several reasons as displayed in Figure 2.1, among them, five articles presented their results without distinction between the effects of determinants on PPC utilisation for women and postnatal care utilisation for newborn babies. One article was excluded to avoid duplication of participants in the systematic review since it analysed the same source of data (2016 Ethiopian Demographic Health Survey) as another article but included fewer women. In fact, one exclusion criterion distinguished these two articles, namely the period when participants gave birth prior to the survey, which was about two years in the excluded study, whereas the other selected study included women five years prior to the survey. Altogether, 24 articles were included in the systematic review.

Table 2.4 presents the results of the quality assessment. The assessment of the quality of studies resulted from collective decisions with a satisfactory level of agreement between assessors at (κ=0.78), (Viera and Garrett, 2005). Overall, 20 studies were appraised as being of good quality, four of moderate quality and none of weak quality.

Table 2.4. Quality assessment of studies included in the systematic review with the Johanna Briggs Institute checklist for cross-sectional studies.

		Q1	**Q2**	**Q3**	**Q5**	**Q6**	**Q7**	**Q8**	**Overall rating**	
Study label	First author's name	Clear definition of inclusion criteria	Detailed description of study subjects and the setting	Valid and reliable way of measurement of the exposure	Identification of confounding factors	statement of strategy to deal with confounding factors	Valid and reliable way of measurement of the outcome	Use of appropriate statistical analysis	Number of questions rated 2	Quality of study
1	Abota	2	2	2	2	2	2	2	7	Good
2	Akibu	2	2	2	2	1	2	2	6	Good
3	Angore	2	2	2	2	2	2	1	6.5	Good
4	Berhe	2	2	1	2	2	1	2	5	Moderate
5	Darega	2	2	1	2	2	1	2	6	Good
6	Malede	2	2	2	2	2	2	2	7	Good
7	Tesfaye	2	2	2	2	2	2	2	7	Good
8	Wudineh	2	2	2	2	2	2	2	7	Good
9	Mohan	2	2	2	2	2	2	2	7	Good
10	Laisser	2	2	1	2	2	1	2	5	Moderate
11	Khaki	2	2	2	2	2	2	2	7	Good
12	Machira	2	2	2	2	2	2	2	6.5	Good
13	Chungu	2	2	2	2	2	2	2	7	Good
14	Izudi	2	2	1	2	2	1	2	6	Good
15	Ononokpono	2	2	2	2	2	2	2	7	Good
16	Sakeah	2	2	1	2	2	1	2	4.5	Moderate
17	Ndugga	2	2	2	2	2	2	2	7	Good
18	Rwabufigiri	2	2	2	2	2	2	2	7	Good
19a-e	Solanke	2	2	2	2	2	2	2	7	Good
20	Benova	2	2	2	2	2	2	2	7	Good
21	Khanal	1	2	2	2	2	2	2	6	Good
22	Neupane	2	2	2	2	2	2	2	7	Good
23	Mon	2	2	2	2	2	2	2	7	Good
24	Siriwardhana	2	2	2	2	1	2	1	5	Moderate

In the article by Solanke et al. (2018), the authors analysed the Demographic and Health Surveys (DHS) of five West African countries (Côte-d'Ivoire, Guinea, Liberia, Niger, Sierra Leone) and reported the findings for each country separately (label 19a-e in Table 2.4). Therefore, from the 24 selected sources of data, 28 studies were considered for data extraction. For greater clarity and fluency of reading, these studies were numbered in Table 2.5 and will be referenced by number for the remainder of the chapter.

2.3.2. Evidence synthesis

2.3.2. 1. Overall characteristics of studies

As shown in Table 2.5, the included studies were carried out in LMIC with four in Asia (Nepal, Myanmar, Sri Lanka) and 20 in Africa. Studies in the African setting included predominantly Ethiopia (9 articles); the others were based in Tanzania, Malawi, Zambia, Soudan, Nigeria, Ghana, Uganda, Rwanda. Moreover, one study (Benova et al., 2019a) aggregated the results of 33 sub-Saharan countries. Although there are studies on PPC uptake in other LMIC (e.g. Bangladesh, Brazil, Indonesia), they were not included in this systematic review because they did not satisfy the inclusion criteria.

Table 2.5. Label and key characteristics of included studies.

Study label	Authors and year of publication	Setting	Study design	Source of data
1	(Abota and Atenafu, 2018)	Southwest Ethiopia	Community-based cross-sectional study	Questionnaire
2	(Akibu et al., 2018)	Northeast Ethiopia - Debre Town	Community-based cross-sectional study	Questionnaire
3	(Angore et al., 2018)	Northeast Ethiopia - Debre Town	Community-based cross-sectional study	Questionnaire
4	(Berhe et al., 2019)	Northern Ethiopia - Tigray area	Community-based cross-sectional study	Questionnaire
5	(Darega et al., 2016)	South and West Ethiopia	Community-based cross-sectional study	Questionnaire
6	(Malede Mequanent et al., 2019)	Ethiopia	Population-based cross-sectional study	DHS 2016
7	(Tesfaye et al., 2019)	Eastern Ethiopia	Community-based cross-sectional study	Questionnaire
8	(Wudineh et al., 2018)	Northwest Ethiopia	Community-based cross-sectional study	Questionnaire
9	(Mohan et al., 2015)	Eastern Tanzania	Community-based cross-sectional study	Questionnaire
10	(Laisser et al., 2019)	Northern Tanzania	Community-based cross-sectional study	Checklist

11	(Khaki and Sithole, 2019)	Malawi	Population-based cross-sectional study	DHS 2015/2016
12	(Machira and Palamulen, 2017)	Malawi	Population-based cross-sectional study	DHS 2010
13	(Chungu et al., 2018)	Zambia	Population-based cross-sectional study	DHS 2013/2014
14	(Izudi et al., 2017a)	South Sudan	Community-based cross-sectional study	Questionnaire
15	(Ononokpono et al., 2014)	Nigeria	Population-based cross-sectional study	DHS 2008
16	(Sakeah et al., 2018)	Upper east and northern Ghana	Community-based cross-sectional study	Questionnaire
17	(Ndugga et al., 2020)	Uganda	Population-based cross-sectional study	DHS 2016
18	(Rwabufigiri et al., 2016)	Rwanda	Population-based cross-sectional study	DHS 2010
19a	(Solanke et al., 2018a)	Côte d'Ivoire	Population-based cross-sectional study	DHS 2012
19b	(Solanke et al., 2018)	Guinea	Population-based cross-sectional study	DHS 2012
19c	(Solanke et al., 2018)	Liberia	Population-based cross-sectional study	DHS 2013
19d	(Solanke et al., 2018)	Niger	Population-based cross-sectional study	DHS 2012
19e	(Solanke et al., 2018)	Sierra Leone	Population-based cross-sectional study	DHS 2013
20	(Benova et al., 2019a)	33 sub-Saharan countries	Population-based cross-sectional study	DHS 2016
21	(Khanal et al., 2014)	Nepal	Population-based cross-sectional study	DHS 2011
22	(Neupane and Doku, 2013)	Nepal	Population-based cross-sectional study	DHS 2006
23	(Mon et al., 2018)	West Myanmar	Community-based cross-sectional study	Questionnaire
24	(Siriwardhana et al., 2019)	Sri Lanka	Population-based cross-sectional study	DHS 2006/2007

Caption: DHS: Demographic and Health Survey

A cross-sectional design was used in all studies. Out of 28, 16 were secondary data analyses of the Demographic Health Surveys, which is a nationally representative household survey used in LMIC (United-States Agency International Development, 2021). The 12 other selected studies used a community-based design with independent questionnaires as the source of data, except for study 10 where the authors analysed a validated and structured checklist of secondary data from health records.

Since the data were retrospectively self-reported and to minimise recall bias, the common inclusion criterion to all studies was the date of the last delivery, which ranged

from six months to five years preceding data collection. However, eligible women were excluded in studies 2 and 11 if they had experienced miscarriage or stillbirths. In studies 17, 19a to 19e, women were excluded if they had health-facility based delivery and caesarean because the authors considered that they were more likely to get PPC visits before being discharged. In studies 3 and 7, women who took part in the survey whilst still being within the postpartum period were excluded because they could, theoretically, still receive PPC visits after data collection. Finally, in studies 8 and 23, women with communication issues due to mental and physical illness were excluded. Altogether, the review is based on 241,887 women who answered the questionnaires.

The data extraction form, in Table 2.6, encompasses the relevant evidence from the first eight included studies, the rest of the data extraction form is available in Appendix 2.1.

Common limitations reported by the study authors included:

- The impossibility of determining the causality between PPC uptake and the determinants due to the cross-sectional design of all studies.
- The retrospective nature of data collection that could lead to recall bias.
- The non-generalisation of findings from community-based studies because their samples were not representative of the country where they were conducted, thus not generalisable to LMIC.

Table 2.6. Data extraction table of studies included in the systematic review, indicating specific inclusion and exclusion criteria, a description of the participants, and the main findings. Each measure of association was reported with its 95% confidence interval.

Author-year- study label- Inclusion/Exclusion criteria	**Population of study**	**Prevalence of PPC uptake**	**Facilitators**	**Barriers**
(Abota and Atenafu, 2018) **(1)** Inclusion criteria: all childbearing married women who had given birth at least once in the past two years preceding the survey.	**765 participants.** Women without formal education (40%) Unemployed women (73.2%) Women's husband with primary education (42.5%) Women having heard about PPC by HP in HF (89.3%), but 5.7% of them did not know of the benefit of PPC and 76.6% knew most common PPM	**PPC uptake: 51.2%** with 17.1% of women who had 3 or more check-ups within 6 weeks and 82.9% who had less than 3 PPC. - 98.4% of women will use PPC in the future, but 1.6% would not because of mistreatment, partner disapproval and economic issues	-Traditional and Catholic religion (AOR=6.1(1.7-21.5)- compared to Protestantism) -Maternal aged 20-24 during the first pregnancy (AOR=1.7 (1.2-2.5), -Knowledge of PPM (AOR=8.7; 95%CI:5.6-13.4) -ANC visits even if less than 4 visits (AOR=2.2 (1.1-4.6)	-working as farmers (AOR=0.3 (0.2-0.7)- compared to being housewives, -Semi-urban (AOR=0.3 (0.2-0.5)) and rural (AOR=0.2 (0.1-0.4)) compared to urban women. - lack of information about (86.3%) even if the majority of women had an appointment 6 weeks after delivery for family planning, - mistreatment by HP, - waiting time at HF, - partner disapproval and - forgotten appointments (11%).
(Akibu et al., 2018) **2** Inclusion criteria: women who have given birth within the last ten months preceding the survey.	**Population of study:** - **510 participants** -Aged 25-29 (31.6%), -89.4% were married -Orthodox religion (72.5%) - 26.9% of women with at least secondary level	**28.4% of participants received 3 PPC check-ups** within six weeks of delivery and 71.6% had two or less PPC visit(s)	**Facilitator determinants:** - Caesarean delivery (AOR=5.7 (3.9-19), - Primiparity (AOR=2.5 (1.4 -14.2), compared to multiparity	**Barrier determinants:** - Among women who had ANC visits, 58.4% did not receive counselling about PPC, 18.4% of these women initially had information about PPC service from different sources

Exclusion criteria: women admitted to health facility for much of the postpartum period, those who gave birth more than ten months ago prior, and women with stillbirths.	education and 21.4% are not graded but literate -Housewives (49.4%), government employee (22.4%), self-employee (19.6%) -Women's partner with higher education level (34.3%) - Primiparous (56.7%) and multiparous (29.2%)		- Women with higher level of education (AOR=3.2 (1.1, 9.2), compared to illiteracy	- 76.3% of women suggested that there was a social and cultural norm called “Seclusion” which forbids them from leaving the home after delivery (hence accessing PPC). 49.1% of these women considered this event more important and valuable than any outdoor visit. - Reasons for not complying with PPC recommendation: feeling healthy (48.8%), unaware of PPC importance (33.9%), long waiting time to get PPC (15.6%), social reasons (23%)
(Angore et al., 2018) **3** Inclusion criteria: Women aged 15-49 who gave birth 6 weeks-12months prior data collection Exclusion criteria: Women who gave birth < 6 weeks prior data collection	**Population of study:** -**390 participants.** Women mean age=28.65 -Christian Orthodox 90.6% - Women’s with at least primary school (41.5%) - Housewives (50.3%) - Young primiparous (< 18 years old) (5.9%) - HF-based delivery (90.8%) - knowledge of PPC (87.4%)	-**83.8% utilised PPC service** in the last 1 year with **36.7% who had at least 3 PPC follow-ups** - Among those who had PPC, 69.4% delivered at home; conversely, 89.3% of women who did not get PPC delivered at a HF - 94.4% of the women who used PPC had heard about it, against 5.6% of the women who did not used PPC)	**Facilitator determinants of PPC uptake not reported.** Suggestions of participants to improve PPC service: close distance to HF, sufficient transport service, well-trained HW, family support.	**Barrier determinants:** -Single marital status (AOR=0.06 (0.01-0.45)) - No awareness of PPC (AOR=0.03 (0.00-0.44)), compared to those who were aware - Family ignorance regarding PPC (15.1%), distance from health facility (8.5%), means of transport (5.9%), not getting a female attendant (1.8%)

	-84.6% of women responded the PPC service was easy to get	-89% of women who used PPC lived < 2 km from HF, whereas 38% of those who did not use PPC lived more than 2 km away, - 89% of women who used PPC had attended to ANC visits whereas 10.6% of those who did not used PPC		
(Berhe et al., 2019) **4** Inclusion criteria: women from 18 to 49 years old, who gave birth in HF or at home in the previous six months.	- **1646 participants.** 80.2% were 20-34 years old, -62.1% were from poor households, - 86.1% were rural dwellers - 84.8% were married - 31.8% reported no formal education, 39% completed primary school, 22.6% secondary school and 6.6% higher education	**8% received PPC check-up.**	**Facilitator determinants:** - Living in an urban area (AOR=1.96 (1.07-3.59)) - Women's higher educational status (AOR=3.60 (1.32-9.83)) - More than 3 ANC visits (AOR=4.84 (1.57-14.9)) - Wanted pregnancy (AOR=6.47 (2.04-20.5)) - Caesarean delivery (AOR=2.88 (1.32-6.29) - Awareness of PPC benefits (AOR=5.49 (3.06-9.83)) - Exposure to mass media (AOR=2.17 (1.21-3.88))	**Barrier determinants** were reported by 62.9% of women who did not use it. Most common reasons were no awareness of PPC importance omitted by HW, disrespectful maternity care staff (being examined roughly, being shouted at or ignored), cultural beliefs (seclusion for 12 to 45 days after birth performed by 43% of women)
(Darega et al., 2016) **5**	- **703 participants**	**83.8% had utilised PPC service**.	**Facilitator determinants:**	**Barrier determinants**: no significant findings were reported.

Inclusion criteria: - Women who gave birth the last year prior data collection - Had to live in one of the 42 rural sub-districts.	-Protestant Christians (74.7%), Orthodox (17.4%) -Married (96.9%) -Women without formal education (45%) -87.4% of women had heard about PPC services, -Facility-based delivery (14.4.8%) -Home-based delivery (85.6%): 35% of home deliveries attended by mother-in-law, 22.9% by own mother, 18.1% by friends/relatives, 8.5% were attended by HP	**36.7% had at least 3 PPC follow-ups.**	- Women's autonomy: women making the decision on their own (AOR=2.32 (1.83-6,52)) -Distance from HF less than 5 km (AOR=2.32 (1.56–3.46)) -Delivering in HF (AOR=1.85 (1.10-3.12)). -ANC visits (AOR=4.96 (2.51-9.80))	
(Malede Mequanent et al., 2019) **6** Inclusion criteria: any women of childbearing age that gave birth in the last 5 years preceding the survey	**- 7193 participants** - Mean age of 29.3 years (SD ±6.9) - Rural women (87.2%) - 63.1% of the respondents had no education - About one-third of women lived in poor households	**The prevalence of PPC uptake was 6.9%.** Among women who used PPC 12.1% lived in urban and 5.5% in rural areas. The prevalence of PPC was 10.5% among women with at least four ANC visits, 9.1% among women who delivered in HF, 15.4% among women who achieved secondary or higher educational level, and 11.8% among women	**Facilitator determinants:** -Women aged 35-49 years old (AOR: 1.75 (1.01-3.04)), compared to women younger than 19 years. -PPC uptake also increased with the number of ANC visits of women: -> 1 to 3 ANC visits (OR=2.37 (1.71-3.29)) compared to 0 ANC visit.	**Barrier determinants:** - Women without formal education (AOR=0.55 (0.37-0.84)), compared to those with a higher level - Living in a poor household (AOR=0.55 (0.39- 0.78)), compared to a rich household

		who belonged to the richest households.	-> 4 ANC visits (AOR: 3.43 (2.47-4.76)), compared to 0 visits	
(Tesfaye et al., 2019) **7** Inclusion criteria: women aged 15-49 years, with at least one birth in the three years preceding the survey and who resided in the district for at least six months prior to the study. Exclusion criteria: women who had a miscarriage, were critically ill and physically or mentally disabled at the time of the survey and women who had not completed the six weeks check after their most recent birth to fully ascertain whether they received PPC or not.	**Population of study:** **- 1206 participants** - Mean age of 27.4 (±6.1) years - Rural dwellers (86.3%) - Married (98.6%) - Muslim (96.9%) - Housewives (96%) - Women's partner with employment (89.1%) - Women without formal education (72.7%) - Women's partner education: without formal education (49.5%), and primary level (20.5%) -No access to mass media (65%) -Unwanted pregnancy (29.5%)	**7.6% of women received PPC.** Out of these, 12% received an EPPC and 72.8% had LPPC -Frequency of PPC visits: among women who attended PPC at least once (7.6%), 54.3% of them attended only once, 20.7% had two PPC visits, 18.5% had three and 6.5% more than three -54.3% of the women received PPC at public HF - 67.4% of PPC provided by nurses/midwives. -30.4% of women used PPC because they felt ill	**Facilitator determinants:** -Women who received education about maternal health (AOR, 2.32 (1.38-3.89)), compared to those who never received maternal health education. -87% of women who received ANC visits and delivery care used PPC -73.2% of women with previous experience of PPC used PPC again for their subsequent, and most recent birth	**Barrier determinants:** Women with low autonomy (whose household was headed by partner or parents) (AOR=0.24 (0.07-0.81)), compared to women whose household was headed by themselves. Women who had not experienced PPM (AOR=0.10 (0.05-0.20)) compared to those who had previous experience of PPM

(Wudineh et al., 2018) **8** Inclusion criteria: childbearing women who gave birth in the past year preceding the data collection period. Exclusion criteria: Women who lived for less than six months in the study area at the time of interview and who had communication problems.	**Population of study:** **- 588 participants** - age group 20–29:56.1% - 88.6% of women were married - 95.9% of women were Orthodox Christian - 17.3% of women were illiterate and 44.2% of them attend secondary school and above - 90% of women had either a TV and/or Radio in their houses - 57.3% of women's partner attended secondary school/above, and 45.7% of respondents' husband were government employees	**57.5% of women used PPC.** **Regarding to the number of PPC visits:** **- 1 PPC (67.5%),** **- 2 PPC (18.6%),** **- 3 or more PPC (13.9%).** **Proportion of PPC visit within 24 h of birth:** **- (30.5%), at 3–7 days** **- (30.8%) and at six weeks postpartum (47.9%).**	**Facilitator determinants:** - Women with secondary school level and above (AOR = 3.29 (1.94–5.57)) compared to illiterate women. - Women from richest households (AOR = 2.85 (1.21–6.68)) compared women from poorest households. - Wanted pregnancy (AOR = 3.96 (1.72–9.01)) compared to unwanted pregnancy. - Health-facility based delivery (AOR = 3.08 (1.24–7.68)) compared to home-based delivery.	**Barrier determinants:** - Feeling healthy (for 45.2%) - Lack of awareness about PPC service (26.8%) - Negative attitude from healthcare providers (11.2%) - Not receiving information and appointment (10.8%) - Being too busy to attend (6%)

Caption: HF: Health facilities - HP: Health professionals - SBA: Skilled birth attendant - PPM: Postpartum morbidity

ANC: Antenatal care – AOR: Adjusted Odds Ratios

A. Sociodemographic characteristics of participants

The key sociodemographic characteristics included age, employment, education, socioeconomic status, women's autonomy in making decision for their health and within their household, religion, and marital status.

Most of the participants were aged between 20 and 34 years old (studies 2, 8, 13, 14, 18, 21-23). In general, women's level of education was low because they did not get formal education (studies 1, 2, 5-7, 15, 19a-19e, 22). Those who went to school achieved primary level (studies 3, 4, 11, 17, 18), but completing the secondary level of education was rare, except in Sri Lanka (85.6%) (study 24).

Access to employment for women was heterogeneous with, on one hand, a majority of employed women in Côte d'Ivoire (71%), Guinea (83%), Liberia (58%) and Sierra Leone (80%) (studies 19a-19c, 19e), and on the other hand a predominance of unemployed housewives in Ethiopia and Niger, with a prevalence ranging from 49% to 96% (studies 1-3, 7, 22).

Women's autonomy was defined as women's ability to make decision about their own health, and some studies also considered the power of decision-making within their household. In study 11, healthcare decisions of Malawian women were solely taken by women (18%), women and their partners (47%), and other people including partners (34%). According to studies 19a-19e, high autonomy signified that women took their decisions alone or jointly with their partner or husband, whereas a low level of autonomy implied that women were not involved in decisions regarding their health, which were taken by their partner or other people. For example, 70% of women in Liberia and 60% in Sierra Leone had a high level of autonomy (studies 19c and 19e), whereas 58% of Nigerian women had a low level of autonomy regarding their health decisions (study 15).

In summary, women were on average aged between 20 to 34 years old, married or in a partnership. Many women did not attend formal education or only reached the primary level of education, and most had a low level of autonomy to make decisions. Finally, some were employed, while others were housewives.

B. Environmental characteristics of participants

The environmental determinants included the place of residence, the distance from a health facility and the exposure to mass media.

From Niger (92%) to Ethiopia (86%) by way of Nepal (76%) and Sri Lanka (72%), the place of residence of women was essentially rural in the majority of studies: 15 studies (studies 19d, 4, 22, 24). Four studies (9, 10, 23, 16) focused solely on rural participants. In contrast, study 1's participants were in majority urban but only just (52%) and studies 3 and 8 included only urban women.

Although the distance from health facilities could prevent women from using PPC, it was not considered to be a challenge to get medical help by 69% of Rwandan women of study 18. Similarly, around half of women from Côte-d'Ivoire, Liberia, Niger and Sierra Leone lived in communities with a high proportion of women who perceived that distance to health facility was not a barrier in using healthcare (studies 19a, 19c-19e). However, the authors did not indicate which type of health facility (public hospital, dispensary, private clinics) was considered.

Exposure to mass media (e.g. radio, television, newspapers) was an interesting determinant as it plays an important role in reproductive health promotion (Naugle and Hornik, 2014). For example, in Uganda, study 17 reported that 67% of women had been exposed to family planning messages via radio, television, or newspapers. Nonetheless, access to mass media was not available to general people in some countries. For instance, in studies 20 and 24, half of the women who lived in Côte d'Ivoire and Sierra Leone did not have access to mass media.

In summary, the place of residence was mainly rural among participants. There was no clear trend about the perception of the distance from health facilities as a barrier of PPC uptake, therefore it varied depending on the country. Similarly, the distribution of exposure to mass media varied depending on the country.

C. Obstetric characteristics of participants

Regarding obstetric characteristics, several were reported, including whether the pregnancy was wanted, parity, antenatal care (ANC) visits, place and mode of delivery, presence of skilled-birth attendant, and knowledge of importance of PPC and dangers of pregnancy.

Most of women were primiparous (57% out of 510 women) in study 2, but multiparous women (having between two to four children) represented 57% (out of 385 women) of the sample in study 14. A child was wanted by 67% of Ethiopian women (study 8), and 59.4% of Rwandan women (study 18).

In LMIC, the number of ANC visits increased significantly since 2011 in order to follow the WHO recommendation (Tikmani et al., 2019). Indeed, among the included studies, a high proportion of women had at least four ANC visits, especially in Sierra Leone (71.5%), Liberia (67%) and Ghana (87%) (studies 19e, 19c, 16 – all conducted since 2011). However, this could be lower, as seen in Côte d'Ivoire, Niger, and Rwanda where, respectively, only 23.6%, 28% and 41.2% of women received at least four ANC visits (studies 19a, 19d, 18).

Generally, women included in this review delivered through vaginal delivery, but caesarean section represented 10% of delivery in Malawi (study 11) and up to 18% in northeast Ethiopia (study 2). During deliveries, women were accompanied by traditional midwives (in case of home-based vaginal delivery only) or a skilled birth attendant (doctors, nurses, midwives). In the past decade, skilled birth deliveries have been more frequent in LMIC, such as in Nepal where they represented 23% of deliveries in 2006 (study 22) and reached 45.2% in 2011 (study 21). Consequently, home-based deliveries diminished by 19.1% between 2006 (79.5%, study 22) and 2011 (60.4%, study 21). Nevertheless, in southern and western Ethiopia, study 5 found that 85.6% of women chose to give birth at home because they had a previous good home delivery experience (43.4%) and they wanted to be close to their relatives (28%). Indeed, 35% of them were assisted by their mother-in-law, 23% by their mother, and 18% by friends or relatives. Their choice was also motivated by a perception of the quality of health facilities' services as poor (12.6%) and non-regular opening hours of health facilities (8.7%). On the other hand, in this same study, 15% of participants delivered at health facilities since they had a previous bad home delivery experience (43.4%), struggled during labour (28.7%) or wanted better services (22.8%). Finally, when asked about the place of delivery they would choose if they got pregnant in the future, 79% of them would prefer to attend in a health facility.

Another obstetric characteristic of interest was awareness of PPC services, which was widely spread in Ethiopia, Sudan and Nepal. Ethiopian women were aware of PPC

importance (89.3% in study 1 and 87.4% in study 3) principally by health professionals (72%), or through mass media (15.8%) or by their family and relatives (9.8%). Likewise, the dangers of the postpartum period were known by 76.6% (study 1) and 86.4% (study 3) of women, especially the risks of haemorrhage (93%) and death (36.5%).

In summary, most women in the studies included in this review desired their pregnancy. Pregnancy monitoring with at least four ANC visits was widely achieved in the majority of countries but not others. The places of delivery were diverse (home, public or private health facilities) and chosen according to several criteria such as previous delivery experience. The assistance of a skilled birth attendant increased during the past decade, as well as the number of caesarean sections, but vaginal deliveries remained the main method of delivery. Finally, the awareness of PPC and its importance was known in Ethiopia, Sudan, and Nepal, but less so in other countries.

2.3.2. 2. The extent of postpartum care utilisation

The proportions of PPC utilisation by study, displayed in Table 2.7, was extracted from almost all studies and calculated for the others by dividing women who used PPC by the total number of participants. To get the extent of PPC utilisation by country, continent and in total (all studies), proportions were weighted based on the sample size, as it has been done in study 20 which gather 33 countries.

Table 2.7. Weighted prevalence of postpartum care utilisation in low-and-middle-income countries.

Setting	Study label	Number of participants (N)	Women who used PPC (n)	PPC use by study (%)	PPC use by country (%)	PPC use in total (%)
Ethiopia	1	765	392	51.2	16.5	**55.4**
	2	510	145	28.4		
	3	390	327	83.8		
	4	1646	132	8		
	5	703	223	31.7		
	6	7193	496	6.9		
	7	1206	92	7.6		
	8	588	338	57.5		
Tanzania	9	1931	448	23.2	33.3	
	10	2648	1075	40.6		
Malawi	11	6693	3239	48.4	50.1	
	12	13776	7012	50.9		
Zambia	13	5074	3197	63.0	63.0	
Sudan	14	385	44	11.4	11.4	
Nigeria	15	17846	5925	33.2	33.2	

Ghana	16	650	403	62.0	62.0	
Uganda	17	5471	2736	50.0	50	
Rwanda	18	2748	352	12.8	12.8	
Cote d'Ivoire	19a	2125	1258	59.2	59.2	
Guinea	19b	2908	643	22.1	22.1	
Liberia	19c	1905	953	50.0	50	
Niger	19d	5660	1381	24.4	24.4	
Sierra Leonne	19e	3754	2249	59.9	59.9	
33 Sub-Saharan countries	20	137218	91387	66.6	66.6	
Nepal	21	4079	1762	43.2	34.8	
	22	4136	1096	26.5		
Myanmar	23	500	126	25.2	25.2	
Sri Lanka	24	4890	4039	82.6	82.6	

Overall, the prevalence of PPC utilisation (whether one or more visit) reached 55.4% in LMIC. Out of all studies (see Table 2.7), the extent of PPC utilisation ranged between 6.9% (study 6) and 83.8% in Ethiopia (study 3).

Only four community-based studies investigated full-PPC uptake of three (former guidance) or four visits as recommended by the WHO. The frequency of PPC was not evidenced in DHS surveys. The proportions of full (4 visits) PPC uptake varied depending on the country, with a difference of 36.8% between Myanmar with a rate of 25.2% (study 23) and Ghana with 62% reported in study 16.

The variations of full PPC uptake prevalence were also observed within countries, such as in Ethiopia of which the southwest region reported 8.8% of full PPC uptake according to study 1, whereas the northwest achieved 28.4% as reported in study 2.

Eleven studies (studies 12-14, 17, 19a-21) analysed the use of early PPC (EPPC) within 48 hours after birth; the observed prevalence ranged from 11.4% in study 11 in Sudan to 66.6% in 33 sub-Saharan countries where birth took place in a health facility. In contrast, 13 studies (studies 1,2,6,7,9,11,15,16,19a-19e, 21-24) focused on PPC uptake within six weeks after delivery (LPPC) with a prevalence that varied from 6.9% (study 6) to 83.8% (study 3).

After the presentation of the profile of women included in the systematic review and the synthesis of PPC utilisation rates, the following section presents the determinants of interest associated with PPC uptake in LMIC.

2.3.2. 3. Associations between determinants and PPC uptake

A. Sociodemographic determinants

The positive and negative influence of sociodemographic determinants on PPC uptake is summarised in Table 2.8 and detailed below.

Table 2.8. Sociodemographic barriers and facilitators to PPC uptake

Sociodemographic determinants	Effects on PPC uptake	References (studies)
Education	Facilitator: primary, secondary, higher education level Facilitator: living in communities with high proportion of women with secondary instruction level Barrier: no formal education	2, 4, 8, 9,14-17,12,19a-23 15, 19a-19e 6, 12
Women's employment status	Facilitator: employed women compared to housewives Barrier: employed compared to unemployed Barrier: unemployed compared to farmers	11, 15, 19c, 19d 19e 17
Age	Facilitator: over 20 years old compared to 15-19 Barrier: over 20 years old compared to 15-19	1, 6, 11, 19a,19b,19d, 20 18
Marital status	Barrier: single status compared to married	3
Socioeconomic status	Facilitator: poorer, middle, richer, richest households compared to poorest Barrier: poorer, middle, richer, richest households compared to poorest reference Barrier: poverty, in poorest households compared to richest Barrier: living in communities with high proportion of poor households	8, 13, 15, 18-19c, 19e-22 11, 17 6 19a, 19c-19e
Women's autonomy	Facilitator: high autonomy, women making health decisions on their own or jointly with their partner Facilitator: women making decisions on their own compared to those deciding jointly with their partner Facilitator: receiving support from partner Barrier: household headed by their partner or in-laws	19b, 19e 5 27 7
Women's partner education	Facilitator: partner with secondary level compared to no formal education	19c, 19e
Religion	Facilitator: Catholic and traditional religions compared to Protestantism Barrier: Christian and traditional religions compared to Islam	1 15
Cultural beliefs	Barrier: not getting out of home between 7 to 45 days after birth (Seclusion practice)	2, 4, 23

- **Socioeconomic status**

Women's socioeconomic (SES) status was significantly positively associated with PPC utilisation when they belonged to the poorer, middle, richer, and richest quintiles (studies 8,13,15,19a-22) compared to the poorest (Table 2.8; socioeconomic status). For example, in Nepal, study 22 compared the poorest quintile to women who lived in the poorer, middle, richer, and richest households and found a 58% (AOR=1.58, 95% CI:1.06-2.35), 69% (AOR=1.69, 95% CI:1.13-2.53), 149% (AOR=2.49, 95% CI:1.68-

3.71), and 157% (AOR=2.57, 95% CI:1.59-4.15) increase in PPC uptake, respectively. Hence, the higher the SES status, the greater the likelihood of using PPC. Although this observation was reported by 11 studies, two studies showed the opposite association, meaning that in comparison with the poorest quintile, Malawian women within the richest households (AOR=0.71, 95% CI:0.53-0.98, in study 11) were less likely to use PPC. Likewise, for those in poorer (AOR=0.76, 95% CI:0.59-0.97), middle (AOR=0.69, 95% CI:0.53-0.91), and richer (AOR=0.66, 95% CI:0.50-0.86) households in Uganda (study 17).

The negative influence of the poorest socioeconomic status on PPC uptake was also found at community levels with a decrease of PPC uptake likelihood between 43% (AOR=0.57, 95% CI:0.33-0.97) and 72% (AOR=0.28, 95% CI:0.15-0.53) among West Africa women living in communities with high proportion of poor households (studies 19a, 19c-19e).

In brief, besides the presence of mixed findings, the majority of included studies showed an increased gradient of PPC utilisation with increasing socioeconomic status. Therefore, living in poorest households was a barrier to PPC uptake and living in poorer, middle, richer, and the richest households was a facilitator.

- **Education**

Women's education, at primary, secondary or higher level, was a conclusive facilitator to uptake of PPC (cf. Table 2.8; education), as evidenced in 18 included studies (studies 2, 4, 8, 9, 12,14-17,19a-19e). Compared to no formal education, the likelihood of using PPC increased by between 34% (AOR=1.34, 95%CI: 1.09-1.65, in study 19a) and 116% (AOR=2.16, 95%CI:1.62-2.87, in study 15) for women with primary education. Women with secondary education level were 11% (AOR=1.11, 95%CI:1.04-1.17) to 400% (AOR=5.73, 95%CI:1.14-28.74) more likely to use PPC, in study 15.

At the community level, living in communities with a high proportion of women who have reached secondary school increased the PPC uptake likelihood by 139% (AOR=2.39, 95%CI:1.63-3.51) in Guinea, 60% in Côte d'Ivoire (AOR=1.60, 95%CI:1.04-2.47), 69% in Liberia (AOR=1.69, 95%CI:1.14-2.51), 82% in Niger (AOR=1.82, 95%CI:1.22-2.71), and 96% in Sierra Leone (AOR=1.96, 95%CI:1.13-

3.41) (studies 19a-19e), in comparison with living in communities with a low proportion of women with a secondary educational level.

In contrast to the 18 positive associations, study 12 reported that the likelihood of PPC uptake decreased by 9% (AOR=0.91, 95%CI:0.83-0.99) for women with a primary level of education compared to their counterpart without formal education.

Partner's level of education was also important. Study 19e indicated that women were 69% (AOR=1.69, 95%CI:1.23–2.34) more likely to receive PPC if their partner or husband achieved secondary school, compared to those living with a partner without formal education.

Ultimately, women with primary or higher education were more likely to use PPC than their counterparts without formal education. The education of the woman's partner was also a facilitator determinant of PPC utilisation.

- **Women's employment status**

The relationship between women's employment status and the uptake of PPC is summarised in Table 2.8. Being employed was significantly associated with a rise in the likelihood of using PPC of 25% (AOR=1.25, 95%CI:1.01-1.56), 32% (AOR=1.32, 95%CI:1.07-1.64), 44% (AOR=1.44, 95%CI:1.22-1.70), and 48% (AOR=1.48, 95%CI:1.24-1.76) in studies 11, 15, 19c and 19d.

However, an opposite finding was found in Sierra Leone (study 19e) where employed women were 27% (AOR=0.73, 95%CI:0.61-0.86) less likely to uptake PPC compared to unemployed counterparts.

Given that the later observation was an exception among the six studies reporting significant findings, it is possible to conclude that women's employment positively correlated with PPC utilisation.

- **Age and marital status**

The influence of women's age is reported in Table 2.8- Age. Seven studies (studies 1, 6, 11, 19, 20, 22, 24) found that women aged over 20 were between 8% (AOR=1.08, 95%CI:1.02-1.13) for 25-29 age group in study 20 to 86% (AOR=1.86, 95%CI:1.19-2.92) for the above 35 age group in study 11 more likely to uptake PPC than younger women. It was notable that only one study (18) showed the opposite association, meaning that in Rwanda, women aged over 20 were 49% (AOR=0.51, 95%CI:0.29-

0.87), 53% (AOR=0.47, 95%CI:0.27-0.83) and 68% (AOR=0.32, 95%CI:0.16-0.64) less likely to use PPC between 20 to 29, 30 to 39 and 40 to 49 years old respectively, than younger women aged under 20.

Regarding marital status, single women were almost all unlikely to use PPC (AOR=0.06, 95%CI:0.01-0.45) compared to married counterparts.

In conclusion, besides one counterintuitive finding, women aged over 20 years old were more likely to use PPC than their younger counterparts, whereas single marital status was a strong barrier to PPC utilisation.

- **Religion**

As seen in Table 2.8- Religion, few studies analysed the influence of religion. According to study 1, in Ethiopia, following Catholicism and traditional religions increased by 6.1 times (AOR=6.1, 95% CI:1.7-21.5) the likelihood of PPC utilisation, compared to following Protestantism. In contrast, in Nigeria, Christian women and those who had traditional and other beliefs were respectively 45% (AOR=0.55, 95% CI:0.41–0.74) and 72% (AOR=0.28, 95% CI:0.13-0.58) less likely to uptake PPC compared to Muslim women.

Therefore, one particular religion could be a facilitator or a barrier depending on the religion to which it was compared. Thus, the data were inconclusive on the influence of religion in the uptake of PPC.

- **Women's autonomy**

Women with high decisional autonomy, (i.e., to decide by themselves or jointly with their partner on PPC uptake), had a 28% (AOR=1.28, 95% CI:1.09-1.52) and 38% (AOR=1.38, 95% CI:1.14-1.66) higher likelihood to use PPC, respectively, in Sierra Leone (study 19e) and Guinea (study 19b). Additionally, 8% of the participants in the study made their health decisions alone. Of those, 52% used PPC.

Moreover, study 7 observed that women who lived in households headed by a partner or parents were 76% less likely to receive PPC (AOR=0.24, 95% CI:0.07, 0.81). In Nigeria, 58% of women in study 15 were not involved in their health decisions, and among them, only 8% attended PPC follow-up.

Therefore, having autonomy to make their own health decisions for women was a facilitator of PPC utilisation. Nevertheless, the influence of women's partner and family

was also a crucial barrier to the uptake of PPC for women who had less autonomy in decision-making.

- **Cultural beliefs**

Social and cultural norms were identified as barrier exclusively in community-based studies, whereas studies using the DHS survey did not investigate maternal health from a cultural viewpoint. A cultural practice that consists of forbidding new mothers from leaving their home or mixing with people post-delivery was reported in studies 2, 4 and 23. This practice lasted for a variable length of time, depending on the country's social norms and cultures. Thus, in Ethiopia, this custom, called Seclusion, lasted between 12 to 45 days after delivery for 43% of women in the northern region of the country (study 4), and for 40 days in the northeast area (study 2), where 49.1% of women who adhered to the practice considered it to be more important and valuable than any outdoor visit. This practice also exists in Asia, particularly in Myanmar and lasts for seven days after delivery, as reported in study 23. In the latter, women who adhered to cultural beliefs were 88% (AOR=0.12, 95% CI:0.04-0.36) less likely to use the full-PPC (four visits) compared to those who did not.

To conclude on the influence of sociodemographic determinants, those that impeded the uptake of PPC were poverty, illiteracy, unemployment, single marital status, lack of autonomy in decision-making and some specific cultural beliefs such as seclusion.

B. Environmental determinants

The influence of three environmental determinants was analysed and is summarised in Table 2.9.

Table 2.9. Environmental barriers and facilitators to PPC uptake

Environmental determinants	Effect on postpartum care uptake	References (Study label)
Place of residence	Facilitator: urban areas Barrier: rural areas	4, 20, 5 1, 11, 13, 19b-19e
Distance from health facility	Facilitator: living in communities with a high proportion of women perceiving the distance from a health facility as not a problem Facilitator: less than 5 km distance Barrier: journey to health facility greater than 1 hour Barrier: distance perceived as a problem	19a, 19c-19e 5 14 12
Exposure to mass media	Facilitator: access to radio, television, and newspapers	4, 12, 17, 19a-19c, 19e

- **Place of residence**

Eight studies observed that living in rural areas significantly reduced the uptake of PPC as summarised in Table 2.9. The likelihood of PPC utilisation decreased by between 18% (AOR=0.82, 95 CI:0.71-0.95) in Sierra Leone (study 19e) and 80% (OR=0.2, 95% CI:0.1-0.4) in southwest Ethiopian communities (study 1) for women living in rural areas. Access to health facilities was perceived by women as a barrier to seeking PPC, in study 12. Consequently, their probability of getting PPC decreased by 13% (AOR=0.87, 95% CI:0.80-0.93) in rural areas and 25% (AOR=0.75, 95% CI:0.59-0.97) in urban locations.

At a community-based level, the same trend was observed in Ethiopia where urban dwellers were almost twice as likely as rural women to use PPC (AOR=1.96, 95% CI:1.07-3.59, study 5).

Moreover, according to study 20, the likelihood of receiving EPPC before discharge from the health facility increased by 8% (AOR=1.08, 95% CI:1.04-1.13) for urban residents of 33 LMIC, compared to their rural counterparts.

Therefore, urban places of residence favoured the utilisation of PPC, whereas rural areas challenged it. This demographic difference emphasised the difficulty in accessing healthcare, which exists in both settings.

- **Distance from health facilities**

Distance from health facilities was assessed by journey time to reach it or kilometres unit measures (Table 2.9- Distance from health facility). The distance from health establishments was found to be an indicator of non-uptake of PPC in several studies. For instance, in the Ethiopian community-based study (study 3), 89% of women who used PPC lived less than two kilometres from a health facility, whereas 38% of those who did not seek PPC lived more than two kilometres from a health facility.

This determinant was identified as a significant barrier to PPC uptake in rural settings when it takes more than one hour to reach the health facility. When this was the case, women were between 22% (AOR=0.78, 95% CI:0.70-0.86) in study 12 and 73% (AOR=0.27, 95% CI:0.09-0.78) in study 15 less likely to use PPC. In addition, in study 5, Ethiopian women who lived less than 5 km from a health facility were twice as likely to seek PPC than those living beyond 5 km (AOR=2.32, 95% CI:1.56-3.46).

Additionally, at the community level, living in communities with a high proportion of women who did not perceive the distance to the health facility as a barrier to healthcare significantly raised the uptake of PPC by 49% (OR=1.49, 95% CI:1.07-2.07) to 83% (OR=1.83, 95% CI:1.25-2.69) in West African countries (studies 19a,19c-19e).

To conclude, distance from the health facility under two kilometres facilitated the uptake of PPC. Moreover, a journey taking more than one hour to reach the health facility represented a barrier to seeking PPC for women living in a rural setting. Challenges to access health facilities existed in both urban and rural setting but were more predominant for rural women.

- **Exposure to mass media**

Finally, exposure to mass media was significantly associated with PPC uptake, as shown in studies 4, 12, 19a-19c, 19e (cf. Table 2.9-Exposure to media). In Uganda (study 17), mass media were used to send messages to promote PPC uptake, and women who accessed mass media messages were 31% (AOR=1.31, 95% CI:1.13-1.52) more likely to attend PPC check-up than those who did not have access. In Malawi, study 12 showed that this determinant had a positive effect in urban areas only (OR=1.38, 95% CI:1.04-1.77), compared to rural settings.

In conclusion, among the three analysed environmental factors, the exposure to mass media, urban settings and a short distance (i.e. under two kilometres or less than one hour) from health facilities facilitated the uptake of PPC. Environmental obstacles were rural places of residence and difficulty of accessing health facilities for rural women.

C. Obstetric determinants

Several determinants related to obstetric care were analysed and their effects on PPC uptake are summarised in Table 2.10.

Table 2.10. Obstetric barriers and facilitators to PPC uptake

Obstetric determinants	Effect on postpartum care uptake	References (Study label)
Parity	Facilitator: primiparity (having 1 child) compared to multiparity (in particular more than five children)	2, 23
Feelings about the pregnancy	Facilitator: desired pregnancy Barrier: undesired pregnancy	4, 8 20
Antenatal care (ANC) visits	Facilitator: attendance to ANC visits compared to no attendance Facilitator: receiving at least 4 ANC visits	1, 3-5, 14, 16, 20, 21 6, 11, 12,17,19a,19b,19e

Mode of delivery	Facilitator: caesarean section compared to vaginal delivery Facilitator: complicated vaginal delivery with use of instruments compared to vaginal delivery	2, 4, 11, 12, 20 9, 14
Skilled birth attendant	Facilitator: Skilled birth attendant (SBA) compared to non-SBA (traditional midwives) Barrier: delivery without the assistance of healthcare professionals, compared to doctor attendance to delivery Barrier: nurses/midwives delivery attendance, compared to doctor's attendance	14 20 20
Place of delivery	Facilitator: health facility-based delivery (regardless of public/private governance) compared to home-based delivery Facilitator: compared to home-based delivery, private structures had higher likelihood of receiving PPC than public structures Facilitator: giving birth in a public health facility compared to a private health facility Facilitator: communities with high proportion of health facility-based deliveries Facilitator: lower-level facilities (dispensaries, health centres) compared to hospitals Barrier: Health facility-based delivery compared to home Barrier: lower-level facilities (dispensaries, health centres) compared to hospitals Barrier: access to health facility perceived as a problem Barrier: government health facility compared to private not for profit health facility	8,11, 18, 21, 17 9 13 17 15 10 20 12 14
Quality of care	Facilitator: friendliness of skilled birth attendant Facilitator: high trust in the health system on issues related to maternal health Barrier: mistreatment by healthcare professionals	14 9 1, 4, 8.
Awareness of PPC importance	Facilitator: awareness of PPC and knowledge of danger signs of postpartum complications Barrier: lack of knowledge of PPC importance among women and their family	4, 9, 14, 22, 23 1, 3

- **Parity**

The influence of parity, which refers to the number of live births per women, was analysed in two studies (Table 2.10- Parity). Study 23 showed that giving birth to their first child multiplied by three (AOR=3.26, 95% CI: 1.8-5.91) women's likelihood of using PPC compared to those who already had children. Moreover, women who had one child (primiparous) were 2.5 times more likely (AOR=2.5, 95% CI:1.4-14.2) to use three PPC follow-ups (within 24 hours of delivery, three to seven days after delivery, and seven to 14 days subsequently) than multiparous women who had more than five children (study 2).

In summary, women who were giving birth to their first child were more likely to seek PPC than multiparous counterparts.

- **Feeling about the pregnancy**

Three studies analysed the influence of the way women feel about their pregnancy on PPC uptake and the extent to which the pregnancy was desired or not (Table 2.10– Feelings about the pregnancy). For Ethiopian women who desired their pregnancy, the likelihood of using PPC increased significantly by 3.96 (AOR=3.96, 95%CI:1.72-9.01) in urban southwest communities (study 8) and by over 6 times (AOR=6.47, 95%CI:2.04-20.5) in the northern region (study 4), in comparison to PPC utilisation among women who did not want their pregnancy. Study 20 showed that women who considered their pregnancy as undesired and delivered in a health facility were 21% (AOR=0.79, 95%CI:0.74-0.85) less likely to receive PPC before discharge. Therefore, undesired pregnancy appeared to be a barrier to using PPC.

- **Antenatal care visits**

Among the obstetric factors that encouraged women to use PPC, attendance to ANC consultations during pregnancy was also significant. Fifteen studies (1, 3-6, 11, 12, 14, 16, 17, 19a-b-e, 20, 21) demonstrated the effect of ANC attendance on PPC uptake (Table 2.10-Antenatal care). The lowest association was reported by study 20, which reported that the likelihood of receiving EPPC before discharge from a health facility in 33 LMIC increased by 4% (AOR=1.04, 95% CI:1.03-1.05). A stronger association was found by study 16, in rural Ghana, where women who had at least four ANC consultations were over five times more likely (AOR=5.23, 95% CI:2.49-11.0) to get at least three PPC check-ups. The latest observation on ANC frequency (at least four visits) was also corroborated by other studies (cf. Table 2.10- Antenatal care). The positive influence of having four ANC consultations (compared to having fewer visits) was found with EPPC (within 48 hours) as well as LPPC within 6 weeks. For EPPC, women were between 20% (AOR=1.20, 95%CI:1.04-1.39, study 17) in Uganda to 740% (AOR=8.40, 95%CI:5.73-12.50, study 19a) more likely to use it in Côte d'Ivoire if they had had at least 4 ANC consultations. Additionally, the increased likelihood of PPC uptake within six weeks (LPPC) ranged from 20% (AOR=1.20, 95%CI:1.11-1.28, study 11) in Malawi to 262% (AOR=3.62, 95% CI:2.34-5.60, study 21) in Nepal.

Moreover, for rural women from Ghana (study 16), and Malawian areas (study 11), the ANC determinant also had a positive association on PPC utilisation (AOR=1.20, 95%

CI:1.11-1.28). This confirms that ANC consultations, and at least four, facilitated PPC within 48 hours (EPPC) or six weeks after birth (LPPC), even in rural areas.

- **Mode of delivery**

Regarding caesarean sections, these occurred only in health facilities because they are conducted in the event of complicated deliveries putting the woman's or her baby's life in danger. Seven studies (studies 2, 4, 9, 11, 12, 14, 20) evidenced that giving birth by caesarean was associated with higher PPC utilisation (Table 2.10- Mode of delivery). In comparison to vaginal delivery, women who delivered by caesarean were 88% (AOR=1.88, 95% CI:1.72-2.05) more likely to receive EPPC before discharge (study 20). For an extended period of six weeks after birth, the likelihood of PPC utilisation was increased by up to five times (AOR=5.70, 95% CI:3.9-19), as evidenced in study 2.

In case of complicated delivery, and before considering caesarean section, skilled birth attendants may also use instruments. This mode of delivery, called instrumental vaginal delivery, was also associated with PPC uptake among Sudanese women (study 15) who were 8% (OR=1.08, 95% CI:0.31-3.77) more likely to receive PPC than those with a straight vaginal delivery. Among the other participants of this study, those who had a caesarean were eight times more likely to get PPC (AOR=8.12, 95% CI:3.24-20.31) than those who had a straight vaginal delivery. Therefore, PPC utilisation was higher after a caesarean than an instrumented vaginal delivery.

- **Skilled birth attendant**

Two studies reported the influence of having a skilled birth attendant on PPC uptake as seen in Table 2.10 (Skilled birth attendance row) with an increase in likelihood to use PPC of more than six-fold (OR=6.74, 95% CI:3.28-13.85) for Sudanese women (study 14), compared to giving birth without skilled health professionals.

However, variations existed according to the type of healthcare professionals who attended the delivery and their relationship with the women. According to study 20, women assisted by nurses or midwives were 26% (AOR=0.74, 95% CI:0.69–0.78) less likely to receive EPPC before discharge, compared to those assisted by doctors. Furthermore, whenever healthcare professionals were perceived to be friendly, EPPC uptake was multiplied by five-fold (OR=5.61, 95% CI:2.53-12.43), in contrast to when they were perceived to be unfriendly.

In addition, three community-based Ethiopian studies pointed out that some women did not return to health facilities to seek PPC due to mistreatment by health professionals, namely they felt disrespected during maternity care (being examined roughly, being shouted at, or ignored). This represented 11%, 7.6% and 11.2% of respondents in studies 1, 4 and 8, respectively.

In brief, the presence of skilled birth attendants during delivery and their friendliness significantly encouraged women to use PPC.

- **Place of delivery**

In the 12 studies (8-15, 17, 18, 20, 21) that assessed the place of delivery determinant, health facilities were categorised according to the level of care provided (lower-level facilities such as dispensaries and health centres versus hospitals) or the administrative governance (public or governmental structures versus private health establishments managed by non-governmental organisations, faith-based or for-profit providers). Study 20 showed that the principal place of delivery in 33 LMIC was lower-level health institutions, where 46.9% of childbirths occurred. However, only 60.6% of women in question received a PPC check-up before being discharged. The second place of delivery with 34.4% was public hospitals of which 74.5% of women received PPC before discharge. Finally, the last option (18.7%) was private facilities where 67.5% of women received EPPC after their childbirth.

The place of delivery was a determinant that influenced the uptake of PPC according to nine studies (studies 4, 8, 10, 11, 13, 15, 17, 18, 21) (cf. Table 2.10- Place of delivery). For illustration, in comparison to home-based delivery, giving birth in a health facility tripled the likelihood of using PPC within six weeks after childbirth, in Rwanda (AOR=2.97, 95% CI:2.28-3.87, study 18) and northwest Ethiopia (AOR=3.08, 95% CI:1.24-7.68, study 8).

The availability of healthcare within a region had a community impact on the uptake of PPC. For instance, in study 15, Nigerian women who lived in communities with a high proportion of health facility-based deliveries were 17 times more likely (AOR=17.86, 95% CI:8.34-38.24) to receive PPC than women who lived in communities with a low proportion of health facility-based deliveries.

It should be noted that study 9 identified health-facility based deliveries as a limiting factor compared to home delivery. In fact, in rural Tanzania deliveries at hospitals

(AOR=0.50, 95% CI:0.33-0.76), health centres (AOR=0.57, 95% CI:0.38-0.85) and dispensaries (AOR=0.48, 95% CI:0.33-0.69) reduced by nearly half the likelihood of PPC utilisation, in comparison with home-based delivery. Since this finding was unique among studies that analysed this association, it does not modify the overall interpretation. Thereby, health facility-based delivery was associated with PPC utilisation compared to home-based delivery.

Regarding the type of governance, the likelihood of EPPC uptake was identical in public (AOR=15.28, 95% CI:11.92-19.58) or private sector (AOR=15.68, 95% CI:11.89-20.67) in Uganda (study 17). However, in Zambia (study 13), women were ten times more likely to receive EPPC after delivering in a private facility (AOR=10.08, 95% CI:3.35-30.35), versus seven times more likely after delivery in a public facility, i.e. public health centres (AOR=7.15, 95% CI:4.79-10.66) or public hospitals (AOR=7.24, 95% CI:4.92-11.84).

Nevertheless, the effect of place of delivery (health centre, public hospitals, clinics) on PPC uptake (cf. Table 2.10- Place of delivery) should be nuanced. In study 20, based on data covering 33 LMIC, delivering in public lower-level facilities reduced by 6% (AOR=0.94, 95% CI:0.90-0.98) the likelihood of PPC uptake compared to hospitals. In contrast, in northern Tanzania, study 10 showed that giving birth in a lower-level facility, meaning dispensaries (AOR=8.78, 95% CI:6.43-11.14) and health centres (AOR=8.82, 95% CI:6.64-11.00) increased by eight-fold the uptake of PPC, compared to hospital-based delivery. Meanwhile, in Sudan (study 14), the likelihood of PPC utilisation decreased by 82% (AOR=0.18, 95% CI:0.05-0.61) for government health facility-based delivery compared to private not for profit structures.

Therefore, there was no clear pattern in PPC uptake according to the place of delivery and the type of health facility governance (private/public) where the delivery occurred. These differences observed could be explained by intrinsic characteristics of health facilities such as the level of care provided, which depends on human and material resources, the perception of the quality of care by women and trust in the health system. For example, at the community level, study 9 showed that the likelihood of PPC utilisation was 77% (AOR=1.77, 95% CI:1.12-2.79) higher among women who lived in communities with a high level of trust in the health system concerning issues

related to maternal health, which include PPC, compared to those living in communities with a lower level of trust.

To sum up, health facility-based delivery facilitated PPC utilisation, compared to home-based childbirth. However, there was no clear pattern on PPC uptake according to the type of health facility, therefore, depending on the country, private facilities could be a facilitator to PPC uptake compared to public facilities.

- **Awareness of the importance of PPC**

The awareness of the importance of PPC was a key determinant due to the lack of knowledge on postpartum morbidities (PPM) that could occur such as bleeding, sepsis, fever or severe abdominal pain, among others (cf. Table 2.10- Awareness of PPC importance). Knowledge of PPM and awareness of the importance of PPC was mainly raised by healthcare professionals and significantly contributed to PPC utilisation, as reported in studies 1, 4, 9, 13 and 14 (cf. Table 2.10- Awareness of PPC). For example, in Myanmar (study 23) women with a high level of awareness of these risks were twice more likely (AOR=2.10, 95% CI:1.15-3.83) to use PPC than those with no or low level of awareness.

Although these danger signs exist, a community-based study in Ethiopia (study 4) showed that only 30.7% of women considered PPC to be beneficial to prevent health issues, get family planning advice and immunise their child. A positive opinion regarding PPC benefits significantly increased by five times (AOR=5.49, 95% CI:3.06-9.83) the likelihood of PPC utilisation. One reason for not using PPC was feeling healthy after childbirth (studies 2 and 8), and thus perhaps not needing PPC.

To conclude on the influence of the obstetric determinants, the following were conclusive facilitators to PPC utilisation: being primiparous (first child), a desired and regularly monitored pregnancy with ANC visits, a delivery with skilled birth attendant, having a caesarean delivery, as well as an awareness of the importance of PPC and knowledge of PPM. Despite differences according to the type of structures, health-facility deliveries were more often evidenced as facilitating PPC uptake than home-based deliveries. Finally, specific obstetric hindrances included mistreatment by healthcare professionals during maternal care and difficulty in accessing health facilities.

2.4. Discussion

This systematic review presented an overview of the uptake of PPC in LMIC. Altogether, the prevalence of PPC utilisation was 55.4%. The main sociodemographic and environmental determinants associated with PPC utilisation were being aged over 20 years old, having achieved secondary education, being in employment, having some autonomy in decision-making, higher SES status, living in urban settings, being exposed to mass media, and having a partner educated and employed. The obstetric facilitators of PPC uptake were primiparity, attendance to antenatal care (at least four consultations), presence of a skilled birth attendant and their friendliness, having a caesarean, being aware of the importance of PPC and having knowledge of postpartum health complications. In contrast, women were less likely to use PPC if they were single, had no formal education, were from poorest socioeconomic status, had low autonomy, lived in rural settings, had an undesired pregnancy, and if the distance to the health facility was perceived as a barrier or if the journey time was greater than one-hour.

One of the key sociodemographic determinants that influenced PPC uptake was socioeconomic status. Medical costs could be expensive for households; even if maternal healthcare, such as caesarean section, could be financially covered, the hidden cost linked to drugs, transport and food remain (Ravit et al., 2015). In addition, because PPC takes place within six weeks after birth, women may not have enough financial resources to complete the care related to their pregnancy, by attending the four PPC visits recommended by the WHO. This may explain how women from middle and rich households could afford to pay for medical and non-medical expenses related to PPC services, whereas it is a hindrance for the poorest women (Gabrysch and Campbell, 2009), something that has already been documented in the literature on LMIC.

The results also suggested that the completion of primary, secondary or higher education had a positive effect on PPC uptake. According to the literature, education is also associated with other facilitators of PPC uptake. For example, better educated women have more capacity to interact with administrative services, better control of the expenditure of household resources, and better communication with their partners. They also have better insight into modern medical culture and more autonomy in

decision-making (Gabrysch and Campbell, 2009; Gopalakrishnan et al., 2019). Education and paid employment are factors that may empower women and enable them to have more autonomy in their decision-making (Senarath and Gunawardena, 2009). This is in line with the study findings suggesting that high autonomy significantly enabled PPC uptake, whereas low autonomy was a barrier. Indeed, the notion of autonomy was also linked to the women's decision-making power inside their household, and the influence of people living with them (Matsumura and Gubhaju, 2001). This was also evidenced in Chaka's (2019) systematic review and in studies based in Senegal, Mali and south Asia (Senarath and Gunawardena, 2009; Sougou et al., 2020; White et al., 2013). Indeed, a majority of Nepalese women were not able to make decisions about their own health due to the influential position of their partner or family (Senarath and Gunawardena, 2009).

Regarding environmental determinants, the distance from health facilities and rural residential locations were evidenced as barriers to PPC uptake. These results are also supported by the systematic reviews of Langlois *et al.* (2015) and Chaka *et al.* (2019). At a community level, distance from health facilities is an impactful determinant of PPC uptake. Living in a community with a high proportion of women perceiving the distance from health facility as a problem was found to be a barrier that might be due to the lack of health infrastructure in their area. This finding correlated with Chaka's systematic review (2019).

Among the obstetric determinants, primiparity was associated with PPC uptake. Since this was women's first delivery experience, this observation might be explained by the lack of experience with childbirth and motherhood and possible greater needs of young mothers to check on themselves and their baby and get advice from healthcare professionals. PPC uptake was also associated with caesarean mode of delivery. One reason could be that women have more issues in the first place because it is a riskier procedure than vaginal delivery. Another explanation could be that women understand that caesarean is a medical intervention involving higher risks than vaginal delivery (Bauserman et al., 2015; Litorp et al., 2015), and thus requires more follow-up care.

The findings show that health facility-based delivery gave women more opportunity to get their first PPC before discharge than home-based delivery. In contrast, women who delivered at home were less likely to seek PPC. Although some women may have

no choice than home-based delivery, other prefer to not medicalise childbirth because vaginal delivery is perceived as a natural process and health facilities are only considered in case of emergencies (Bohren et al., 2014; Gebrehiwot et al., 2012; Øxnevad, 2011; Wild et al., 2010). Hence, women may consider PPC as unnecessary, especially if they feel healthy after childbirth. However, it was evidenced that awareness of the importance of PPC, antenatal consultations (at least four) and skilled-birth deliveries positively influenced the uptake of PPC. These could represent opportunities for women to be counselled and informed by health professionals about the danger signs that could occur after delivery and the importance of PPC (World Health Organisation and Human Reproduction Programme, 2022).

This systematic review synthesised the recent literature on PPC uptake in LMIC since the systematic review by Langlois was published (Langlois et al., 2015) and analysed a broad range of determinants to get a wider understanding of the rate of PPC uptake and the factors associated with it. The results concerning ANC visits, knowledge of postpartum danger signs, urban setting, and high sociodemographic characteristics (secondary or higher education, employment, wealthier households, high level of autonomy, partner's secondary education level and employment) are consistent with other systematic reviews (Chaka et al., 2019; Langlois et al., 2015), indicating no evolution in the influence of these determinants on PPC uptake since 2013. Moreover, similarly to Langlois et al. (2015), no clear conclusion could be drawn on the effect of religion.

The main strength of this review is to provide new insights on PPC uptake. All the studies included in this review had a cross-sectional design which allowed to analyse several variables at a time. Indeed, this review stated the prevalence of PPC uptake at the LMIC level and investigating more determinants (21 in total) than the studies by Langlois (six determinants) and Chaka (13 determinants). The added determinants (parity, desired pregnancy, mode of delivery, marital status, length of hospitalisation after delivery, exposure to mass media, age, women's partner employment status) brought an insightful understanding of PPC uptake. Therefore, this systematic review of the literature has further highlighted the multifactorial nature of PPC uptake in developing countries.

The review has other strengths, beyond providing an up to date and more comprehensive understanding of PPC uptake in LMIC and the factors contributing to it. There was a good consistency between researchers during the study selection process and the qualitative assessment of the included studies. The data were extracted from studies assessed for the majority (20 studies) of good scientific quality and moderate quality for four studies. Additionally, the consistency between included studies was based on the publication of articles in peer-reviewed journals, which added value to their quality, and all undertook a cross-sectional study design.

Despite its robustness, the systematic review has limitations. The complete PPC utilisation (four visits as recommended by the WHO) was not reported by population-based studies because these data were captured by studies using DHS surveys (n= 16 studies). Therefore, at the national level, it was difficult to assess how the WHO guidance was applied. Likewise, studies using DHS surveys did not capture the potential effects of cultural beliefs, which could be an issue given that community-based studies showed the existence of cultural practices hindering PPC uptake. Moreover, causality relationships could not be drawn due to the cross-sectional nature of studies. All studies, except one (Laisser et al., 2019), relied on self-reported data that may yield social desirability bias. Thus it is possible that some determinants such as wanted pregnancy or women's autonomy might be over-reported. Data were collected retrospectively which might elicit some recall bias. However, this bias was minimised by considering the most recent delivery of women who gave birth within six months to five years (depending on the study) before data collection. The exclusion of qualitative studies could have limited the exhaustivity of the review of PPC uptake in LMIC because this method allows participants to give an in-depth explanation of the effect of some determinants such as cultural beliefs, as well as women's perception of PPC. Finally, the effect of payment schemes (free PPC or having access to private insurance) was not reported in this review. This variable might influence PPC uptake as the socioeconomic status did.

2.5. Summary of the chapter

This chapter presented a systematic review of PPC uptake in LMIC by searching the individual and community effects of 21 determinants. Overall, over half of women sampled sated having accessed some form of PPC. The inequities in PPC utilisation

reflected social inequities in terms of women's sociodemographic background, pregnancy experiences and level of autonomy to make decisions. From a collective perspective, PPC uptake was also marked by the community's level of instruction and wealth of women and the presence of health facilities. Thus, the results show that improving PPC uptake would require a reduction in social and geographical inequalities. They also indicate that an improvement in the quality of care would be beneficial as women who could trust healthcare professionals and receive support from them during their delivery experience. Finally raising awareness of the importance of PPC by targeting women and their families would also be likely to promote PPC uptake.

This study addresses the first objective of the research, which was the description of postpartum care uptake in LMIC. Given that half of the included studies used the same methodology, namely a secondary data analysis of the DHS survey, the same method of data collection and the same outcomes variable (PPC uptake), it was possible to conduct a meta-analysis. This analysis is presented in the next chapter (Chapter 3) and completes the systematic review's findings.

Furthermore, based on the systematic review results, the following research hypotheses could be generated to be investigated in the Moroccan context:

1. Women's young age (under 19 years old) hinders the uptake of PPC.
2. Women's and their partner's education facilitates PPC uptake.
3. Women's unemployment hinders PPC uptake.
4. The low decision-making autonomy (to take decision especially for their health without being influenced by partner or family) of women hinders PPC uptake.
5. Poverty hinders PPC uptake
6. The access to mass media facilitates PPC uptake.
7. A close distance to the health facility facilitates PPC uptake.
8. An urban place of residence facilitates PPC uptake.
9. The presence of a skilled birth attendant during delivery encourages PPC uptake.
10. Attendance to antenatal care during the pregnancy facilitates PPC uptake.
11. Caesarean delivery facilitates PPC uptake.

These will be investigated in the secondary data analysis reported in Chapters 5 and 6.

Chapter 3

Meta-analysis of the associations between key determinants and postpartum care uptake in low-and-middle income countries

As identified in the systematic literature review (Chapter 2), several determinants are associated with the utilisation of PPC in low- and middle-income countries. This chapter presents a meta-analysis based on the studies included in the systematic review that use the Demographic Health Survey. Since 1985, the Demographic Health Survey (DHS) programme has been providing technical assistance in the implementation of nationally representative household surveys on population health in 90 developing countries and thus, can be used to measure PPC utilisation. This meta-analysis focuses on key PPC determinants in low-and-middle income countries (LMIC) and their association with PPC utilisation.

3.1. Introduction

In the systematic review conducted as part of this research (Chapter 2), a conclusion reached was that a meta-analysis was possible because of the similarity across some of the studies in terms of methodology: i.e. inclusion criteria, the definition of determinants and the outcome measure – in this case, the utilisation of PPC.

Meta-analysis is a statistical procedure that integrates the results of several independent studies considered as "combinable" (Egger et al., 1997). It aims to estimate a single pooled effect or size of the association between exposure (e.g. determinants) and outcome (PPC utilisation) variables. It determines the direction of the association (either positive or negative). For this purpose, all selected studies need to share similar characteristics and the same outcome variables. In the case of studies with bigger sample (i.e. in this meta-analysis from 1905 participants in study 19c to 137,218 participants in study 20), pooled estimation gains some precision. Another advantage of meta-analysis relates to the potential identification of problems not addressed individually in each included study, such as a potential variation in the influence of determinants depending on the period when PPC was used (Haidich, 2010).

Meta-analyses are often conducted on randomized controlled trials, but Egger and colleagues (1998) reported that they can also be carried out with observational data, which was the case in this study. In fact, only observational data, from the DHS surveys, were analysed.

In the past ten years, two meta-analyses were published on barriers and facilitators of PPC utilisation**.** As mentioned in Chapter 2 (section 2.1.1), in 2015, Langlois *et al.*, (2015) reported a systematic review and meta-analysis on inequities in PPC utilisation in LMIC based on 36 studies ten of which were used in their meta-analysis. This paper presented results of a meta-analysis based on place of residence and socioeconomic status determinants. It showed that urban women were more likely to use PPC than their rural counterparts. It also reported a social gradient of health according to the socioeconomic status meaning that women from the richest, richer, middle, and poorer households were more likely to use PPC than women from poorest households.

The second systematic review and meta-analysis from Chaka *et al.* (2019), focused on PPC utilisation in Ethiopia. It considered thirteen determinants, among others the place of residence, women's education, socioeconomic status (SES), and place of delivery. They reported an increased likelihood of PPC utilisation for women from urban dwelling, richer SES, with at least primary education level, and who deliver in a health facility.

The proposed added value of the present meta-analysis was to analyse more up to date data from LMIC since 2013 (Langlois's meta-analysis which focused on the place of residence and the SES). Additionally, unlike Chaka's study that considered solely Ethiopian setting, the aim was to bring new pooled estimations of other determinants' influence on PPC utilisation at LMIC level.

3.1.1. Objectives of the meta-analysis

This meta-analysis aims to answer the first objective of the thesis, which is the identification of the barriers and facilitators of PPC uptake in LMIC. The findings are to generate research hypotheses that will be investigated in the Moroccan context.

The quantitative synthesis was based on the evidence available from 2013 to 2020 and searched to answer the following research questions**:**

1) To what extent women attend PPC in LMIC? The expected outcome is the pooled proportion of PPC utilisation among included studies.

2) What are the pooled estimations of the associations between the determinants and PPC utilisation? The response to this question is given by forest plots. Conclusions are based on pooled odds ratios (OR) from forest plots without heterogeneity or at a low level.

3) Do the determinants have different effects depending on when PPC is used (e.g. early postpartum care (EPPC) that is within 48 hours after birth and later PPC that is within six weeks (LPPC))? This question is analysed through the subgroup analyses by comparing the pooled OR obtained in each group.

4) Have the effects changed since 2013? The intention is also to compare the results to Langlois and Chaka's systematic reviews to observe the evolution of PPC utilisation if any since 2013.

3.2. Method

3.2.1. Search strategy and study selection

Since the meta-analysis was a subset of the systematic review, its search strategy is identical to the PRISMA method presented in the Chapter 2 (section 2.2.1). This protocol was retained because it aimed to minimise bias which is one of the essential aspects to consider in the meta-analysis (Haidich, 2010).

Of the 24 articles included in the systematic review, nine were considered for the meta-analysis based on common inclusion criteria. First, only population-based studies that analysed Demographic and Health Survey (DHS) data were eligible. This criterion was applied because DHS programmes use a standardised method and identical maternal questionnaire across all countries where it is conducted (The DHS Programme - Team and Partners). All DHS studies used a homogeneous methodology which ensure nationally representative data. By contrast, community-based studies were excluded because their sampling methods varied, the questionnaires that measured PPC utilisation were not similar, and their findings were not generalisable at a national level.

Second, to ensure consistency, only Odd Ratios (OR) were eligible as parameters of measure of association because to obtain a pooled measure of association, the same size effect need to be used. OR measures the strength of an association between an exposure and an outcome and they vary from zero to 0.99 for a negative association to more than one for a positive association. Hence, studies using other type of effect size were excluded. Third, studies that investigated PPC utilisation on a period different from 48 hours or within six weeks after delivery were excluded because such studies would not belong to any subgroups to answer the third research question.

3.2.2. Quality assessment

The methodological quality of study was an important aspect to consider to assess the risk of bias (Haidich, 2010). Indeed, the quality assessment presented in the systematic review (cf. Chapter 2, section 2.2.2) was carried out using the JBI checklist for cross-sectional studies (Moola et al., 2017). It assessed, among other factors, the reliability and validity of the data collection tool, the statistical analysis used, the identification, and control of confounding variables. Using this framework, all the included studies were deemed to be of good quality.

3.2.3. Statistical method

Since the principle of meta-analysis is to pool individual studies' effect size, a minimum of two studies are needed to conduct a meta-analysis. The pooled estimations are reported in a diagram called forest plot.

For the present meta-analysis, determinants were categorised following the same classifications as Langlois's (2015) and Chaka's (2019) meta-analyses to allow comparison of findings. Consequently, the determinants (place of residence, women's employment status, women's education, and place of delivery) were coded as dichotomous discrete variables and the socioeconomic status determinant as a categorical ordinal variable with five categories (see Table 3.1). Adjusted or crude OR were retrieved from studies that use the same categorisation of determinants as described below in Table 3.1. When different categorisations were used, crude OR (COR) were calculated based on the rate of PPC utilisation presented in the papers. Altogether, among the 21 determinants identified in the systematic review (cf. chapter 2) only those that were measured in all the studies included in this meta-analysis were

considered. Therefore, odds ratios were pooled for key determinants, with some of them (women's education, socioeconomic status, place of delivery) split into subcategories.

Table 3.1. Categorisation of determinants analysed in the meta-analysis.

Determinants	Dichotomous categorisation
Place of residence	Urban versus rural (reference)
Socioeconomic status	Richest households compared to poorest households (reference)
Socioeconomic status	Richer households compared to poorest households (reference)
Socioeconomic status	Middle households compared to poorest households (reference)
Socioeconomic status	Poorer households compared to poorest households (reference)
Women's education	Primary education level compared to no formal education (reference)
Women's education	Secondary education level compared to no formal education (reference)
Women's employment status	Employed versus unemployed (reference)
Place of delivery	Health facility versus home (reference)
Place of delivery	Private health facility versus public health facility (reference)

3.2.3. 1. Dealing with heterogeneity

Meta-analyses can be performed with fixed or random effect models. In case of heterogeneity, random-effect model is recommended because it takes into consideration the variability between studies (Riley et al., 2011). Heterogeneity corresponds to any variability in the characteristics of participants or of the intervention (i.e., in this case it is PPC utilisation). According to Deeks et al., (2020) and Haidich, (2010), to calculate the degree of heterogeneity, a Cochran Q test is conducted, and a low p-value ($p< 0.01$) indicates the presence of heterogeneity. The I^2 statistic determines the degree of heterogeneity between studies, the higher the value the higher the heterogeneity. According to the Cochran's handbook (Deeks et al., 2020, p. 10), the level of heterogeneity is interpreted as being low when the I^2 statistic is under 40%, moderate if it is between 40% and 60%, and high when it is above 75%.

In this study, the random effect model was chosen because high heterogeneity between studies was found in almost all pooled estimations. Its cause could be the inclusion of PPC utilisation over a period after delivery that varied between studies (e.g. two days or six weeks). To investigate this hypothesis a subgroup analysis was conducted. It consisted in dividing studies into two categories: one group included studies focusing on EPPC corresponding to PPC utilisation within 48 hours after

delivery, and the second group comprised studies which focused on PPC up to six weeks after delivery (LPPC).

3.2.3 2. Sensitivity analysis

The aim of sensitivity analysis is to get validated pooled estimations, by removing non-significant and outlier individual OR from the meta-analyses with high heterogeneity, according to Mueller *et al.* (2018).

Furthermore, publication biases are defined by Dickersin and Min (1993) as the non-publication of a study "on the basis of the direction or strength of the study findings." This causes a bias to a precise overview of a research topic. Therefore, publication biases were searched for all analyses conducted through the interpretation of funnel plots. A symmetrical funnel plot suggests that publication bias does not distort the findings. Taking word count into consideration, funnel plots will be displayed in appendices.

The data analysis was performed using Review Manager (RevMan) [Computer programme] Version 5.4. The Cochrane Collaboration, 2020.

3.3. Results

3.3.1. Search findings

The following diagram, in Figure 3.1, illustrates the selection process of studies included in the meta-analysis.

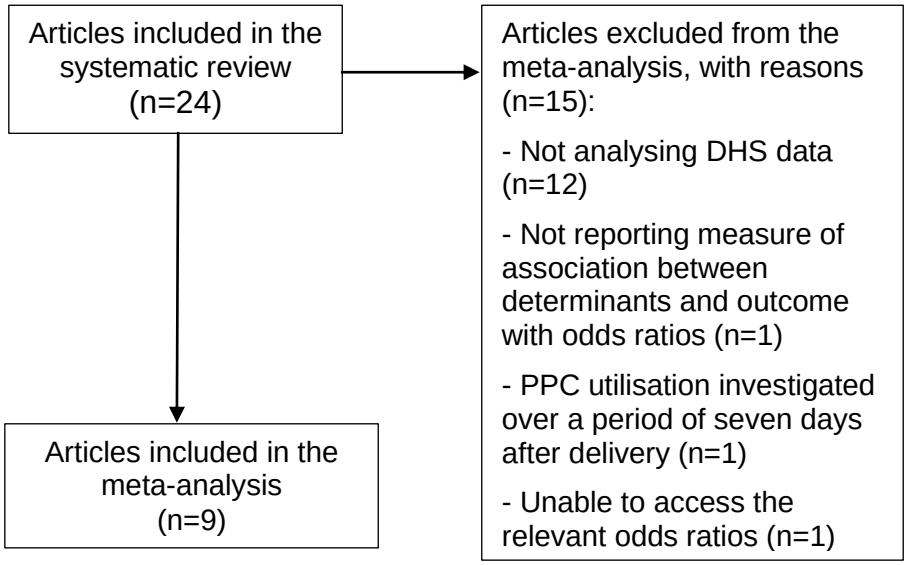


Figure 3. 1 Selection process of studies included in the meta-analysis.

The study selection process was the result of a collective decision taken by the researcher and the supervisory team. Among the 24 articles included in the systematic review, 12 were excluded because they did not report DHS data, and one because measures of associations were not given with OR. In another article OR were given for PPC utilisation for two different groups (urban women and rural counterparts) but not for the overall sample. Despite contacting the authors to get the data needed to calculate the OR without distinction of place of residence, no answer was received. Therefore, this record was excluded. Finally, a study was excluded since the authors investigated the uptake of PPC within seven days after delivery which did not meet the inclusion criteria, as only studies that defined utilisation of PPC within 48 hours or six weeks after birth were eligible. Therefore, nine articles were selected for the meta-analysis. All articles were deemed to have a good scientific quality (cf. Chapter 2,Table 2.4, p.54).

Table 3.2 below lists the studies selected for this meta-analysis, and for greater fluency and consistency they will be referenced by the same label they were given in Chapter 2.

Table 3.2. List of studies included in the meta-analysis with their setting, source of data and year of data collection.

Study label	Authors	Setting	Source of data Year of data collection
6	(Malede Mequanent et al., 2019)	Ethiopia	DHS 2016
11	(Khaki and Sithole, 2019)	Malawi	DHS 2015/2016
13	(Chungu et al., 2018)	Zambia	DHS 2013/2014
15	(Ononokpono et al., 2014)	Nigeria	DHS 2008
17	(Ndugga, 2020)	Uganda	DHS 2016
19a	(Solanke, 2018)	Côte d'Ivoire	DHS 2012
19b	(Solanke, 2018)	Guinea	DHS 2012
19c	(Solanke, 2018)	Liberia	DHS 2013
19d	(Solanke, 2018)	Niger	DHS 2012
19e	(Solanke, 2018)	Sierra Leone	DHS 2013
20	(Benova, 2019)	33 Sub-Saharan countries	DHS 2016
21	(Khanal et al., 2014)	Nepal	DHS 2011
22	(Neupane and Doku, 2013)	Nepal	DHS 2006

Caption: DHS: Demographic and Health Survey

Each study analysed DHS data from a specific country, except for the study by Benova et al. (2019) which covered and pooled odds ratios (OR) for 33 sub-Saharan

countries. Likewise Solanke et al. (2018) focused and presented independent OR for five West African countries (Cote d'Ivoire, Guinea, Liberia, Niger, Sierra Leone). Hence, in total, nine papers were included in the meta-analysis, but 13 independent studies were analysed, which represent a population of study of 198 402 women. DHS data were collected between 2006 and 2016.

For the subgroup analysis (EPPC and LPPC), studies were split into two groups as follows:

- Studies 13, 17, 19a, 19b, 19c, 19d, 19e, 20 covered the EPPC group, meaning utilisation of PPC within 48 hours after birth.
- Studies 6, 11, 15, 21, 22 covered PPC within six weeks group (LPPC). These studies considered utilisation of PPC within the first 48 hours and beyond without distinction.

3.3.2. Evidence synthesis

3.3.2.1. <u>The pooled proportion of PPC utilisation in LMIC and its determinants</u>

PPC utilisation reported in the included studies ranged between 6.9% and 66.6%. Once aggregated, PPC utilisation was estimated to be 57.0%. The pooled estimation of the association between each determinant and PPC utilisation was assessed.

Overall, the retained pooled estimations of PPC utilisation are summarised in Table 3.3 below. Findings are based on analyses displaying good reliability through sensitivity analysis when necessary and are given with interval confidence of 95%. The below findings are discussed in detail in the next section.

Table 3.3. Pooled measures of association assessing the effect of five determinants on postpartum care utilisation in low-and-middle income countries.

Determinants	Meta-analysis (Total)	EPPC subgroup	LPPC subgroup
Urban place of residence compared to rural area (rf)	Pooled OR=1.88 (0.76-1.91)	Pooled OR=1.76 (1.57-1.97)	No possibility to get a robust pooled OR
Richest socioeconomic status compared to poorest (rf)	Pooled OR= 3.31 (2.82-3.88)	Pooled OR=2.75 (2.01-3.77)	Pooled OR= 3.13 (2.48-3.94)
Richer socioeconomic status compared to poorest (rf)	Pooled OR= 2.01 (1.71-2.35)	Pooled OR= 1.76 (1.48-2.10)	Pooled OR= 2.37 (1.90-2.95)
Middle socioeconomic status compared to poorest (rf)	Pooled OR=1.56 (1.35-1.80)	Pooled OR= 1.24 (1.15-1.34)	Pooled OR=1.72 (1.36-2.17)
Poorer socioeconomic status compared to poorest (rf)	Pooled OR:1.38 (1.23-1.56)	Pooled OR:1.17 (1.06-1.26).	Pooled OR=1.71 (1.34-2.19)

Women's education: primary level compared to no formal education (rf)	Pooled OR= 1.45 (1.31-1.61).	Pooled OR=1.29 (1.17-1.41)	Pooled OR=1.69 (1.48-1.95)
Women's education: secondary level compared to no formal education (rf)	Pooled OR=1.67 (1.45-1.92)	Pooled OR=1.63 (1.30-2.05)	Pooled OR=2.25 (1.71-2.96)
Women's employment status: employed versus unemployed (rf)	Result unreliable	Result unreliable	No possibility to get a robust pooled OR
Place of delivery: health facilities versus other places (rf)	No possibility to get a robust pooled OR	Pooled OR= 18.69 (17.00-21.60)	Pooled OR=1.90 (1.59-2.27)
Place of delivery: Private health facilities versus Public (rf)	Non-significant pooled OR=1.20 (0.85-1.70)	Non-significant pooled OR=1.20 (0.85-1.70)	No studies belonged to this group

Caption: rf = reference

3.3.2.2. The influence of the place of residence on PPC utilisation: rural versus urban areas

Twelve studies reported a significant association between living in an urban area and PPC utilisation. Living in urban areas significantly increased utilisation of PPC compared to rural areas (pooled OR=1.76, 95% CI:1.28-2.41). However, heterogeneity was significantly present across studies (I^2=98%, p<.001), as illustrated in Figure 3.2 which shows poor overlapping of confidence intervals (from 0.60 to 5.19) meaning that there was variability between studies. Therefore, this result must be interpreted with caution.

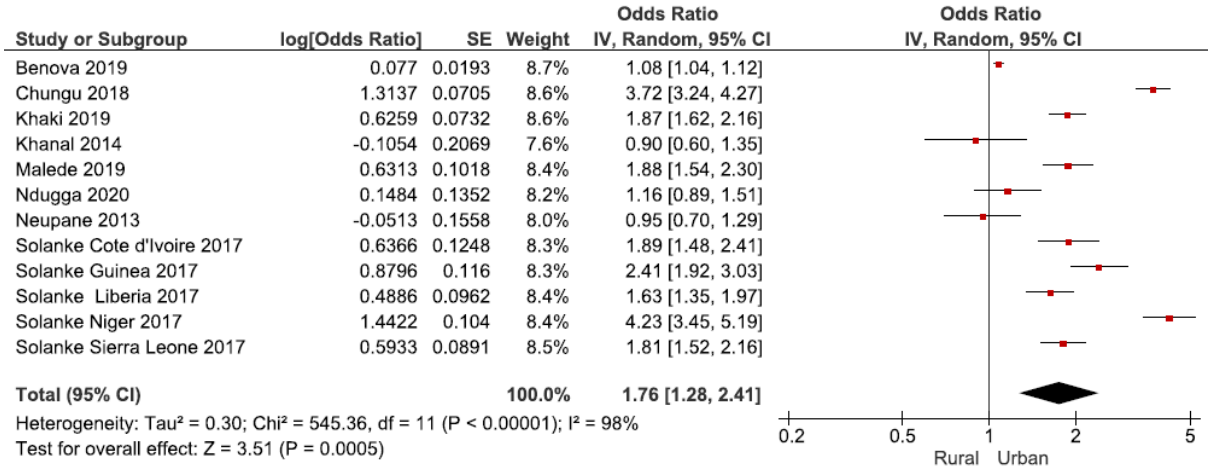


Figure 3.2 Meta-analysis of the association between PPC utilisation and place of residence: urban compared to rural (reference).

To understand the reason for heterogeneity, a subgroup analysis was conducted. For the EPPC group, the analysis was carried out after removing outlier and non-significant individual OR (as directed by (Deeks et al., 2020)). The pooled estimation,

in Appendix 3.1- figure 1 reached an OR=2.01 (95% CI:1.30-3.11) with high heterogeneity (I^2=99%, P=0.001). Regarding the LPPC group, there was a discrepancy between studies with two studies reporting a negative association between living in urban areas and the uptake of PPC, and two other studies showing a positive association, (see Appendix 3.1- figure 2). In this case, pooling the related OR was inappropriate.

A sensitivity analysis was performed by removing six non-significant or outlier OR to get robust findings. Consequently, six studies were considered, and the significant pooled result obtained was OR=1.88 (95% CI:1.71-2.06) which was higher than the first one (OR=1.76, 95% CI:1.28-2.41). The forest plot of this analysis can be found in Appendix 3.1-figure 3. Therefore, this finding establishes that women living in urban areas were 88% more likely to use PPC than women living in rural areas.

For the EPPC subgroup, in Appendix 3.1-figure 4, there was no heterogeneity between the three selected studies and no publication bias, which led to a validated pooled size effect of OR=2.00 (95% CI:1.68-2.39). Concerning LPPC, the sensitivity analysis could not be carried out as the individual OR were too divergent.

In summary, living in urban areas increased by 88% PPC utilisation compared to rural place of residence. The comparison of PPC utilisation within 48 hours or six weeks after birth could not be drawn.

3.3.2.3. <u>The influence of the socioeconomic status on PPC uptake</u>

- **Richest socioeconomic category versus poorest**

This analysis included 11 studies (studies 6,11,15,17,20,19a-19e,22). The results show that richest women were twice more likely to use PPC than poorest women (pooled OR=2.65, 95% CI:1.88-3.73), as can be seen in Figure 3.3.

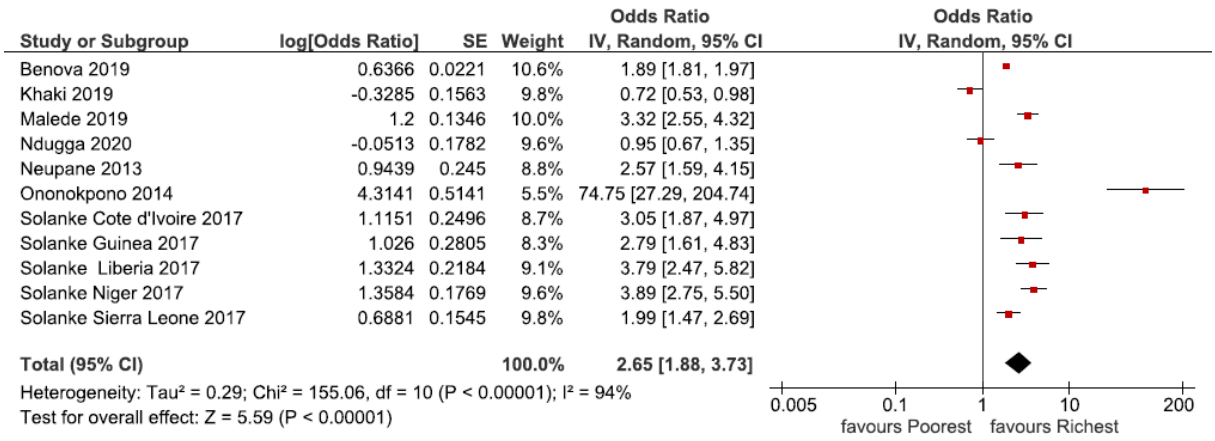


Figure 3.3. Meta-analysis of the association between use of postpartum care and richest socioeconomic status compared to poorest (reference).

Sensitivity analyses were carried out because of the presence of high heterogeneity. After removing five studies from the analysis, the forest plot, in Figure 3.4, established a robust pooled OR indicating that living in richest households tripled (pooled OR= 3.32, 95% CI:2.83-3.89) the likelihood of PPC utilisation.

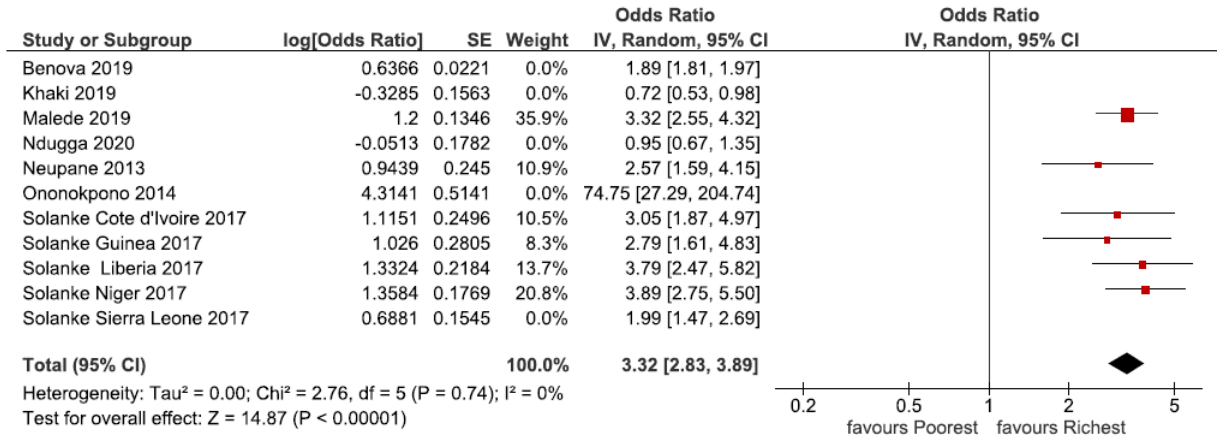


Figure 3.4. Sensitivity analysis of the meta-analysis estimating the association between use of postpartum care and richest socioeconomic status compared to poorest category (reference).

The subgroup analysis included seven studies for the EPPC group and four studies for the LPPC group with high heterogeneity between them (I^2> 60%). The two pooled OR suggested that richest women were more likely to receive PPC within six weeks (OR= 4.19, 95% CI:1.26-13.94), than 48 hours after birth (OR= 2.33, 95% CI:1.71-3.18) (Appendix 3.2- figures 1 and 2).

To get robust findings from the subgroup analysis, three studies were removed from the EPPC group and two from the LPPC group. As a result, less variability was found

and the pooled OR justified the effect of richest socioeconomic status determinant on the uptake of PPC compared to the poorest households. This means that richest women were more likely to use PPC than poorest women, within six weeks (OR= 3.13, 95% CI:2.48-3.94, in Appendix 3.2- figure 4). Similarly, richest SES facilitated EPPC uptake within 48 hours (OR=3.50, 95% CI:2.82-4.35, in Appendix 3.2-figure 3).

Moreover, a symmetrical funnel plot was found for the EPPC analysis, which suggested the absence of publication bias as can be seen in Appendix 3.2 (figure 4). Therefore, this further confirms the robustness of the result.

- **Richer socioeconomic category versus poorest**

Figure 3.5 displays the positive pooled association (OR=1.82, 95% CI:1.46-2.27) between richer women and PPC utilisation. However, this finding should be considered with caution because of high heterogeneity (I^2> 60%).

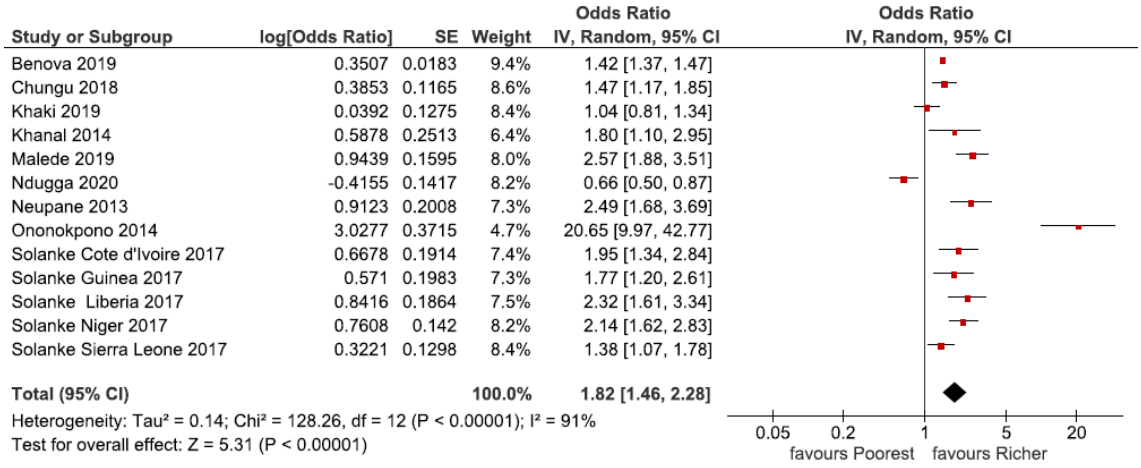


Figure 3.5. Meta-analysis of the association between use of postpartum care and richer socioeconomic status, compared to poorest category (reference).

To decrease the variability found in the meta-analysis, the sensitivity analysis illustrated in Figure 3.6 was performed by removing five studies with outlier OR, which led to a robust pooled OR (2.01, 95% CI:1.72-2.35). Hence, compared to poorest households, women living in richer households were twice more likely to use PPC.

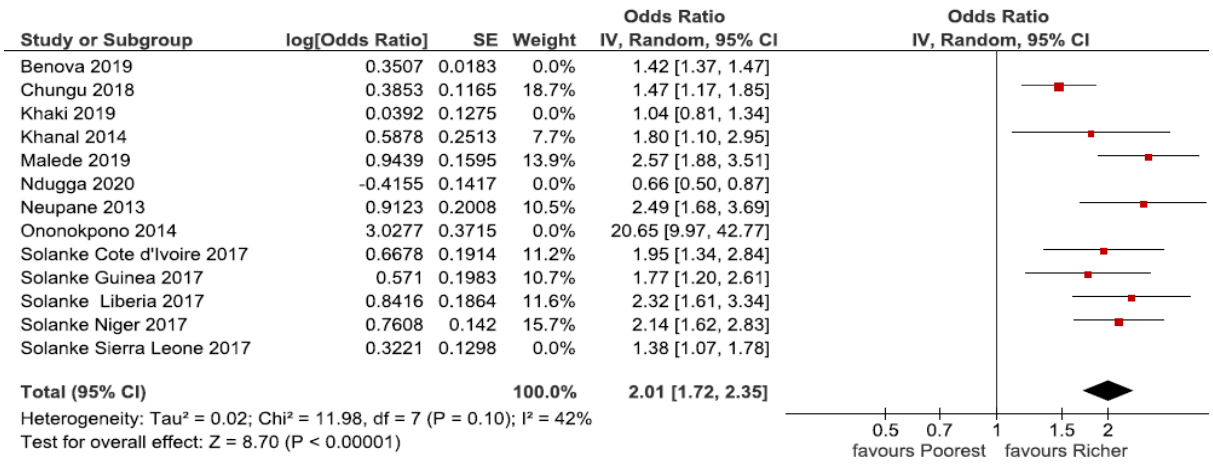


Figure 3.6. Sensitivity analysis of the meta-analysis showing the association between richer socioeconomic status and utilisation of postpartum care, compared to the poorest class (reference).

In addition, no publication bias was found for this meta-analysis as observed in Appendix 3.3 (Figure 5) showing a symmetrical funnel plot, which further confirms the reliability of this pooled OR.

The subgroup analysis showed a similar trend for both groups (i.e. EPPC and LPPC), with a higher association for LPPC (OR= 2.84, 95% CI:1.39-5.81) than EPPC (pooled OR=1.52, 95% CI:1.23-1.87) (Appendix 3.3- figures 2 and 1). Nevertheless, high heterogeneity (I^2> 60%) was found in both findings. Consequently, the sensitivity analysis conducted for both subgroups emphasised a significantly higher association for LPPC group (OR= 2.37, 95% CI:1.90-2.95) than the EPPC group (OR= 1.76, 95% CI:1.48-2.10) (Appendix 3.3-figures 3 and 4). Therefore, richer women were more likely to attend PPC within six weeks than 48 hours compared to poorest women.

- **Middle socioeconomic category versus poorest**

Similarly to previous analyses on the socioeconomic (SES) determinants, the forest plot in Figure 3.7 showed that women from the middle SES were 45% more likely to use PPC (OR=1.45, 95% CI:1.20-1.74) than women from the poorest SES.

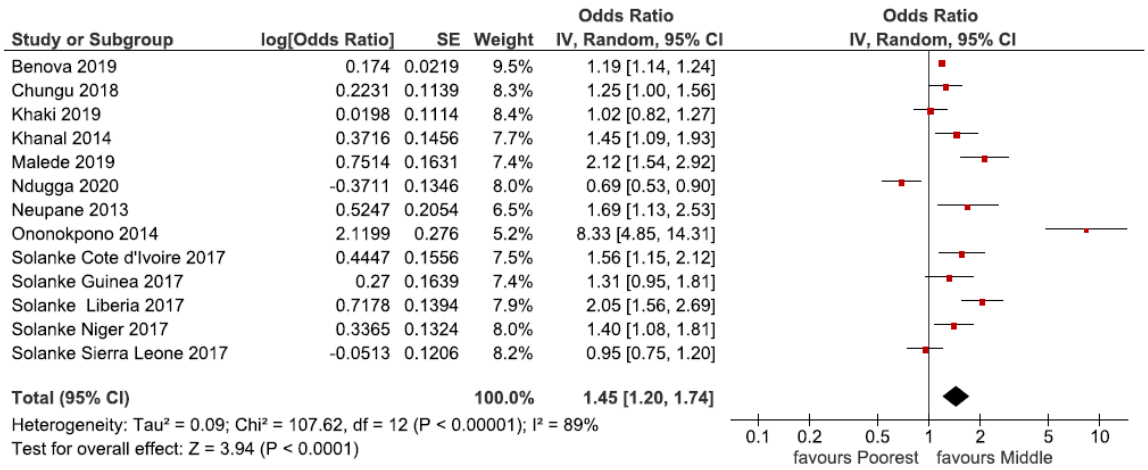


Figure 3.7. Meta-analysis of the association between postpartum care utilisation and middle socioeconomic status, compared to poorest category (reference).

The sensitivity analysis was necessary as high level of heterogeneity were found in the previous analysis. The sensitivity analysis presented in Figure 3.8 was conducted after removing five studies with non-significant and outlier OR. The obtained pooled estimation (OR=1.56, 95% CI:1.35-1.80) was almost identical to the previous one, which confirmed the robustness of the results.

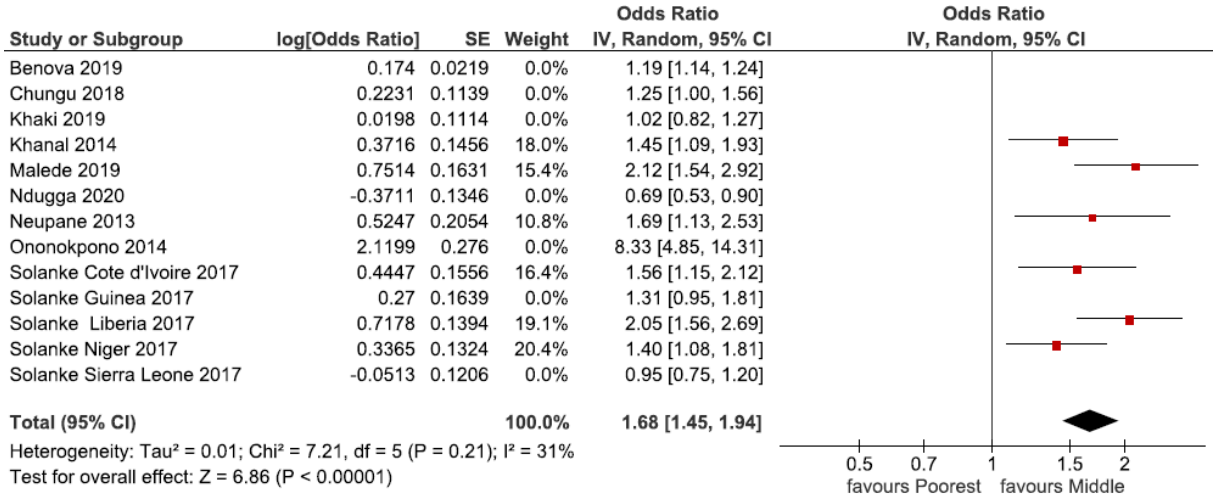


Figure 3.8. Sensitivity analysis of the meta-analysis for the association between middle socioeconomic status and utilisation of postpartum care, compared to the poorest class (reference).

The comparison of the subgroup analysis, in Appendix 3.4- figures 1 and 2, indicated that middle SES determinant had a stronger association with LPPC utilisation (pooled OR= 2.05, 95% CI:1.20-3.53) than EPPC (pooled OR= 1.23, 95% CI:1.04-1.47). A sensitive analysis was necessary due to high heterogeneity present in both subgroups. Therefore, the EPPC group included five studies and the one for the LPPC group three

studies. As illustrated in Appendix 3.4- figures 3 and 4, robust pooled OR proved that women from middle SES were more likely to use LPPC than EPPC, with a likelihood of 72% (OR=1.72, 95% CI:1.36-2.17) and 56% (OR=1.56, 95% CI:1.31-2.07) respectively.

Moreover, the Appendix 3.4 (Figure 5) below displays a funnel plot of the later PPC utilisation sensitivity analysis. No asymmetry was found which confirmed the absence of publication bias.

- **Poorer socioeconomic category versus poorest**

The interpretation of the forest plot in Figure 3.9, demonstrated that belonging to the poorer SES increased by 26% (pooled OR:1.26, 95% CI:1.08-1.47) the likelihood of using PPC in comparison to the poorest category.

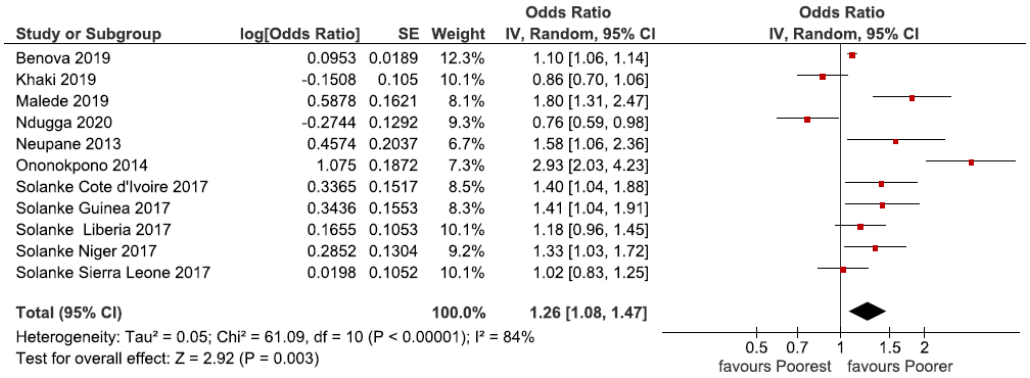


Figure 3.9. Meta-analysis of the association between use of postpartum care and poorer socioeconomic status, compared to poorest category (reference).

A sensitive analysis was carried out by removing five studies with non-significant and outlier OR. Thus, the robust pooled estimation illustrated in Figure 3.10, indicated that the likelihood of PPC utilisation increased by 38% (OR:1.38, 95% CI:1.23-1.56) for poorer women compared to their poorest counterparts.

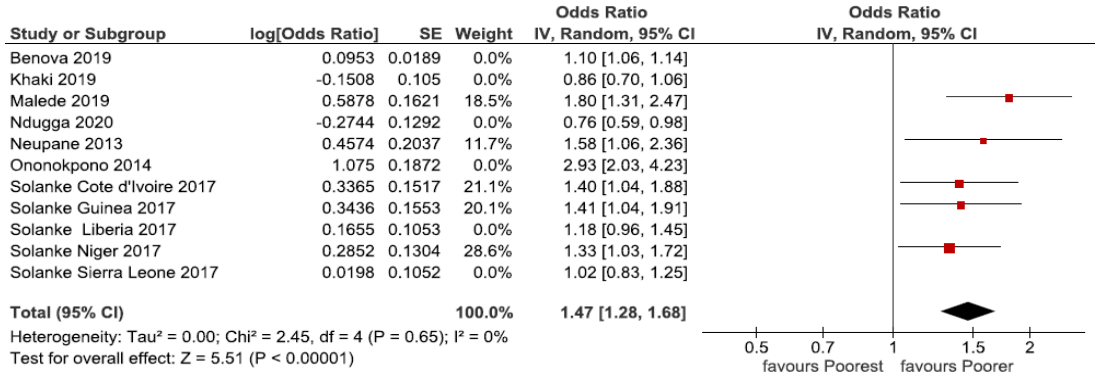


Figure 3.10. Sensitivity analysis of the meta-analysis for the association between poorer socioeconomic status and utilisation of postpartum care, compared to the poorest class (reference).

A subgroup analysis was performed but the pooled OR obtained for both EPPC and LPPC groups revealed a non-statistically significant positive association. Consequently, atypical data were removed for subgroup analyses to get more robust findings. The obtained forest plots, without heterogeneity, in Appendix 3.5- figures 1 and 2, indicate that the likelihood increased by 71% (pooled OR:1.71, 95% CI:1.34-2.19) for LPPC and 17% for EPPC (OR:1.17, 95% CI:1.06-1.28) groups. Therefore, poorer women were more likely to get PPC within six weeks than within 48 hours, compared to poorest women.

To summarise, in comparison to the poorest households, all other socioeconomic status were facilitators of PPC utilisation. A social gradient of health was identified, meaning that the higher the wealth status, the greater the likelihood of PPC utilisation, as evidenced by the pooled OR for richest (3.31, 95% CI:2.82-3.88), richer (2.01, 95% CI:1.71-2.35), middle (1.56, 95% CI:1.35-1.80), and poorer (1.38, 95% CI:1.23-1.56) socioeconomic class. Finally, the influence of the SES was higher for LPPC than for EPPC.

3.3.2.4. The influence of women's education on PPC uptake

- **Primary education level**

The meta-analysis of the association between primary education level and PPC utilisation cumulated the results of eleven studies and concluded to a significant positive association (pooled OR=1.42, 95% CI:1.22-1.66) between women's primary level of education and PPC utilisation, in comparison with no formal education (Figure 3.11).

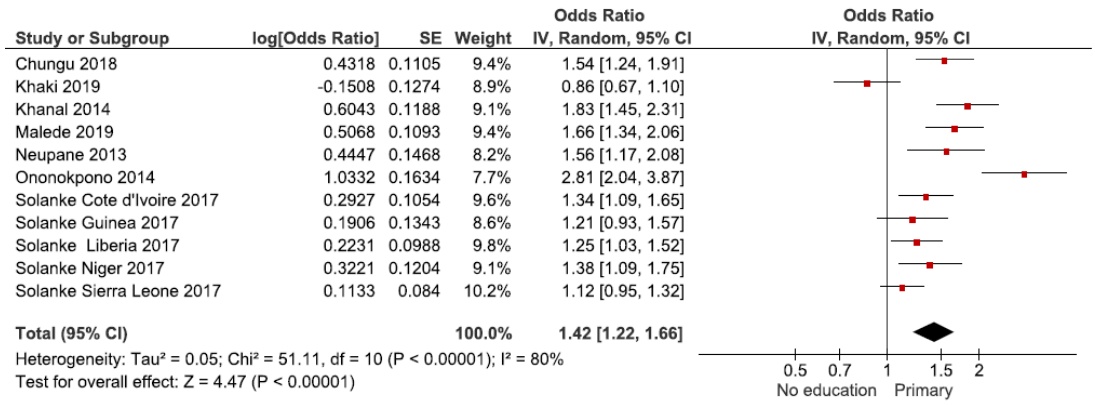


Figure 3.11. Meta-analysis of the association between use of postpartum care and women's primary education level, compared to no formal education (reference).

Although no publication bias was detected in this analysis as showed in Appendix 3.6 (figure 3), high heterogeneity was found.

To get a robust pooled estimation from the Figure 3.12, three studies with outlier individual OR were removed. The result, displayed in Figure 3.16, confirmed that women who have achieved a primary level education were 48% more likely to use PPC than those without formal education (pooled OR= 1.48, 95% CI:1.34-1.67).

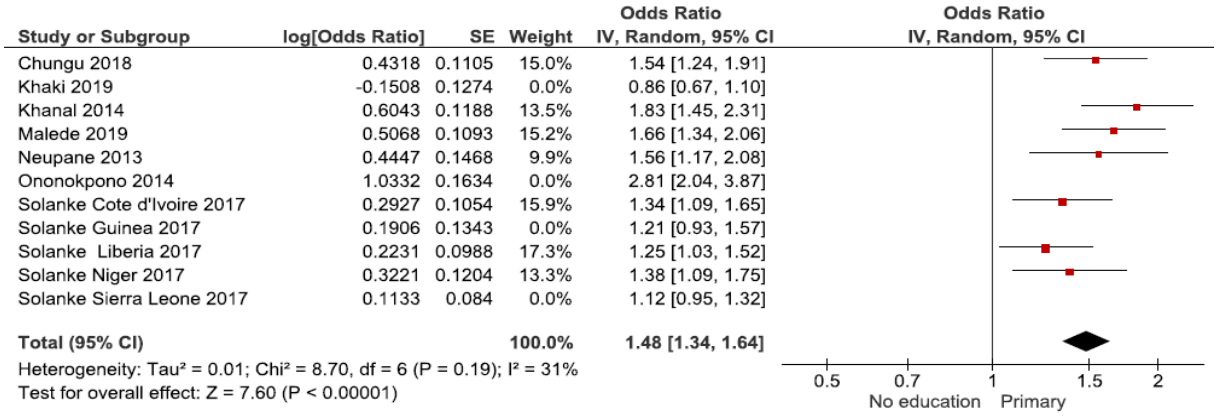


Figure 3.12. Sensitivity analysis illustrating the association between women's primary education level and use of postpartum care, in comparison without formal education.

The subgroup analysis was performed for both groups (EPPC and LPPC). It demonstrated that women with primary education were 62% (pooled OR:1.62, 95% CI:1.14-2.29) more likely to use LPPC (Appendix 3.6-figure 1) than their counterpart without formal education. No publication bias influenced this analysis according to the funnel plot interpretation (Appendix 3.6- figure 4).
However, due to high heterogeneity, a sensitivity analysis was conducted by removing two studies (Appendix 3.6-figure 2). That led to no publication bias and to a robust pooled estimation revealing that LPPC utilisation increased by 69% (OR=1.69, 95% CI:1.47-1.94) for women with primary education level, compared to those without formal education.

Concerning the EPPC group, Figure 3.13 shows that the likelihood of PPC utilisation increased by 29% (pooled OR=1.29, 95% CI:1.17-1.41) for women with primary education level. It was a robust result as low heterogeneity (I^2=19%) was found

between the six included studies, hence a sensitivity analysis was not necessary in this case.

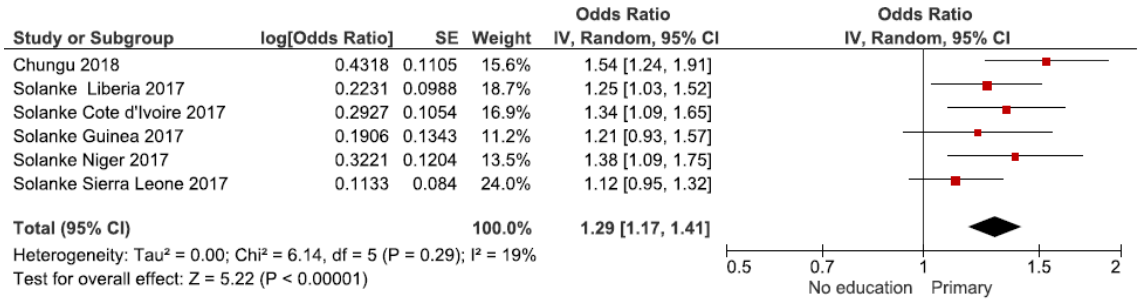


Figure 3.13. EPPC subgroup meta-analysis of the association between primary education level and postpartum care utilisation compared to no formal education (reference).

In conclusion, women's primary education was a determinant that facilitated the use of PPC, compared to no formal education, and its effect was higher for PPC utilisation within six weeks (LPPC) than 48 hours after delivery (EPPC).

- **Secondary education level**

The pooled effect of secondary education level was positively correlated to PPC attendance (OR=2.39, 95% CI:1.83-3.11), in Figure 3.14.

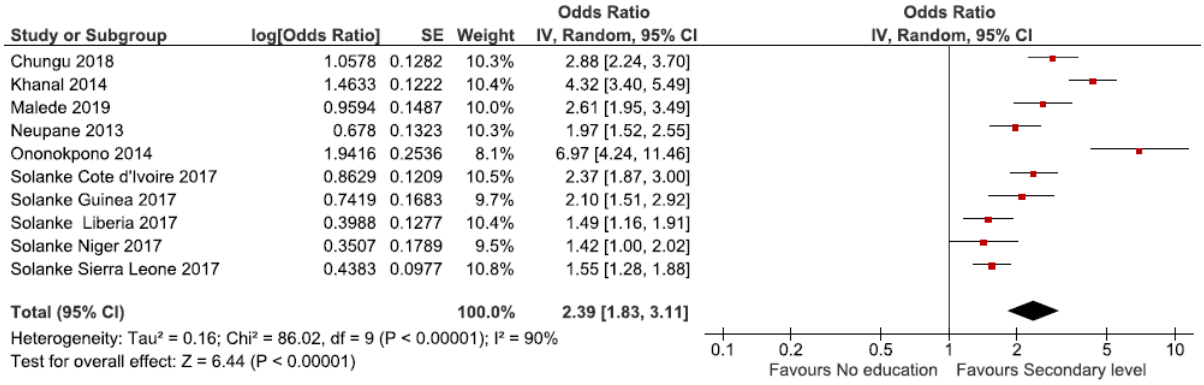


Figure 3.14. Meta-analysis of the association between use of postpartum care and women's secondary education level, compared to no formal education (reference).

However, due to the presence of high heterogeneity (I^2=90%) five studies with outlier OR were removed and led to the forest plot displayed in Figure 3.15. A conclusive pooled estimation was obtained confirming that women were more than twice likely (OR=2.38, 95% CI:2.08-2.73) to use PPC if they had achieved secondary school.

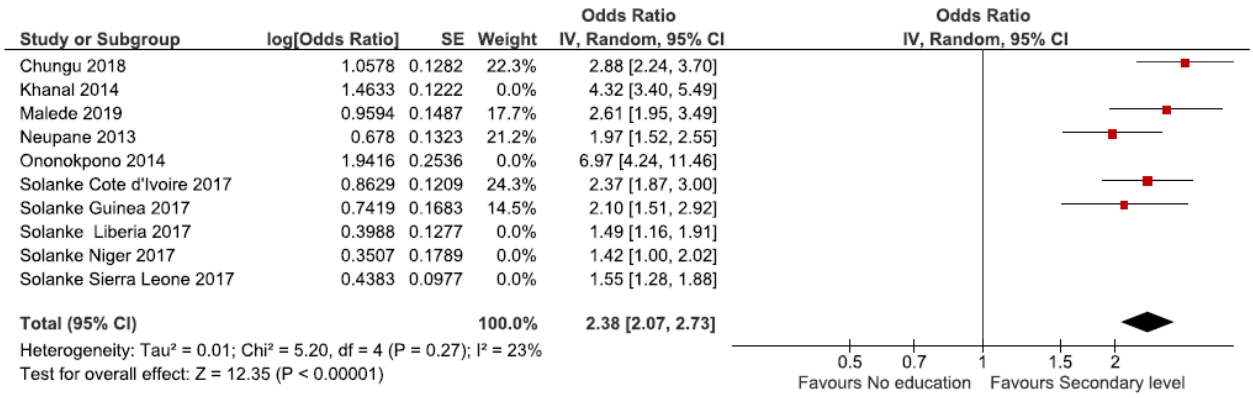


Figure 3.15. Sensitivity analysis of the association between secondary level education and use of postpartum care in comparison to no formal education (reference).

The subgroup analyses were also carried showing that the likelihood of PPC utilisation was multiplied by three for LPPC (pooled OR= 3.43, 95% CI:2.12-5.54) and increased by 91% for EPPC (pooled OR=1.91, 95% CI:1.51-2.41) for women with secondary education level compared to those without formal education (Appendix 3.7- figures 1 and 2). These findings presented a high heterogeneity; therefore a sensitive approach was carried out (see Appendix 3.7- figures 4 and 3) and concluded to a higher association of secondary level of education with LPPC utilisation (pooled OR=2.25, 95% CI:1.71-2.96) than with EPPC (pooled OR=1.63, 95% CI:1.30-2.05).

In conclusion, education positively influenced PPC uptake compared to no formal education, with secondary education having a stronger association with PPC uptake than primary education, regardless of when PPC occurred.

3.3.2.5. The influence of women's employment status on PPC uptake

The individual OR illustrating the effect of women's employment status on PPC utilisation varied widely and a poor overlapping of confidence intervals between studies was observed as seen in Figure 3.16. This observation suggested that for this determinant, the results for the included studies were too dissimilar to aggregate their estimations.

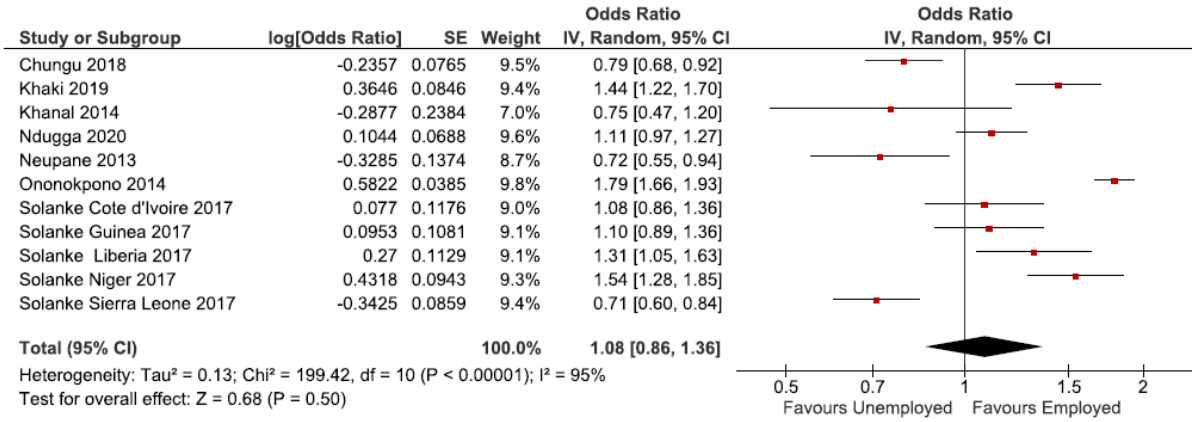


Figure 3.16. Forest plot showing the effects of women's employment on postpartum care utilisation, compared to unemployment (reference).

Concerning the subgroup analysis, statistically non-significant results were also found for both groups (Appendix 3.7, figure 5).

To conclude, the analysis did not support an association between the employment status of women and PPC utilisation.

3.3.2.6. The influence of the place of delivery: health facility versus other places on PPC uptake

For the place of delivery determinant, women who gave birth in health facilities were compared with those who gave birth in other places, in particular at home. The aggregation of studies' individual findings was inappropriate because individual OR were too disparate as shown in Figure 3.1. This distribution of ORs made the sensitivity analysis impossible.

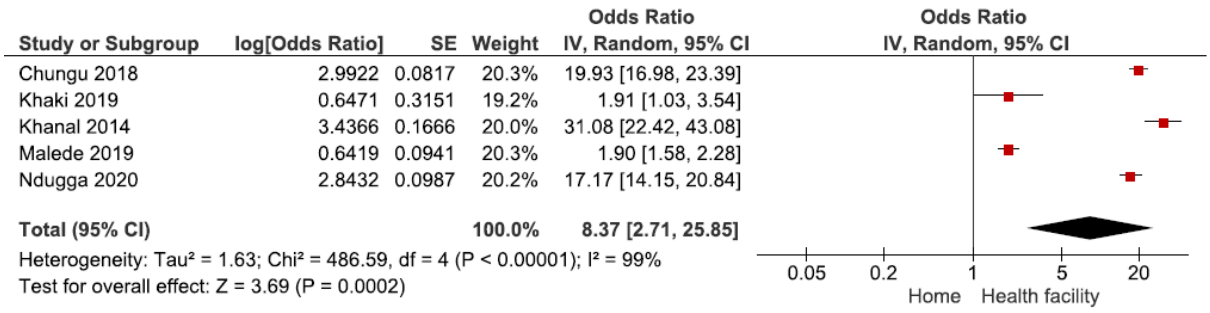


Figure 3.17. Meta-analysis of the association between health facility-based delivery and postpartum care utilisation, compared to other places (references).

Nonetheless, a subgroup analysis was performed. For the EPPC subgroup, two studies with low heterogeneity between them (I^2=26%) were included. As can be seen in Appendix 3.8-figure 1, the EPPC utilisation likelihood was multiplied by 18 (pooled

OR= 18.69, 95% CI:16.17-21.60) when the delivery occurred in a health facility rather than in other places.

The robustness of this finding was also reinforced by the absence of publication bias in its funnel plot as presented in Appendix 3.8 (Figure 2). Therefore, this determinant was a conclusive facilitator to receive EPPC.

Subgroup analysis for the LPPC subgroup was not feasible because individual results were too divergent. However, the removal of one study with atypical OR led to a robust finding as displays in Figure 3.18. The pooled estimation obtained indicated that giving birth at health facilities increased by 90% (OR=1.90, 95% CI:1.59-2.27) the likelihood of later PPC utilisation within six weeks.

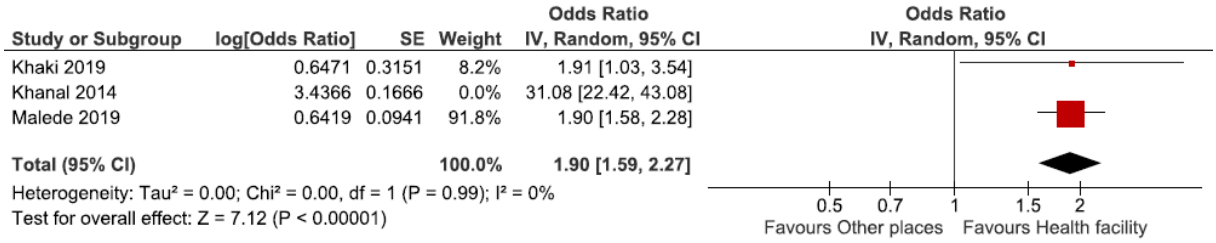


Figure 3.18. Sensitivity analysis of the LPPC subgroup meta-analysis showing the association between use of postpartum care and place of delivery: health facilities in comparison to delivery in other places (reference).

To summarise, although it was not possible to aggregate all individual OR for this determinant, the subgroup analysis demonstrated that giving birth in health facilities increased significantly PPC utilisation, especially during the early postpartum period (EPPC). This determinant had also a positive association with PPC utilisation during a period of six weeks after delivery (LPPC), but to a lesser extent.

3.3.2.7. The influence of the health facility governance: Public versus Private on PPC uptake

It seemed interesting to assess the association between the place of delivery and utilisation of PPC from another perspective, namely estimating the effect of giving birth in a private health facility on PPC utilisation compared to delivering in a public health facility. Among the 13 selected studies, only two had estimated the OR for this determinant and both belonged to the EPPC subgroup. Despite the absence of publication bias and low heterogeneity (I^2=27%), the analysis indicated a non-significant pooled effect (OR=1.20, 95% CI:0.85-1.70) (figure 3.19).

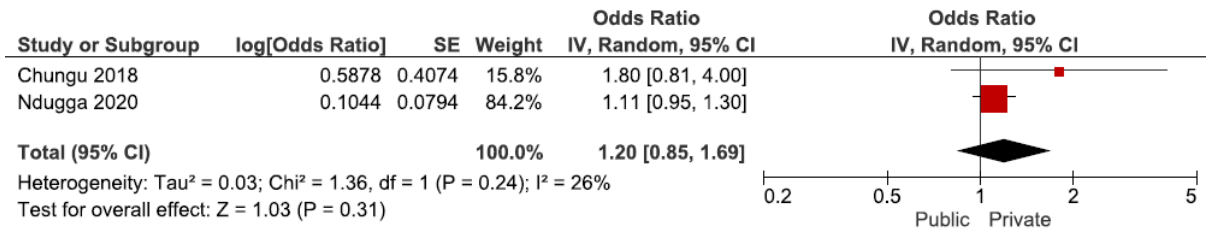


Figure 3.19. Meta-analysis of the association between private health facility-based delivery and postpartum care utilisation, compared to public health facility-based delivery (reference).

In addition, a sensitivity analysis was not feasible due to the lack of studies that measured this association. Therefore, it was not possible to conclude a pooled significant association between the type of health facilities' governance where women delivered and PPC utilisation.

3.4. Discussion

The meta-analysis was carried out to determine a pooled estimation of the effects of five determinants on the utilisation of postpartum care services. From the 24 articles included in the systematic review, nine articles were selected, which corresponded to 13 studies, with a total of 198 402 participants. Of those, 57% used PPC. This was more than the 32% found by Chaka *et al.* (2019) in their meta-analysis. The difference could be due to the study setting since Chaka only considered studies from Ethiopia whereas the studies included in the present meta-analysis represented 35 low-and-middle income countries.

The main results of this meta-analysis indicate that primary and secondary education level, employment status, and urban place of residence were associated with PPC utilisation. Likewise, a socioeconomic health gradient was evidenced, meaning that the higher the wealth status, the higher the use of PPC. This supports the results from the systematic review (Chapter 2).

This study highlighted that women who live in urban areas used PPC services more than those in rural areas. This may be explained by a better exposure to promotion campaigns and easier access to health facilities and skilled healthcare professionals. Secondly, as reported by the systematic review in Chapter 2 and by Hounton *et al.*, (2008), geographic distance, poor infrastructure and difficulties with transportation are barriers for rural women to access PPC. A comparison of the pooled estimations of PPC utilisation for place of residence and socioeconomic status determinants was

possible with Langlois *et al.* (2015) meta-analysis findings. A slight increase was observed since 2013 in the impact of both determinants on PPC utilisation. However, the comparison with Chaka's meta-analysis findings was not judicious because it focused on Ethiopia only and the present meta-analysis represented 35 LMIC with only one Ethiopian study.

The findings also show that educated mothers used PPC more than mothers without formal education. The effect of education level on PPC utilisation doubled when women had completed secondary education compared to primary education. Therefore, the higher the women's education level, the higher the likelihood of PPC utilisation. This finding supports Mainuddin *et al.* (2015) observation that the longer women study, the more likely they are to be autonomous in their own healthcare decision. They may have greater capacity to communicate with health professionals and to request adequate care which is less compatible with a paternalist relationship.

Regarding the type of administration governance in health facilities (private or public establishments), it was not possible to conclude on their respective effects on PPC utilisation because the findings were statistically non-significant. In South and Southeast Asia, deliveries in health facilities, especially private have increased across all types of facilities (health centres, clinics, hospitals) and most of the delivery care and maternal services are provided by the private sector. The literature points to an increase in use of private facilities across LMIC (Das et al., 2016; Gupta et al., 2015; Riaz et al., 2020; Waiswa et al., 2015). In India, Ghana or Kenya it is not only the quality of care that attracts women to use care in private health facilities, it is also the coverage of delivery care expenses by health insurance programmes implemented by governments (Montagu et al., 2017). Perhaps, women who deliver in a private health facility are more likely to receive EPPC than those who deliver in public facilities or home.

The subgroup analyses suggested that level of education, place of residence, employment status, and socioeconomic status determinants had higher associations with PPC uptake within six weeks (LPPC group) than 48 hours (EPPC group) after delivery. This finding can be explained by the fact that studies in LPPC group included participants who could have their PPC check-up(s) within 48 hours after delivery and

beyond up to six weeks, whereas the EPPC group focused on PPC provision within 48 hours post-delivery only. However, for the place of delivery determinant (health facilities vs. home), the results demonstrated that health facility-deliveries had a higher association with EPPC than LPPC. This might be because women are very likely to receive PPC before discharge from health facilities. Thus, the subgroup analyses added new learnings that were not reported by the systematic review, namely that the influence of determinants on PPC uptake varies depending on the period when PPC occur (i.e. before discharge or later).

The major strength of this meta-analysis is the large sample size (n=66 844) and the representativeness of the data which make the results generalisable to other LMIC. However, this study has some limitations. First, the presence of high heterogeneity between studies brings some concerns regarding the reliability of the results. To solve this issue, sensitivity analyses were undertaken, and they generated similar pooled size effects than those obtained with no or low heterogeneity. Therefore, the conclusions reached in the present meta-analysis can be deemed to be based on significant and robust pooled estimations. Another limitation in this study is the cross-sectional design of DHS which prevents the establishment of causality and temporal relationship between analysed determinants and PPC uptake (Levin, 2006).

Furthermore, some of the limitations of this meta-analysis are similar to those discusses in the previous chapter, given that the meta-analysis represents a subgroup of studies included in the systematic review. Hence, this study did not measure the potential effects of cultural beliefs because there were not captured by DHS surveys. All studies relied on self-reported data that may yield social desirability bias. Thus it is possible that some determinants such as delivery in health facility might be over reported. Data were collected retrospectively which might elicit some recall bias. However, this bias was minimised by considering the most recent delivery of women who gave birth within six months to five years (depending on the study) before data collection. Finally, the lack of studies that analysed the use of complete-PPC (e.g. four PPC visits within six weeks as recommended by the World Health Organisation) prevent the calculation of the pooled effect of the five determinants on full-PPC utilisation.

3.5. Summary of the Chapter

Thanks to its methodological benefits, this meta-analysis complements the learnings of the systematic review. Indeed, this chapter brought more precise and reliable pooled estimation effects of certain determinants. After merging individual ORs of 13 independent studies, the analysis allows to conclude with confidence that urban place of residence, women's primary and secondary education level, higher socioeconomic status, employment status, and the use of health-facility for delivery were associated with PPC utilisation. This meta-analysis also enabled the investigation of a question not addressed systematically by individual studies, namely the difference between EPPC and LPPC, with higher effect of determinants on LPPC utilisation than EPPC provision. Thus, as a complement to the systematic review (Chapter 2), this chapter finished to address the first research objective by quantifying PPC utilisation in LMIC.

Table 3.4. Summary of barriers and facilitators to PPC utilisation in LMIC synthetised in the systematic review and meta-analysis

Systematic review and meta-analysis findings	
Barriers	**Facilitators**
- Living in rural areas - Poverty socioeconomic situation - Women's unemployment status - Women and their partner without formal education - Age between 15-19 years old - Single marital status - Cultural norm - Lack of information on PPC by women and their family - Disrespectful maternity care	- Living in urban areas - Close distance from a health facility - Exposure to mass media - Education (from primary higher level) - Women's autonomy in decision-making - Wanted pregnancy - Primiparity - Attendance to antenatal care check-ups - Skilled birth attendance - Caesarean section - Delivery in health facilities

Implications for the research:

As mentioned previously the follow hypotheses will now be tested in the Moroccan sample:

1. Women's and their partner's education facilitates PPC utilisation,
2. Women's employment status does not influence the use of PPC,
3. Women's poverty hinders PPC utilisation,

4. Urban place of residence facilitates the use of PPC,
5. Giving birth in a health facility (versus other places) facilitates PPC utilisation,
6. Private health facility administration governance (private compared to public) where women gave birth facilitates PPC utilisation.

The next chapter presents the methodology employed for the empirical part of the research.

Chapter 4
Methodology

This chapter presents the methods used to study PPC and PPM in Morocco. First, the theoretical framework used in this research is described. The reasons for using a mixed-method approach grounded in the pragmatic paradigm is discussed. Second, the method used to carry out the quantitative study is presented. This involves describing the survey from which the database was extract and the statistical analysis strategy used to carry out this secondary data analysis. Third, the method used to carry out the qualitative studies is outlines, including participant recruitment procedure, data collection and analysis as well as ethical considerations.

4.1. Philosophical approach

In every study, researchers are led to define the philosophical framework in which their research is conducted, as this influences the way they collect and interpret the data (Morgan, 2007). The research is conceptualised and conducted according to the epistemological beliefs and values of a research paradigm (Tashakkori and Teddlie, 2010). Four paradigms are commonly used in social research, namely post-positivism, constructivism, advocacy/participatory, and pragmatism (Cresswell, 2014; Johnson and Christensen, 2014). Given the varied nature of the research objectives, this research utilised the pragmatic paradigm often associated with the use of a mixed method approach. The pragmatism approach bridges conflicting philosophy, i.e. constructivist and post-positivism (Johnson and Onwuegbuzie, 2004, p.17). In practice, the pragmatism focuses on real-world problems giving researchers the possibility to use different methods to produce knowledges based on a given research problem (Cresswell, 2009). Public health issues often involve health inequities which are caused by individual, social, and environmental factors. Given these complexities, using a quantitative or qualitative method alone may not be appropriate to gain a comprehensive picture of the topic (McClean et al, 2020). Cresswell (2014) defined mixed method research as method based on a collection of two forms of data (quantitative and qualitative), using two forms of designs. The quantitative study is based on a deductive reasoning, which involves a top-down process to test some hypotheses, whereas the qualitative study follows an inductive reasoning (bottom-up

process) to explore women's and healthcare professionals' accounts of their experience (Cresswell, 2014). These two methods investigate postpartum morbidity (PPM) and postpartum care (PPC) in different but complementary ways. Therefore, the obtained findings provide a more comprehensive understanding of the reasons for occurrence of PPM and the use of PPC.

4.2. Research design

The research design consisted of a systematic literature review and meta-analysis, and a sequential explanatory study divided in two phases as illustrated in Figure 4.1. This research design used the strengths of quantitative and qualitative methods (McClean et al., 2020).

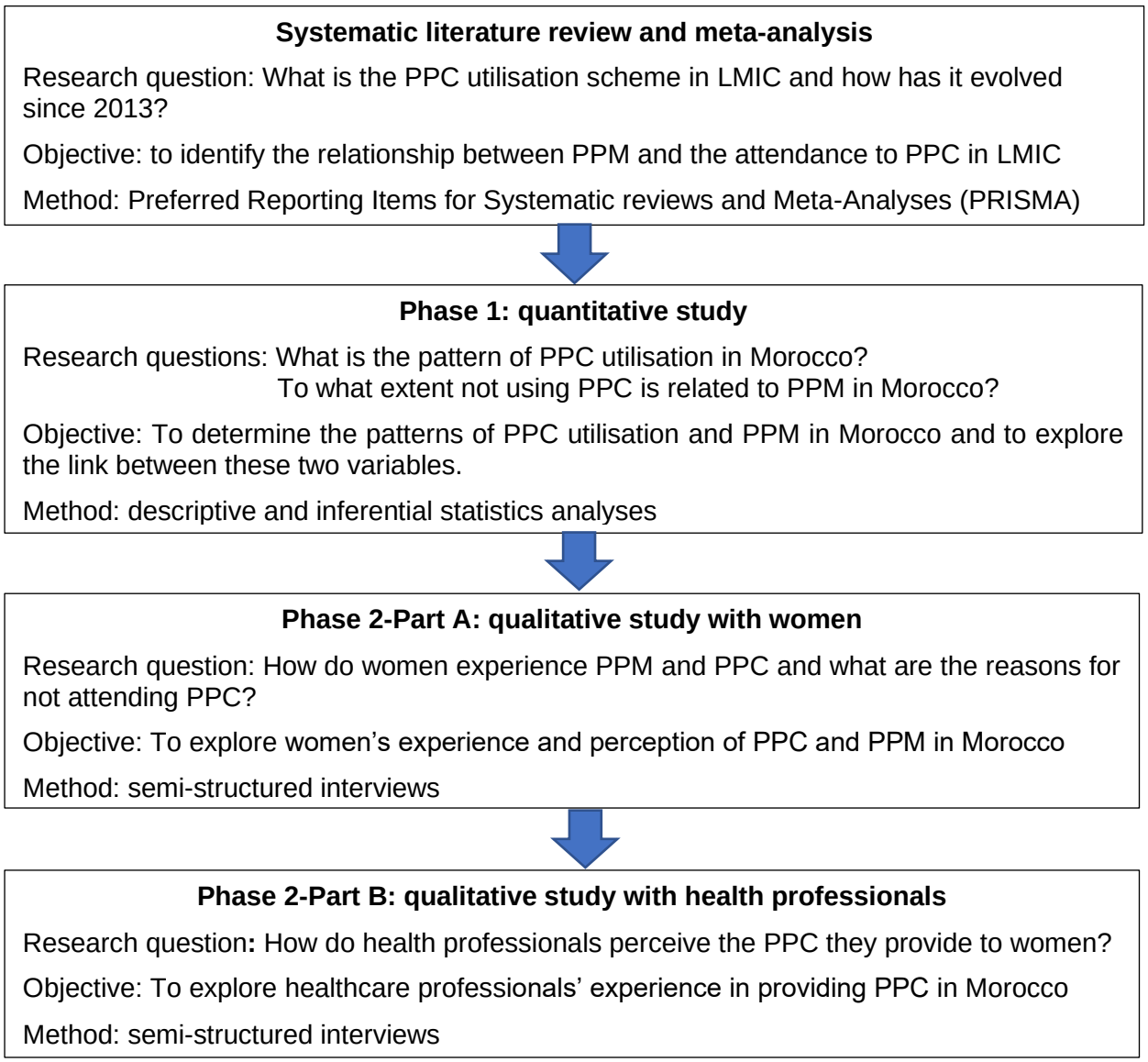


Figure 4.1. Research framework design.

4.3. Quantitative study

4.3.1. Data source

In the past thirty years, every five years, the Moroccan Ministry of Health, assisted by United-Nations' organisations, has conducted the *Enquête Nationale sur la Population et la Santé Famililale*- National Survey on Population and Family Health (NSPFH) which is a large-scale cross-sectional survey. Similarly to DHS, the purpose of the survey is to evaluate the heath of the population and the impact of health programmes and policies implemented to reach international engagement, amongst others, the Sustainable Development Goals (United Nations, 2021). Phase 1 of the research analyses the most up to date instalment of the survey conducted in 2018 (Figure 4.1).

To enable access to the data, a partnership was organised between the University of West London and the Mohammed V University at Rabat (Morocco). It was a necessary step to obtain access to the national database. The Moroccan university made a request to the Moroccan Ministry of Health to access the National Survey on Population and Family Health 2018 database.

4.3.2. Survey design

The NSPFH survey consists of three questionnaires: one focused on the household, another concerning women's health and the last one regarding the health of elderly people. The questionnaires are constructed from the Multiple Indicator Cluster Surveys (MICS) and the Pan Arab Project for Family Health (PAPFAM) questionnaires and adapted to the Moroccan context.

Only the questionnaire targeting women's health was considered for the study. The questionnaire is organised in seven sections:

- Section 1: characteristics, economic resources, and marriage
- Section 2: Reproduction and infant mortality
- Section 3: Maternal health related to the last child born within five years preceding the survey
- Section 4: Nutrition, health, and monitoring of the baby's health
- Section 5: Reproductive health
- Section 6: Family planning and fertility preference

- Section 7: Violence against women

The data analysed in the study were mainly taken from the following: section 1 to analyse the sociodemographic characteristics of women, section 3 to analyse antenatal care, delivery and PPC data, and section 5 to examine PPM.

4.3.2.1. Study population

Figure 4.2 below describes the sampling plan of the NSPFH survey, and the selection process of the individuals included in this study.

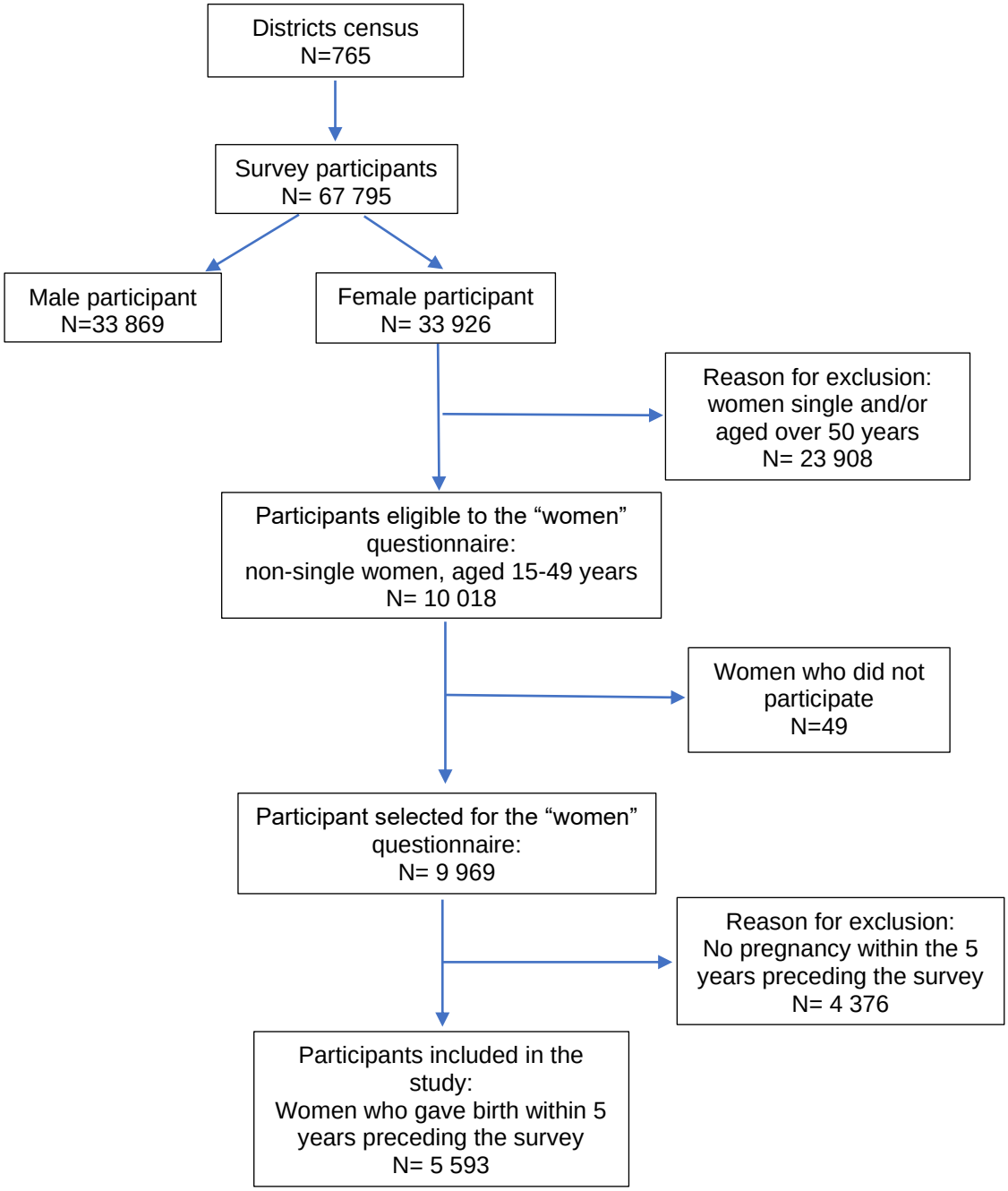


Figure 4.2. Flowchart of the selection process of the study participants.

The NSPFH participants were recruited using a two-stage stratified probability sampling method meaning that from the national list of census districts, 765 census districts were drawn, then 20 households were drawn from each census district representing 15 300 households in total (9000 urban households and 6300 rural households). Altogether, the survey recruited 67 795 participants, 33 896 men and 33 926 women (Figure 4.2). To be eligible to complete the "women" questionnaire, two inclusion criteria based on the age and marital status of the women were applied. To assess reproductive health, only childbearing women, aged between 15 and 49 years, were eligible. Moreover, only women who were non-single, meaning married, divorced, separated, or widowed at the time of the survey were eligible. Therefore, 10,018 women were eligible to complete the "women" questionnaire and among them 9,969 participated in the survey, representing a participation rate of 99.5%. To assess maternal health, a third inclusion criterion was applied to these participants. Thus, the sections 3 and 4 of the "women" questionnaire were administered only to women who gave birth to a live baby within five years prior to the survey (from 2013 to 2017). Altogether, this amounted to 5593 women included in the analysis.

The data were recognised as representative of the total population because of the sampling methods used. The fact that only non-single women were recruited did not affected the representativeness of the data because the majority of women who deliver in Morocco are not single. It is due to the law in force which forbids and punishes sexual relationships outside marriage (Penal Code-Consolidated version since the 5th of July 2018, 1962) and the cultural context in which most single mothers are marginalised by their family and the society.

4.3.2.2. Analysis plan

The aim of the study was to determine the scope of PPC utilisation in Morocco. Dependent and independent variables are described in the next section.

A. Dependent variables

Three dependent variables or outcomes were analysed. The first one was early PPC (EPPC) utilisation before discharge from the delivery led hospitalisation. Analyses related to this dependent variable focused on a sub-sample of women and excluded women who delivered at home or other places. The second variable was later PPC utilisation (LPPC) within six weeks following delivery, and the third one was PPM within

the same period (up to 6 weeks post-delivery). All the variables were binary (Yes/No) discrete ones.

The PPM variable was defined as the occurrence of the following eight health complications covered in the questionnaire: acute vaginal haemorrhage, oedema and foot pain, smelly vaginal discharge with fever, pelvic pain with fever, lower back pain with fever, dorsal pain with fever, urinary burning with fever, pain and swelling mammary with fever, and other morbidities that were not defined in the database.

B. Independent variables

Altogether 55 independent variables or predictors were considered and classified in four groups: sociodemographic, environmental, obstetric and other.

The list of determinants in displayed in Tables 4.1, 4.2, 4.3, 4.4.

The sociodemographic determinants included:

Table 4.1. Table of sociodemographic independent variables analysed in the Moroccan database

Variables	Categories
Women's age	15-29, 30-39, 40-49
Women's education level	None, primary, secondary and higher
Women's partner education level	Primary, moderate, secondary and higher
Women's employment	Employed, unemployed
Socioeconomic status	Poorest, poorer, middle, richer, richest
Marital status	Married, widowed, divorced, separated

The environmental determinants covered:

Table 4.2. Table of environmental independent variables analysed in the Moroccan database

Variables	Categories
Place of residence	Urban, rural
Regions_ group 1	the 12 administrative regions of Morocco
Regions_ group	Northern, Central, Southern
Long distance from health facility as a reason for not using LPPC (focused only on women who did not used LPPC)	Yes, no

The Obstetric determinants encompassed:

Table 4.3. Table of obstetric independent variables analysed in the Moroccan database

Variables	Categories
ANC consultations	Yes, no
ANC consultations frequency	0 visit, 1 to 3 visits, 4 visits, more than 4 visits
Birth attendant	Doctors, nurses or midwives, doctors and nurses or midwives, traditional midwives, relatives-friends-neighbours, another person, nobody
Mode of delivery	Vaginal, vaginal assisted by instruments, caesarean delivery
Place of delivery	Public hospital, delivery centre or health centre, private clinic, private surgery
Health facility governance	Public, private
Length of hospitalisation after delivery	Less than a day, from 1 to 7 days, a week or more
LPPC location	Public hospital, public health centres or delivery centres, private clinics, private surgeries
LPPC provider	Doctor, nurse or midwife, traditional midwife, another person
Reasons for non-utilisation of LPPC	Absence of complications, no awareness of the importance of PPC, expensive cost, long distance, PPC not available, others

The other determinants analysed included sociodemographic and obstetric factors not reported in the systematic review (cf. Chapter 2). These included:

Table 4.4. Table of other independent variables analysed in the Moroccan database

Variables	Categories
Number of PPM (which were also analysed individually)	From ‘none’ to nine morbidities per women
Last ANC location	Public hospital, delivery centre or health centre, private clinic, private surgery
ANC provider	Doctor, nurses or midwives, doctor and nurses or midwives, traditional midwives
Health issues during pregnancy	Yes, No
Number of health issues during pregnancy	From none to nine morbidities experienced per women
Desired caesarean	optional decision (i.e. caesarean without medical indication), planned before labour or by necessity, after the beginning of labour

Postnatal care for babies before discharge and within six weeks after delivery	Yes, no
Knowledge about female cancers (breast and cervical cancers	Yes, no
Informed about female cancers screening	Yes, no
Experience of cervical cancer screening	Yes, no
Cervical screening location	Health centre or delivery centre, private surgery or clinic, other places
Time since the last cervical screening	less than three years, more than three years
Contraception usage	Yes, no
Breastfeeding	Yes, no
Computer usage	Study, work, web navigation, other usage, no usage, never heard about it
Person making decision for women's employment status	Women only, husband only, women and husband together, someone else

4.3.3. Statistical method

The statistical approach consisted of a secondary data analysis conducted in two steps. The first one involved exploratory data analysis (EDA) and is reported in Chapter 5. The second one is a confirmatory data analysis (CDA) and is reported in Chapter 6. Tukey (1980) defined the EDA as the first step of data analysis aiming to identify patterns of a phenomenon- in this case PPC utilisation and PPM occurrence. In this study, EDA consisted of measuring the distribution of dependent and independent variables and performing univariate analyses (more details in Chapter 5-Method). Therefore, the EDA provided comprehensive information to contextualise PPC and PPM in Morocco and contributed to the formulation of models that were tested using CDA. The objective of the CDA is to confirm or disprove the patterns observed in the data by taking into account possible confounding factors (Behrens, 1997). CDA was performed using multivariate analyses. It consisted in conducting a hierarchical logistic regression model to control for confounding bias (more details in Chapter 6-Method). Significant adjusted odds ratios resulting from the logistic regression were used to respond to the second and third research objectives.

Thus, although EDA and CDA have different objectives they are complementary analytical approaches (Behrens, 1997). All analyses were performed using the Statistical Package for the Social Sciences software (SPSS, 2017, 2021).

The next section addresses the methodology used for the qualitative studies exploring women's and healthcare professionals' perceptions of PPC.

4.4. Qualitative studies

The initial plan was to collect data face-to-face in Morocco. However, the Covid-19 pandemic delayed the fieldwork because Moroccan's borders were closed. Consequently, a contingency plan was prepared to conduct the study remotely. The contingency method included online recruitment through social media (Facebook group of Moroccan midwives), professionals' bodies and snowballing approach. Ultimately, the researcher did not use the online recruitment method except for the snowballing approach via people met in-person in Morocco.

4.4.1. Qualitative study focusing on women

4.4.1 1. Setting

The search for eligible participants was conducted in-person in public and private health facilities and associations helping women in three cities (Casablanca, Rabat, Agadir) and their surrounding suburban and rural areas. Women were also recruited from the hospital the external supervisor is a consultant at. The procedure to access these facilities is discussed in more depth in section 4.4.5. Ethical considerations. Additionally, a snowballing recruitment method was employed to recruit women via phone calls in these three cities as well as in the North of Morocco (Tetouan, Berkane).

4.4.1. 2. Participants

Eligible participants were women aged 15 to 49 years old, who had given birth to a live baby at least six weeks (to enable them to have attended LPPC) to two years prior to data collection (between March 2020 and March 2022). Women also needed to speak Arabic, French, or English. In order to compare different experiences, women with varied socio-demographic profiles were recruited. Having received PPC was not an inclusion criterion, hence women who did not used PPC were also included to explore their reason of non-utilisation. Finally, women had to reside in Morocco, but their nationality was not an exclusion criterion. The final sample size was determined based on the concept of data saturation, which is the point at which no new information or themes are emerging from the data (Kerr, 2010).

4.4.1. 3. Recruitment procedure

Participants were recruited face-to-face in health facilities they came to for LPPC, baby's postnatal vaccination or other reasons. Prior to conducting interviews, participants received an information sheet and consent form (appendices 4.1 and 4.3). A room was allocated in the facilities for face-to-face interviews, otherwise interviews were conducted over the phone or at participants' home. The vocabulary used was adapted to women's level of understanding.

4.4.1. 4. Data collection

An interview grid was used (appendix 4.4) which contained 15 open questions. Examples of questions included: how was your relationship with health professionals during your hospitalisation and what is your opinion about the healthcare you received? Why have you chosen to attend to these consultations (LPPC)? It was piloted with the first participants to check whether it needed to be adapted in any way (for example due to lack of understanding of the questions). The pilot resulted in no major changes as the questions were well understood by participants, but one question on bribery practice was added, in case women mentioned complicated relationships with HPs or lack of care. Interviews were recorded only for participants who gave their consent and transcribed verbatim. Transcripts were translated into English and back translated into the language of origin to ensure accuracy. The supervisory team checked 10% of the translation accuracy. The interviews in Arabic were transcribed and translated into French and a third party verified 10% of the translations. Interviews in French were transcribed using Microsoft Stream software and checked for accuracy. All transcripts were then translated from French into English using the website www.deepl.com. Each English translation was proofread and corrected to ensure consistency with the French transcripts. Accuracy of the translation was checked on a 10% subsample of the transcripts by the researcher's French supervisor. Nevertheless, some of the quotes may be grammatically incorrect because of the limited French proficiency of some participants. Data were anonymised by giving a pseudonym to each participant and removing all identifying information.

4.4.2. Qualitative study focusing on health professionals

4.4.2. 1. Setting

The data collection took place in three cities (Casablanca, Rabat, Agadir) and their surrounding semi-urban and rural areas. The recruitment occurred in several and diverse health facilities, namely private surgeries, clinics and delivery centres, a structure managed by a non-governmental organisation, public hospitals, maternity wards, health centre, delivery centre to explore if the health professionals' (HPs) perceptions on PPC were different depending on the setting. Moreover, some HPs were recruited from the hospital the third supervisor is a consultant at. The procedure to access these facilities is detailed in section 4.4.5. Ethical considerations.

4.4.2. 2. Participants

Participants were HPs from a range of professions- e.g. gynaecologists, general practitioners, nurses, midwives working in urban and suburban areas. Only those who provided PPC as part of their role for at least six months were included. This was to ensure that participants had had the opportunity to experience providing PPC and to form an opinion about it.

4.4.2. 3. Recruitment procedure

HPs were recruited face-to-face at their workplace or remotely through snowballing approach by the researcher. In addition, some acquaintances from the supervisor in Morocco were interviewed or contributed to the recruitment of other HPs. All professionals took part in the study in a private capacity. An information sheet and informed consent form were provided to prospective participants (Appendices 4.2 and 4.3).

4.4.2 4. Data collection

Interviews were conducted face-to-face or by phone in French or Moroccan dialect according to participants' choice. An interview grid (Appendix 4.5) was designed and piloted with the first participants. This contained 11 questions, with example of questions including when do women seek PPC after leaving the health facility where they delivered? Why are there few women who attend to PPC in Morocco and what would encourage them to use them?

Data were anonymised by giving a pseudonym to each participant and removing all identifying information. Interviews were recorded only for participants who gave their consent and transcribed verbatim. Interviews transcripts were translated into English and back translated into the language of origin to ensure accuracy. For non-recorded interviews, notes were taken and transcribed. The interviews in Arabic were transcribed and translated into French and a third party verified 10% of the translations. Interviews in French were transcribed using Microsoft Stream software and checked for accuracy. All transcripts were then translated from French into English using the website www.deepl.com. Each English translation was proofread and corrected to ensure consistency with the French transcripts. Accuracy of the translation was checked on a 10% subsample of the transcripts by the researcher's French supervisor. Nevertheless, some of the quotes may be grammatically incorrect because of the limited French proficiency of some participants. Data were anonymised by giving a pseudonym to each participant and removing all identifying information.

4.4.3. Data analysis

A thematic analysis, using an inductive approach, was adopted to analyse the two qualitative studies. This method "provides a robust, systematic framework for coding qualitative data, and for then using that coding to identify patterns across the data in relation to the research question"(Braun and Clarke, 2014, pp.1-2). It is a versatile and flexible method that can be adapt to different research context and theoretical frameworks (Braun and Clarke, 2006). Indeed, it was implemented in a large heterogeneous sample to compare data of different groups of participants, in this case women and health professionals, to put into perspective their opinions.

The analysis involves six phases that were performed using Excel software from the phase 2 to the phase 5:

- Phase 1: familiarisation with the data which is an active reading of the data that was performed several times to start the identification of patterns and meanings.
- Phase 2: start the codification which enabled the data to be organised in clusters based upon similarities across interviews.
- Phase 3: searching for themes to define a list of prospective themes and subthemes.

- Phase 4: reviewing themes which signify that the entire data were read again, and the coding completed if necessary.
- Phase 5: defining and naming themes, thus each of them give an element of answer to the research question.
- Phase 6: producing the report to expose the analysis by including some quotations that illustrate the themes.

4.4.5. Ethical considerations

To enable access to the quantitative data collection or the qualitative data, a partnership was organised between the University of West London and the Mohamed V University at Rabat (Morocco). It was a necessary step to have access to the Moroccan national database. Ethical approval for the research was sought from the University of West London College of Nursing, Midwifery and Healthcare Ethics Committee. This was obtained the 10th of February 2020.

Amendments to the application for ethics approval regarding the contingency plan for the qualitative study were made and approved by the committee on the 17th of February 2022. As stated previously, in the end, the online recruitment method was not used.

Prior to any recruitment, the researcher obtained approval to conduct the research from the person in charge of the health establishments and recruit women and HPs. The signed documents (Appendix 4.9) were passed on to the supervisory team prior to collecting data.

Information sheets (Appendices 4.1 and 4.2) were provided to potential participants to inform them about the general purpose of the study and remind them of their rights as participants, including their right to withdrawal, anonymity, and be informed on the study findings (brief summary send upon request). It was accompanied with a consent form to be signed (Appendix 4.3) and returned to the researchers. After the interview, a debrief sheet was given to all participants (Appendices 4.6 and 4.7).

Postpartum morbidities and postpartum care might be a sensitive topic for women to discuss. There was a risk that some women may find it emotionally uncomfortable, particularly in the case of traumatic experiences, or lack of support from relatives and

friends. To mitigate any distress, clear information about right to withdraw and skip questions were included in the information sheet and repeated prior to the interview. In addition, details of support associations (such as family planning centres) was provided in case women needed support after the interview. The potential for distress was less significant for HPs than for the women, nevertheless, a list of associations that could support them was provided to them. It was made clear to them that the aim of the study was not to assess their performance nor the quality of care they provided, but rather to gauge their opinions on the care available to women.

Regarding safeguarding of the researcher, the data collection was processed over a period of six weeks in three cities of Morocco and their suburban areas. These cities were not chosen randomly. The criteria taken into consideration were the methodological and organisational feasibility and the safety of the researcher. She safely travelled to Morocco and commuted inside it. Also, she had a safe place to stay in each city, and remained in contact with the supervisory team, and in particular with the Moroccan supervisor.

Finally, data were stored and managed according to UWL requirements (Appendix 4.8). Names of participants and institutions were changed to protect participants' identity.

The next chapter covers the first part of the quantitative study which is an exploration of the Moroccan database extracted from the NSPFH.

Chapter 5
PPC uptake and PPM occurrence and factors associated with these in Morocco

The systematic review and meta-analysis presented in Chapters 2 and 3 outlined the scope of postpartum care (PPC) uptake in LMIC and the predictors associated with it. The resulting hypotheses on PPC utilisation and the factors associated with it were tested in the Moroccan context and the results are presented in this chapter. Additionally, the relative influence of predictors of postpartum morbidity (PPM) are also addressed here.

5.1. Introduction

This chapter reports the first step of the secondary data analysis: the exploratory analysis (see Chapter 4- 4.3.3 for more information). As quoted in the rationale for the research (cf. Chapter 1), only four monocentric studies had investigated PPC uptake and its determinants as well as the occurrence of PPM in Morocco. All of them focused on the Marrakech region. The findings indicated that PPC utilisation within six weeks after delivery (LPPC) reached 30.1% in 2015 (Elkhoudri et al., 2015) and that women with low sociodemographic characteristics, who were primiparous, and who delivered in a public hospital without PPM were less likely to use PPC (Assarag et al., 2013). Other reasons for not using PPC included a lack of knowledge on the importance of PPC, financial difficulties and previous bad experiences at hospitals (Elkhoudri et al., 2015).

These studies also indicate that PPM reported by women included haemorrhage, fever, pelvic infection, breast issues, pregnancy-induced high blood pressure, urinary leakage and burning (Assarag et al., 2015; Elkhoudri et al., 2015). Although PPM were reported by women, they were not always confirmed by a medical diagnosis. For example, postpartum mental distress was reported unprompted by 10% of women but only 5% were diagnosed. Moreover, the rate of diagnosed PPM, regardless of the condition, was 14% higher than self-reported PPM, with 60% and 44% respectively (Assarag et al., 2013) which emphasised the importance of LPPC in identifying these

conditions. Finally, near-miss during delivery, caused by pregnancy-related health issues, were also reported to lead to PPM (Assarag et al., 2015).

The gap in the literature related to the absence of evidence on PPC uptake and PPM based on broader and nationally representative data and a comprehensive and insightful understanding of the situation by analysing more determinants of PPC and a wider range of PPM. Therefore, the aim of the secondary data analysis is to fill this knowledge gap.

5.1.1. Objectives of the analysis

The aim of the study was to determine the scope of PPC utilisation in Morocco; to achieve this, four objectives were defined:

1) **To describe the population of study**. The expected findings were the distribution of the dependent variables and independent variables.

2) **To measure the extent of PPC utilisation before discharge and later (LPPC) and the rate of PPM.** The results would indicate the prevalence of PPC utilisation and PPM in Morocco.

3) **To identify the determinants associated with PPC utilisation and PPM onset in Morocco.** The expected outcome would be defined by crude OR (COR).

4) **To compare the situation in Morocco to other LMIC**, by comparing the results of this secondary data analysis to those from the systematic review and meta-analysis.

The tested hypotheses were drawn from the findings from the systematic review and meta-analysis reported in Chapters 2 and 3 and based on other LMIC.

5.2. Method

Detailed methodological information has been provided in Chapter 4 section 4.3. In summary, the database consisted of nationally representative data on maternal health, sociodemographic and environmental characteristics of women whose profile correspond to the study's inclusion criteria. There were three dependent and 55 independent variables.

The definitions of the various predictors were compared to that of similar variables in the maternal questionnaire of the Demographic and Health Survey 2008 and 2018

(DHS, 2008, 2018) to enable the comparison of findings with the meta-analysis that included studies based on DHS data (cf. Chapter 3).

To describe the population of study, the distributions of dependent and independent variables were assessed. Moreover, univariate analyses were performed to estimate the associations between predictors and EPPC, LPPC and PPM, independently. For independent variables with two modalities, Chi-squared tests were carried out, whereas bivariate analyses were chosen to examine the associations with predictors defined by at least three categories. The effect sizes were expressed by COR with a significance level of 5%. The p-values were also calculated to confirm or reject the null hypotheses. All of the analyses were performed with SPSS software (versions 25 and 28) (SPSS, 2021).

5.3. Results

5.3.1. Definition and reliability of variables

5.3.1. 1. Dependent variables

This study analysed three variables namely:

- PPC before being discharged from a health facility that was labelled as early PPC (EPPC) and coded as “Yes” or “No” (received/not received). All of the analyses related to this dependent variable applied to women who delivered in a health facility, accounting for 4792 women. This excluded women who delivered at home or other locations,
- PPC uptake later (LPPC) post-discharge and within six weeks after delivery coded as “Yes” or “No”,
- PPM occurrence within the first six weeks after delivery. This binary (“Yes/No”) dependent variable corresponds to the onset of at least one of the following symptoms: acute vaginal haemorrhage, oedema and pain in the feet, smelly vaginal discharge with fever, pelvic pain with fever, lower back pain with fever, dorsal pain with fever, urinary burning with fever, breast pain and swelling with fever, as well as other morbidities that were not defined in the database.

5.3.1. 2. Independent variables

Altogether, 55 predictors (or independent variables) were analysed and classified into four main categories: sociodemographic (eight variables), environmental (four variables), obstetric (27 variables) and 'other' (16 variables). Among the 21 predictors identified in the systematic review (cf. Chapter 2), 15 were also identified in the Moroccan database. The definitions in both surveys (i.e. NSPFH and DHS) were similar. The remaining determinants analysed in the systematic review and meta-analysis (religion, maternal autonomy in decision-making, exposure to mass media, desired of pregnancy, awareness of importance of PPC and knowledge of PPM) were not explored in the Moroccan questionnaire and the two (parity and multiple birth) were not provided, and thus these are not taken into consideration in the present analyses.

Other variables available in the Moroccan database (health issues during pregnancy, postnatal care for babies before being discharged from the health facility, and within six weeks after delivery, breastfeeding, compliance with female cancer screening, contraceptive utilisation, person deciding on women's employment status and computer usage) were used as predictors in these analyses.

A number of variables were recoded or created from pre-existing variables as follows:
- maternal age group, by grouping women into three categories (15-29, 30-39 and 40-49 years),
- the 12 regions of Morocco were categorised into three areas: Northern (Tangier, Oriental, Fès and Rabat), Central (Beni-Mellal, Casablanca, Marrakech, Drâa-Tafilalet and Souss-Massa), and Southern (Guelmim, Laayoune and Dakhla),
- the number of health issues during pregnancy and within six weeks after delivery was calculated using two variables scored on a 0-9 scale reflecting the number of symptoms experienced

- **Reliability of the data**

The number of missing data was negligible overall, as only five variables had missing data. These included: "maternal partner's education", "number of antenatal visits", "mode of delivery", "contraception utilisation" and "person deciding on the mother's employment status", with missing data for 24.8% (which might be explained by the fact that this variable did not consider men without formal education), 0.7%, 14.0%, 9.6% and 51.4% of the sample respectively. Therefore, given that since there were no

missing data for the majority of predictors (i.e. 50 out of 55 predictors), the data were deemed reliable.

5.3.2. Description of the population of study

5.3.2. 1. Sociodemographic characteristics

The sociodemographic distribution of women is detailed in Appendix 5.1. The population of study was primarily comprised of married women (97.5%). The majority were aged between 25 and 39 years old (25-29: 24.8%, 30-34: 24.0%, 35-39: 21.1%) mean age 31.7 (6.8), with the youngest (15-19) and oldest (45-49) women representing only 1.7% and 2.9% of the sample respectively. More than half of the women (57.8%) had not received formal education, 32.8% had achieved primary level and 9.4% secondary and higher education level. The level of formal education of the women's partners was primary (44.0%), preliminary (i.e. moderate) (27%) and secondary and higher (29%).

Most of the women were unemployed (90.0%), with the decision on the woman's employment status being taken by the husband in 49.7% of the sample, by the couple in 33.1% and by the women herself in 16.0%. No major variation was found between women's socioeconomic status, but a decreasing gradient was observed, namely women who lived in the poorest households represented the largest group in the sample 22.8%, followed by those from poorer (20.5%), middle (20.9%), richer (20.2%) and the richest (15.7%) households. Finally, computer usage was rare, since 82.7% of women had not used computers, and 52.0% had never heard of them. When they were used, women utilised them for web navigation (70.6%), study (14.0%), work (13.4%) or other purposes (2.0%).

To summarise, women in the Moroccan database were married, aged between 25 and 39 years old on average, unemployed, and mainly without formal education or educated to a primary level. A minority of women and their husbands reached secondary and higher education. Finally, their socioeconomic level was in majority poor.

5.3.2.2. Environmental characteristics

Appendix 5.2 shows the geographical distribution of women. The proportion of women who lived in urban areas (55.9%) was higher than in rural areas (44.1%). Geographically, 36.2% of women lived in the North of Morocco, 60.9% in the Central area and 2.9% in the South. This distribution is consistent with the geographical characteristics of the country because the size of the population in the South of Morocco is smaller due to the Sahara Desert. The distance to health facilities for LPPC utilisation was not the principal reason preventing women from using LPPC because only 2.9% of those who did not use LPPC considered the distance as a barrier.
In brief, the majority of women lived in urban locations, and in Northern and Central Morocco.

5.3.2. 3. Obstetric characteristics

Appendix 5.3 displays the obstetric characteristics of women. During their last pregnancy, 88.1% of women had received antenatal care with 53.0% of them attending at least four consultations. The last ANC consultation was provided by doctors (46.4%) and nurses or midwives (18.7%), in private surgeries (53.3%) and in public health centres or delivery centres (36.8%). On the other hand, 11.9% of women did not attend any ANC consultations. There were no particular health issues during pregnancy for 55.3% of women, but those who experienced health complications suffered mainly from a single morbidity (18.6%). Symptoms that were often reported included swelling of the face, fingers and feet (21.4%), intense pelvic pain (17.4%), breathing difficulties (15.1%) and intense and persistent headaches (14.7%).

Childbirth occurred essentially through vaginal delivery (38.2%) and vaginal delivery assisted by instruments (40.9%). Caesarean deliveries represented 21%, with 56.1% of these being opted for prior to labour or as a necessity, 34.2% after the onset of labour and, to a lesser extent, as an optional decision without medical indication (9.6%).

Deliveries occurred essentially in health facilities (86.2%), which were more commonly public (81.8%) than private (18.2%). More than half (56.8%) of deliveries took place in public hospitals (56.8%) followed by private clinics (14.6%), public health centres or delivery centres (13.7%) and private surgeries (1.1%). The length of hospitalisation

varied between one and seven days in 89.3%, less than a day in 9.6% and unusually beyond a week (1.1%). Nevertheless, 13.8% of women delivered their baby at home.

Most women were assisted by a healthcare professional (HP) during their delivery; these HPs were mainly nurses or midwives (54.5%) and doctors (18.8%). However, non-skilled attendants such as traditional midwives (7.9%), neighbours, friends, or relatives (5.2%) also assisted women. Only 0.4% of women gave birth alone.

Breastfeeding was commonly practised by women (97.1%), immediately (44.2%) or within a few hours (42.3%) after delivery. Postnatal care for newborn babies was more often provided before discharge from health facilities than within the six weeks after delivery, accounting for 67.8% and 35.5% respectively.

Regarding family planning, 87.1% of women used contraception, in particular the pill (73.1%) and intrauterine devices (5.5%). Additionally, awareness of female cancers (e.g., breast and cervical cancers) was high (94.6%), as was awareness of the associated screening method (93.3%). However, only 10.2% of women received cervical screening; this took place less than three years prior to data collection for 74.1% of them, in private structures (49.8%) and in public health centres or delivery centres (45.5%).

To conclude, in Morocco, women received ANC consultations from skilled HPs, and more than half of them received the four recommended antenatal consultations. Private health facilities were more often used for ANC visits than for delivery, while public health facilities were more often chosen as the place of delivery rather than for pregnancy monitoring. Deliveries occurred mainly in health facilities with the assistance of a skilled birth attendant and the duration of hospitalisation was a few days. Although vaginal deliveries were the standard approach, the caesarean section rate was twice as high compared to the WHO recommendations (i.e. 10–15% of deliveries) (WHO Statement on Caesarean Section Rates, 2015).

Having described the population of study, the following section will present the main results, namely the prevalence of PPC utilisation and PPM in Morocco, and the influence of sociodemographic, environmental, and obstetric predictors on PPC uptake and PPM.

5.3.3. PPC utilisation and PPM occurrence in Morocco

The proportion of women who delivered in a health facility and had EPPC before discharge was 62.6%. Within six weeks after delivery, the prevalence of LPPC utilisation reached 21.3% and LPPC were mostly provided by doctors (54.8%) and nurses or midwives (44.9%) (Appendix 5.3). LPPC follow-ups were essentially given in public health facilities or delivery centres (40.0%), as well as private surgeries (30.2%), private clinics (15.4%) and public hospitals (13.1%). Women more often reported using LPPC in public (53.2%) rather than in private health facilities (45.6%) and rarely at home (1.2%). Nevertheless, as displays the Figure 5.1, 78.2% of women did not seek LPPC because they did not experience complications (70.6%), or because they were not aware of the importance of LPPC (15.2%), its expensive nature (7.5%), the long distances from health facilities (2.8%) and the non-availability of the PPC service (1.7%) (Appendix 5.3).

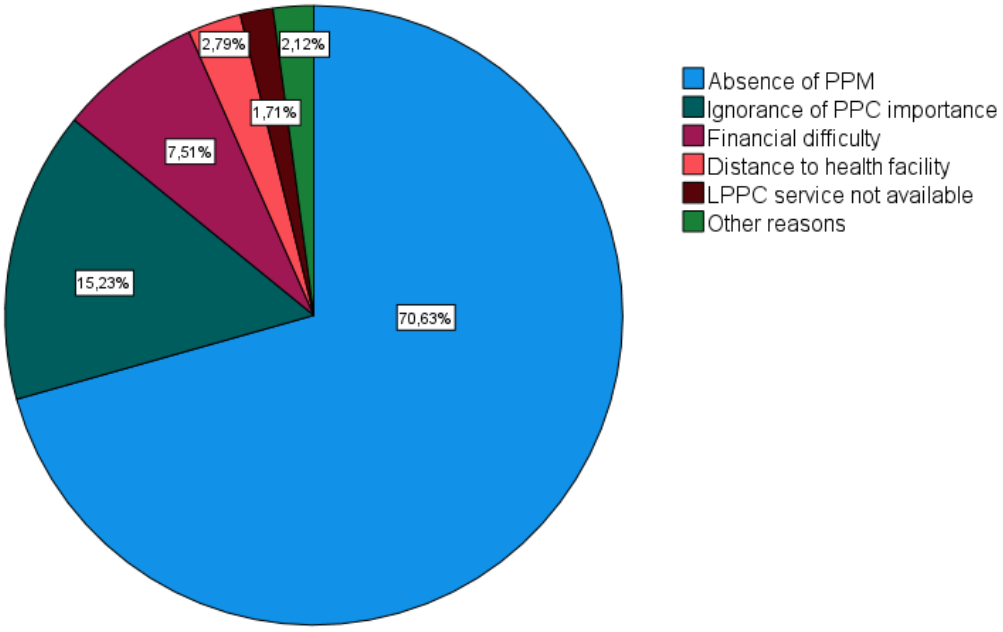


Figure 5.1. Reasons of non-utilisation of LPPC among women who did not use it.

Moreover, the proportion of women who experienced at least one PPM was 28.3% and most of them reported a single symptom (15.7%) (Appendices 5.3 and 5.4).

5.3.4. Associations between determinants and PPC uptake and PPM

5.3.4.1. Predictors influencing early PPC before discharge (EPPC)

A. Sociodemographic determinants

Table 5.1 below summarises the associations between sociodemographic predictors and EPPC, which was expressed as crude odd ratios (COR), confidence intervals at 95% and p-values.

Table 5.1. Associations between sociodemographic predictors and early postpartum care uptake (EPPC)

Sociodemographic variables	EPPC No (%)	EPPC Yes (%)	OR (95% CI)	P-value
Maternal age				
15-29	41.4	58.6	1	
30-39	35.4	64.6	1.29 (1.14-1.46)	< 0.01
40-49	31.7	68.3	1.52 (1.26-1.83)	< 0.01
Maternal education				
No formal education	41.1	58.9	1	
Primary	36.3	63.7	1.22 (1.08-1.39)	< 0.01
Secondary and higher	22,7	77.3	2.37 (1.90-2.95)	< 0.01
Partner's education level				
Primary	43.0	57.0	0.40 (0.34-0.47)	< 0.01
Preliminary/Moderate	39.2	60.8	0.47 (0.39-0.56)	< 0.01
Secondary and Higher	23.2	76.8	1	
Women's employment				
Unemployed	38.7	61.3	1	
Employed	26.4	73.6	1.76 (1.43-2.16)	< 0.01
Socioeconomic status				
Poorest	39.3	60.7	1	
Poorer	43.6	56.4	0.84 (0.69-1.01)	0.06
Middle	39.8	60.2	0.98 (0.81-1.18)	0.81
Richer	34.6	65.4	1.23 (1.02-1.48)	0.03
Richest	29.1	70.9	1.58 (1.29-1.93)	< 0.01
Marital status				
Married	37.4	62.6	1	
Widowed	33.6	66.4	1.18 (0.57-2.44)	0.65
Divorced	30.0	70.0	1.40 (0.82-2.40)	0.22
Separated	52.2	47.8	0.55 (0.24-1.23)	0.15

Analyses in Table 5.1 show that being over 30 years of age significantly increased the likelihood of receiving EPPC by 29% for women aged between 30 and 39 and 52% for those aged 40 and 49, compared to younger women (15-19).

Moreover, an increasing gradient was observed for the influence of education, namely the higher the level of education, the higher the likelihood of receiving EPPC. Indeed, compared to women without formal education, women with primary level, secondary and higher education were 22% to two times more likely to receive EPPC (Table 5.1).

As can be seen in Table 5.1, the employment status of women was significantly associated with receiving EPPC, being higher for employed women. The latter were 76% more likely to receive EPPC than unemployed women.

The influence of the socioeconomic was notable with an increasing gradient indicating that the higher the socioeconomic class, the higher the likelihood of receiving EPPC (Table 5.1). However, findings were non-significant for the poorer and middle classes. Hence, it can only be concluded that the richer and richest women were 23% and 58% more likely, respectively, to receive EPPC than the poorest women.

In summary, the maternal sociodemographic characteristics associated with EPPC in Morocco were being aged between 30 and 49 years, having completed formal education, regardless of the level for women and at least of secondary or a higher level for their husbands, being employed, and living in richer or the richest households.

B. Environmental determinants

The influence of environmental predictors on EPPC are summarised in Table 5.2.

Table 5.2. Associations between environmental determinants and early postpartum care uptake (EPPC)

Environmental variables	EPPC No (%)	EPPC Yes (%)	OR (95% CI)	P-value
Place of residence				
Rural	43.1	56.9	1	
Urban	33.9	66.1	1.47 (1.31-1.66)	<0.01
Regions_Group 1				
Tangier -Tétouan - Al Hoceima	43.6	56.4	1	
Oriental	42.3	57.7	1.06 (0.80-1.39)	0.70
Fès- Meknès	36.1	63.9	1.37 (1.08-1.74)	0.01
Rabat - Salé -Kénitra	32.3	67.7	1.62 (1.27-2.06)	< 0.01
Béni Mellal -Khénifra	19.0	81.0	3.31 (2.36-4.63)	< 0.01
Casablanca- Settat	34.1	65.9	1.50 (1.20-1.86)	< 0.01
Marrakech-Safi	54.5	45.5	0.65 (0.52-0.81)	< 0.01
Drâa-Tafilalet	9.3	90.7	7.52 (4.46-12.67)	< 0.01
Souss-Massa	38.5	61.5	1.23 (0.94-1.61)	0.12
Guelmim-Oued Noun	11.9	88.1	5.72 (2.57-12.75)	< 0.01
Laâyoune – Sakia El Hamra	52.4	47.6	0.70 (0.42-1.17)	0.18
Dakhla – Oued ed Dahab	54.6	45.4	0.64 (0.27-1.51)	0.31
Regions_Group 2				
Northern	37.1	62.9	1	
Central	37.6	62.4	0.98 (0.86-1.10)	0.70
Southern	36.5	63.5	1.03 (0.73-1.45)	0.89
Long distance from a health facility preventing the utilisation of LPPC				
No	44.0	56.0	1	
Yes	60.9	39.1	0.50 (0.28-0.92)	0.22

The place of residence was a significant factor associated with EPPC, as shown in Table 5.2. Living in urban areas increased the likelihood of receiving a consultation than living in rural areas by 47%. Women who lived in Drâa-Tafilalet, Guelmim, Beni-Mellal, Rabat, and Casablanca regions were seven times and five times, three times, 62%, and 50%, respectively, more likely to receive an EPPC check-up. On the other hand, for women who lived in the Marrakech area, the likelihood decreased by 35%.

In brief, living in urban areas favourably influenced the possibility of receiving EPPC. Regardless of the level of urbanisation (urban or rural areas), inter-regional disparities were identified.

C. Obstetric determinants

The Table 5.3 summarised the associations between obstetric predictors and EPPC.

Table 5.3. Associations between obstetric determinants and early postpartum care uptake (EPPC)

Obstetric variables	EPPC No (%)	EPPC Yes (%)	OR (95% CI)	P-value
LPPC setting				
Public hospital	15.5	84.5	1	
Delivery centre or health centre	12.2	87.8	1.33 (0.78-2.26)	0.29
Private clinic	7.9	92.1	2.13 (1.07-4.25)	0.03
Private surgery	20.1	79.9	0.73 (0.44-1.22)	0.23
Home	20.0	80.0	0.74 (0.17-3.12)	0.68
LPPC setting - type of governance				
Public health facility	13.1	86.9	1	
Private health facility	15.8	84.2	0.80 (0.57-1.12)	0.20
Home	20.0	80.0	0.60 (0.15-2.44)	0.48
LPPC provider				
Doctor	17.0	83.0	1	
Nurse or midwife	10.8	89.2	1.69 (1.18-2.43)	< 0.01
Traditional midwife	55.6	44.4	0.16 (0.01-3.60)	0.25
Another person	65.2	34.8	0.11 (0.01-1.36)	0.09
LPPC skilled provider				
No	60.0	40.0	1	
Yes	14.4	85.6	8.89 (1.47-53.60)	< 0.01
Reason for not having received LPPC				
Absence of complications	40.7	59.3	1	
Not aware of the importance of the care	49.5	50.5	0.70 (0.58-0.84)	< 0.01
Expensive cost	64.7	35.3	0.38 (0.29-0.49)	< 0.01
Long distance	60.2	39.8	0.45 (0.25-0.82)	0.01
Postpartum care service not available	60.4	39.6	0.45 (0.25-0.80)	0.01
Other	37.9	62.1	1.12 (0.72-1.76)	0.61
Antenatal care (ANC) received				
No	48.5	51.5	1	
Yes	36.6	63.4	1.63 (1.30-2.04)	< 0.01
ANC frequency				
0 visit	46.9	53.1	1	
1 to 3 visit(s)	42.7	57.3	1.18 (0.94-1.49)	0.15
4 visits	38.1	61.9	1.44 (1.13-1.82)	< 0.01
More than 4 visits	29.7	70.3	2.09 (1.66-2.64)	< 0.01

ANC provider				
Doctor	36.2	63.8	1	
Nurses or midwives	44.0	56.0	0.72 (0.61- 0.85)	< 0.01
Doctor and nurses or midwives	33.3	66.7	1.13 (0.99-1.30)	0.08
Traditional midwives	52.1	47.9	0.52 (0.05-5.13)	0.58
Mode of delivery				
Vaginal delivery	41.4	58.6	1	
Vaginal delivery assisted by instruments	45.5	54.5	0.85 (0.75-0.96)	0.01
Caesarean delivery	14.4	85.6	4.18 (3.43-5.11)	< 0.01
Wanted caesarean				
Optional decision	15.3	84.7	1	
Before the labour or by necessity	15.3	84.7	0.36 (0.15-0.85)	0.02
After the beginning of labour pain	6.1	93.9	0.36 (0.15-0.87)	0.02
Birth attendant (all types)				
Doctors	19.3	80.7	1	
Nurses/Midwives	46.1	53.9	0.28 (0.24-0.33)	< 0.01
Doctors+ Nurses/MW	26.8	73.2	0.65 (0.52-0.82)	< 0.01
Traditional Midwives	0.0	100.0	385505795.71	1.00
Relatives/Friends/Neighbours	61.1	38.9	0.15 (0.20-1.18)	0.72
Another person	52.0	48.0	0.22 (0.35-1.39)	0.11
Nobody	15.1	84.9	1.34 (0.03-70.38)	0.29
Place of delivery				
Public hospital	44.0	56.0	1	
Delivery centre or health centre	37.2	62.8	1.32 (1.13-1.56)	< 0.01
Private clinic	14.2	85.8	4.75 (3.85-5.85)	< 0.01
Private surgery	8.7	91.3	8.24 (3.38-20.12)	< 0.01
Place of delivery-type of governance				
Public	42.6	57.4	1	
Private	13.8	86.2	4.65 (3.80-5.70)	< 0.01
Length of stay in a health facility after birth				
Less than a day (hours)	47.1	52.9	1	
From 1 to 7 days	36.5	63.5	1.54 (1.27-1.87)	< 0.01
A week or more	22.2	77.8	3.12 (1.59-6.13)	< 0.01

Caption: LPPC: Later postpartum care

- **ANC check-up and health issues during pregnancy**

Attending ANC consultations increased the likelihood of receiving EPPC by 63%, according to Table 5.3. In addition, compared to women who did not receive any pregnancy monitoring, those who attended at least four ANC consultations were 79% more likely to receive EPPC. However, the type of healthcare professional providing the ANC also influenced EPPC because, compared to doctors, having attend an ANC consultation with nurses or midwives decreased the possibility of receiving EPPC by 28%.

Moreover, women who suffered from health issues during pregnancy were 21% less likely to receive EPPC than those who had no complications (Appendix 5.5).

- **Mode of delivery**

Depending on mode of delivery, the likelihood of receiving EPPC differed, as shown in Table 5.3. In comparison with standard vaginal delivery, the possibility of receiving

EPPC decreased by 15% in cases of vaginal delivery assisted by instruments, whereas it increased by four times after a caesarean delivery.

- **Skilled birth attendant**

Compared to deliveries assisted by doctors only, the likelihood of receiving EPPC decreased by 72% when women were assisted by nurses or midwives and by 35% in the case of doctors with nurses and midwives. Therefore, the findings in Table 5.3 suggest that the assistance of paramedic only during delivery decreased the provision of EPPC, compared to doctors' assistance.

- **Place of delivery**

Table 5.3 indicates a clear difference according to the type of health structure. Compared to public hospitals, the likelihood of getting EPPC increased by 32% when women delivered in public health centres or delivery centres, four times in private clinics and up to eight times in private surgeries. Overall, women who gave birth in private structures were four times more likely to receive EPPC than their counterparts who delivered in public establishments.

Additionally, the higher the length of hospitalisation, the higher the likelihood of receiving EPPC, increasing by 54% for those hospitalised for a few days or three times for those who were hospitalised for more than a week.

- **Postnatal care for babies (PNC)**

Findings in Appendix 5.5 suggest that women were 30 times more likely to receive EPPC when their babies received a consultation before discharge, and two times more likely when the latter received PNC within six weeks after childbirth; this was compared to babies without PNC before discharge or within six weeks after delivery.

- **Female cancers**

The influence of predictors related to female cancers is shown in Appendix 5.5. Knowledge of breast and cervical cancers was significantly associated with EPPC utilisation, with a likelihood increase of 34% and 31% for women who heard about them and those who had been screened, respectively compared to those who had not heard.

To conclude, the obstetric factors influencing EPPC utilisation included ANC visits, in particular with a frequency of at least four, delivery in a health facility, especially private structures, a hospitalisation period of a few days to more than a week, and delivery

via caesarean section. The fact that newborn babies received PNC before discharge was strongly associated with the possibility that their mother would also receive a consultation for themselves (EPPC). Nevertheless, women who experienced vaginal delivery assisted by instruments were less likely to receive EPPC. Finally, not receiving EPPC decreased the likelihood of later PPC uptake.

5.3.4. 2. Predictors influencing PPC uptake within six weeks after delivery (LPPC)

A. Sociodemographic determinants

Table 5.4 shows the influence of sociodemographic determinants on LPPC.

Table 5.4 Sociodemographic determinants associated with LPPC uptake.

Sociodemographic variables	LPPC No (%)	LPPC Yes (%)	OR (95% CI)	P-value
Maternal age				
15-29	81.5	18.5	1	
30-39	76.1	23.9	1.38 (1.20-1.58)	< 0.01
40-49	75.2	24.8	1.45 (1.19-1.75)	< 0.01
Maternal education				
No formal education	83.6	16.4	1	
Primary	74.5	25.5	1.75 (1.52-2.01)	<0.01
Secondary and higher	57.8	42.2	3.71 (3.05-4.52)	<0.01
Partner's education level				
Primary	82.5	17.5	1	
Preliminary/Moderate	78.9	21.1	1.26 (1.04-1.51)	0.02
Secondary and Higher	63.1	36.9	2.75 (2.33-3.25)	< 0.01
Women's employment status				
Employed	71.0	29.0	1.53 (1.26-1.86)	< 0.01
Unemployed	79.0	21.0	1	
Socioeconomic status				
Poorest	86.2	13.8	1	
Poorer	81.6	18.4	1.40 (1.13-1.75)	< 0.01
Middle	77.9	22.1	1.77 (1.43-2.18)	< 0.01
Richer	74.6	25.4	2.13 (1.73-2.62)	< 0.01
Richest	67.1	32.9	3.05 (2.47-3.78)	< 0.01
Marital status				
Married	78.2	21.8	1	
Widowed	86.2	13.8	0.57 (0.24-1,39)	0.22
Divorced	77.2	22.8	1.06 (0.61-1.85)	0.84
Separated	74.4	25.6	1.23 (0.53-2.90)	0.63

- **Maternal age and employment status**

Women aged between 30 and 39 and 40 and 49 years were 38% and 45% more likely, respectively, to use LPPC than women under 30 years of age (Table 5.4), and employed women were 53% more likely to use LPPC than unemployed counterparts. In addition, compared to women who decide by themselves upon their employment

status, those whose decision was taken by their husband were 29% less likely to get LPPC. This finding suggests indirectly that women with a lower level of autonomy in decision-making in their household could be less prone to utilise LPPC.

In summary, being over 30 years of age and employed is associated with the utilisation of LPPC.

- **Education and computer usage**

The level of education of women and their husbands significantly facilitated LPPC utilisation. Indeed, as can be seen in Table 5.4, compared to no formal education, achieving primary level of education for women increased the likelihood of LPPC utilisation by 75%, and a secondary or higher level by three times.

Likewise, compared to women whose partners had achieved primary level of education, those with a partner who had preliminary and secondary or higher level were 26% and two times more likely to use LPPC. These results suggest that there may be a gradient between the level of education of women and their husbands and LPPC utilisation.

Furthermore, maternal utilisation of computers for study, work, or other web navigation purposes was shown to increase the likelihood of getting LPPC by three times compared to non-utilisation of computers (Appendix 5.6).

In summary, educated women and computer usage were associated with LPPC utilisation, as well as having a partner who has received a formal education.

- **Socioeconomic status**

Maternal socioeconomic class was associated with LPPC utilisation, as displayed in Table 5.4. In comparison to the poorest class, women who lived in the poorer, middle, richer, and richest households were 40%, 77%, two times and three times more likely to use LPPC, respectively. Therefore, the higher the socioeconomic status, the higher the likelihood of using LPPC as illustrated in Figure 5.2.

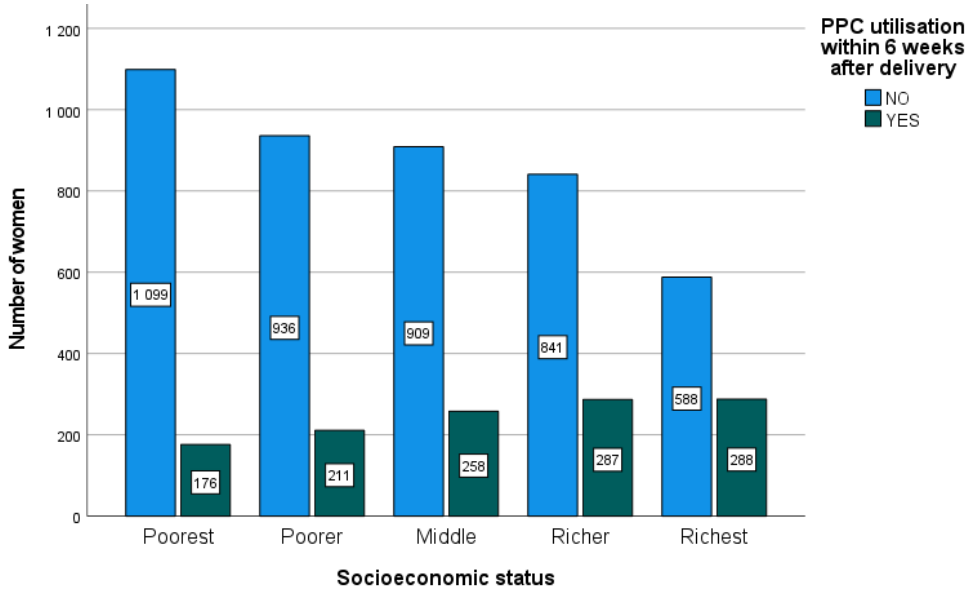


Figure 5.2. Bar chart illustrating the utilisation of LPPC depending on the socioeconomic status of women.

In brief, women who used LPPC to a greater extent tended to be over 30 years, have achieved formal education, be employed, computer users, and do not belong to the poorest households.

B. Environmental predictors

The associations between geographical factors and LPPC uptake are addressed in Table 5.5.

Table 5.5. Environmental determinants associated with LPPC uptake

Environmental variables	LPPC NO (%)	LPPC YES (%)	OR (95% CI)	P-value
Place of residence				
Rural	84.3	15.7	1	
Urban	73.4	26.6	1.95 (1.70-2.23)	< 0.01
Regions_Group 1				
Tangier-Tétouan- Al Hoceima	77.2	22.8	1	
Oriental	71.1	28.9	1.38 (1.03-1.83)	0.03
Fès- Meknès	82.6	17.4	0.71 (0.54-0.93)	0.01
Rabat - Salé -Kénitra	79.6	20.4	0.87 (0.67-1.13)	0.29
Béni Mellal -Khénifra	74.3	25.7	1.17 (0.87-1.57)	0.29
Casablanca- Settat	75.1	24.9	1.12 (0.89-1.41)	0.34
Marrakech-Safi	91.0	9.0	0.33 (0.25- 0.45)	< 0.01
Drâa-Tafilalet	38.1	61.9	5.49 (4.06-7.43)	< 0.01
Souss-Massa	86.4	13.6	0.53 (0.38-0.74)	< 0.01
Guelmim-Oued Noun	84.0	16.0	0.64 (0.32-1.28)	0.21
Laâyoune – Sakia El Hamra	81.6	18.4	0.76 (0.41-1.41)	0.39
Dakhla – Oued ed Dahab	76.7	23.3	1.03 (0.38-2.75)	0.96
Regions_Group 2				
Northern	79.9	20.1	1	
Central	77.0	23.0	1.18 (1.03-1.35)	0.01
Southern	81.9	18.1	0.88 (0.58-1.33)	0.54

In urban areas, women were 95% more likely to use LPPC compared to women in rural areas. Compared to the Tangier region, living in the Oriental and Drâa-Tafilalet increased the likelihood of using LPPC by 1.38 times and 5.49 times, respectively. In contrast, the likelihood decreased by 67% in the Marrakech region and 47% in the Souss-Massa region.

Thereby, living in urban areas was a significantly associated with LPPC utilisation, and inter-regional differences subsisted regardless of the type of residence (e.g., urban or rural).

C. Obstetric predictors

Table 5.6 displays the associations between LPPC and obstetric determinants.

Table 5.6 Obstetric determinants associated with LPPC utilisation

Obstetric variables	LPPC NO (%)	LPPC YES (%)	OR (95% CI)	P-value
Early PPC received				
No	91.0	9.0	1	
Yes	68.7	31.3	4.61 (3.85-5.52)	< 0.01
Antenatal care (ANC) received				
No	90.5	9.5	1	
Yes	76.5	23.5	2.92 (2.24-3.82)	< 0.01
ANC visit frequency				
0 visit	90.1	9.9	1	
1 to 3 visit(s)	83.5	16.5	1.80 (1.37-2.37)	< 0.01
4 visits	76.7	23.3	2.77 (2.09-3.67)	< 0.01
More than 4 visits	68.7	31.3	4.15 (3.18-5.42)	< 0.01
ANC provider				
Doctor	74.0	26.0	1	
Nurses or midwives	84.5	15.5	0.52 (0.43 -0.64)	<0.01
Doctor and nurses or midwives	75.6	24.4	0.92(0.80 - 1,06)	0.25
Traditional midwives	80.6	19.4	0.69 (0.11- 4.32)	0.69
Mode of delivery				
Vaginal delivery	84.5	15.5	1	
Vaginal delivery assisted by instruments	83.3	16.7	1.09 (0.92-1.30)	0.31
Caesarean delivery	51.7	48.3	5.10 (4.27-6.08)	< 0.01
Wanted caesarean				
Optional decision	43.7	56.3	1	
Before the labour or by necessity	49.8	50.2	0.78 (0.51-1.20)	0.26
After the beginning of labour	57.3	42.7	0.58 (0.37- 0.91)	0.02
Birth attendant (all types)				
Doctors and Nurses/Midwives	66.2	33.8	1	
Nobody	52.5	47.5	1.77(0.77-4.11)	0.18
Doctors	58.7	41.3	1.38 (1.13-1.68)	< 0.01
Nurses/Midwives	86.1	13.9	0.32 (0.26-0.38)	< 0.01
Traditional Midwives	85.9	14.1	0.32 (0.24-0.44)	< 0.01
Relatives/Friends/Neighbours	84.5	15.5	0.36 (0.25-0.51)	< 0.01
Another person	90.1	9.9	0.22 (0.07-0.71)	0.01
Skilled Birth attendant				
Not skilled	85.3	14.7	1	
Skilled	77.2	22.8	1.72 (1.39-2.14)	< 0.01

Place of delivery				
Home	14.9	85.1	1	
Public hospital	17.6	82.4	1.22 (0.98-1.52)	0.07
Delivery centre or health centre	14.2	85.8	0.95 (0.71-1.26)	0.71
Private clinic	49.2	50.8	5.53 (4.34-7.04)	< 0.01
Private surgery	55.3	44.7	7.05 (4.10-12.10)	< 0.01
Place of delivery				
Home	14.9	85.1	1	
Health facility	22.9	77.1	1.69 (1.37-2.09)	< 0.01
Type of governance				
Public	83.0	17.0	1	
Private	50.3	49.7	4.82 (4.12-5.64)	< 0.01
Length of stay in a health facility after birth				
Less than a day (hours)	86.0	14.0	1	
From 1 to 7 days	76.3	23.7	1.92 (1.46-2.51)	< 0.01
A week or more	63.2	36.8	3.59 (1.93-6.66)	< 0.01

- **EPPC and LPPC utilisation**

Although EPPC was a dependent variable in the analyses, it was also considered to be an independent variable that could be used to test its influence on LPPC. As can be seen in Table 5.6, there was a significant association between having received EPPC and using LPPC. Women who received EPPC were four times more likely to use LPPC, compared to women who did not receive EPPC. Moreover, women who went to private clinics for LPPC were twice as likely to have received EPPC than those who received LPPC in public hospitals. Conversely, the likelihood of having received EPPC decreased by 62% and 30% for women who did not use LPPC, regardless of the reason (Table 5.3).

In summary, having received EPPC before discharge facilitated later PPC utilisation within six weeks after delivery, in particular when LPPC was provided in private clinics.

- **Antenatal consultations**

Women who received pregnancy monitoring were almost three times more likely to use LPPC than those who had not had any ANC consultations (Table 5.6).

The more regularly women were monitored during their pregnancy, the more likely they were to use LPPC. In fact, compared to women who had no ANC consultations, the likelihood of LPPC utilisation increased by 80% for women who attend 1 to 3 ANC consultations, was multiplied by two times with four, and by four times for more than four consultations (Table 5.6).

Besides, the modalities of ANC consultations were also significant factors to consider. Indeed, the type of HPs who provided ANC was associated with LPPC uptake since women were 48% less likely to use LPPC if the ANC provider were nurses or midwives compared to doctors. The location of the last ANC consultation was also important because women were two times more likely to use LPPC when it occurred in private establishments compared to public hospitals (Appendix 5.6).

In summary, ANC check-ups promoted the uptake of LPPC, especially when they were frequent, in private structures and provided by a doctor.

- **Delivery proceeding**

As illustrated in Table 5.6, in comparison with vaginal delivery without complications, caesarean delivery increased the likelihood of using LPPC by five times.

The influence of the type of birth attendant on LPPC uptake varied depending on their profile. Women assisted by a skilled birth attendant (SBA) (doctors, nurses and midwives) were 72% more likely to use LPPC than those who were not assisted by an SBA (e.g., traditional midwives, friends, neighbours, relatives).

Table 5.6 shows the influence of place of delivery on LPPC. In contrast to home deliveries, birth in all other types of health facilities showed a significant relationship (up to 69%) with LPPC uptake. Women who delivered in private clinics and private surgeries were five times and seven times, respectively, more likely to use LPPC than women who delivered at home. Moreover, analysis of the type of health facility pointed out that giving birth in private structures increased the likelihood of LPPC uptake by four times compared to public establishments.

Finally, the length of hospitalisation was also associated with LPPC utilisation with a likelihood of 92% for a period of a few days and multiplied by three for hospitalisation beyond a week.

In summary, deliveries in health facilities, in particular those with private rather than public governance, were associated with LPPC utilisation, unlike home deliveries. The longer the length of stay in hospital, the more likely that LPPC would be used post-discharge.

- **Postnatal care for babies (PNC)**

The associations between PNC and LPPC uptake presented in Table 5.6 suggest that LPPC utilisation by women was multiplied by three if PNC for their babies occurred before discharge, compared to when no PNC was provided. Similarly, the likelihood increased by eight if PNC happened within six weeks after delivery.

- **Female cancers**

Women who knew of the existence of female cancers were 29% less likely to use LPPC compared to women who had no knowledge of them. However, women who received cervical screening were 78% more likely to use LPPC than their counterparts who did not. Moreover, when the screening was performed in private establishments, the likelihood of LPPC uptake increased by 58% compared to public health centres or delivery centres (Appendix 5.6).

In summary, LPPC utilisation in Morocco was associated with high sociodemographic predictors (i.e. being employed, educated and high(er) socioeconomic level) and urban places of residence. Other factors such as the pregnancy and delivery management in health facilities, especially in the private sector, by health professionals facilitated LPPC utilisation as well as the knowledge of female cancers and their screening. Additionally, it was more likely that women would have LPPC if their babies received PNC. Lastly, for women who delivered in healthcare facilities, there was a conclusive association between receiving EPPC and using PPC later, but within six weeks.

After having described the predictors' influence on PPC utilisation, the next session will examine their influence on postpartum morbidities (PPM).

5.3.4. 3. Predictors influencing postpartum morbidities

A. Sociodemographic determinants

Among the main sociodemographic factors analysed, only three were significantly associated with PPM, as illustrated in Table 5.7.

Table 5.7. Sociodemographic determinants associated with PPM occurrence

Sociodemographic variables	PPM No (%)	PPM Yes (%)	OR (95% CI)	P-value
Maternal age				
15-29	71.8	28.2	1	
30-39	72.2	27.8	0.98 (0.86-1.11)	0.72

40-49	69.7	30.3	1.11 (0.93-1.32)	0.26
Maternal education				
No formal education	71.4	28.6	1	
Primary	70.8	29.2	1.03 (0.91-1.17)	0.65
Secondary and higher	76.3	23.7	0.78 (0.63-0.96)	0.02
Partner's education level				
Primary	70.5	29.5	1.27 (1.07-1.49)	0.01
Preliminary/Moderate	72.5	27.5	1.15 (0.96-1.38)	0.14
Secondary and Higher	75.2	24.8	1	
Women's employment status				
Unemployed	71.7	28.3	1	
Employed	71.5	28.5	1.01 (0.83-1.23)	0.92
Socioeconomic status				
Poorest	73.2	26.8	1	
Poorer	73.6	26.4	0.98 (0.82-1.18)	0.86
Middle	69.0	31.0	1.23 (1.03-1.47)	0.02
Richer	69.3	30.7	1.21 (1.02-1.45)	0.03
Richest	73.7	26.3	0.97 (0.80-1.18)	0.79
Marital status				
Married	71.8	28.2	1	
Widowed	70.7	29.3	1.05 (0.54-2.06)	0.88
Divorced	70.0	30.0	1.09 (0.66-1.81)	0.74
Separated	63.6	36.4	1.46 (0.67-3.16)	0.34

Education was an important factor in the development of PPM. The risk of developing PPM for women with a secondary or higher education level decreased by 22% compared to women without a formal education (Table 5.7). Similarly, the likelihood of PPM occurrence increased by 27% for women married to a partner with a primary level of education compared to those with a partner with at least a secondary level of education.

Moreover, the influence of computer usage, presented in Appendix 5.7, indicates that women who used computers were 24% less likely to experience PPM.

In addition, the findings demonstrated that secondary and higher formal education levels achieved by women, or their husbands may be a protective factor against PPM, whereas the lack of formal education for women or education at no more than primary level for the mother's partner may increase the risk of developing PPM.

Finally, the results in Table 5.7 show that women from the middle and richer classes were 23% and 21% more likely to develop PPM, respectively, than those of the poorest households.

B. Environmental predictors

Table 5.8 displays the influence of the place of residence and Moroccan regions.

Table 5.8. Environmental predictors associated with PPM occurrence

Environmental variables	PPM No (%)	PPM Yes (%)	OR (95% CI)	P-value
Place of residence				
Urban	70.4	29.6	1.15 (1.02-1.30)	0.02
Rural	73.3	26.7	1	
Regions_Group 1				
Tangier-Tétouan- Al Hoceima	68.7	31.3	1	
Oriental	68.2	31.8	1.02 (0.78-1.34)	0.89
Fès- Meknès	47.3	52.7	2.44 (1.95-3.05)	< 0.01
Rabat - Salé -Kénitra	68.8	31.2	0.99 (0.79-1.26)	0.96
Béni Mellal -Khénifra	89.9	10.1	0.25 (0.17-0.36)	< 0.01
Casablanca- Settat	75.1	24.9	0.72 (0.58-0.90)	<0.01
Marrakech-Safi	75.7	24.3	0.70 (0.56-0.88)	<0.01
Drâa-Tafilalet	86.6	13.4	0.34 (0.23-0.50)	<0.01
Souss-Massa	78.3	21.7	0.61 (0.46-0.80)	<0.01
Guelmim-Oued Noun	84.6	15.4	0.40 (0.20-0.80)	0.01
Laâyoune – Sakia El Hamra	73.8	26.2	0.78 (0.45-1,35)	0.37
Dakhla – Oued ed Dahab	81.7	18.3	0.49 (0.17-1.43)	0.19
Regions_Group 2				
Northern	61.2	38.8	1	
Central	77.5	22.5	0.46 (0.41-0.52)	< 0.01
Southern	79.2	20.8	0.41 (0.28-0.61)	< 0.01
Long distance from a health facility preventing the uptake of LPPC				
No	73.4	26.6	1	
Yes	66.4	33.6	1.40 (0.95-2.05)	0.09

In urban areas, women were 15% more likely to develop PPM than women who lived in rural areas.

The inter-regional comparison between the Tangier region and other Moroccan regions revealed that women situated in the Fès-Meknes region were twice as likely to develop PPM whereas in the Beni-Mellal, Casablanca, Marrakech, Drâa-Tafilalet, Souss-Massa and Guelmim regions, women were significantly less likely to experience PPM. In other words, globally, compared to Northern Morocco, the occurrence of PPM decreased by 54% in Central Morocco and by 59% in the South.

C. Obstetric predictors

The influence of maternity care received during pregnancy, delivery and the postpartum period on PPM occurrence is shown in Table 5.9.

Table 5.9 Obstetric determinants associated to postpartum morbidities (PPM) occurrence

Obstetric variables	PPM No (%)	PPM Yes (%)	OR (95% CI)	P-value
Early PPC (EPPC) received				
No	66.8	33.2	1	
Yes	74.8	25.2	0.68 (0.60-0.77)	< 0.01
Later PPC (LPPC) received				
No	73.2	26.8	1	
Yes	66.2	33.8	1.39 (1.22-1.60)	< 0.01
LPPC location				
Public hospital	52.7	47.3	1	
Delivery centre or health centre	77.7	22.3	0.32 (0.22-0.47)	< 0.01
Private clinic	73.1	26.9	0.41 (0.26-0.64)	< 0.01
Private surgery	54.1	45.9	0.95 (0.65-1.37)	0.77
Home	64.3	35.7	0.62 (0.20-1.89)	0.40
LPPC location-type of governance				
Public health facility	71.5	28.5	1	
Private health facility	60.5	29.5	1.64 (1.29-2.08)	< 0.01
Home	64.3	37.5	1.39 (0.47-4.14)	0.55
LPPC provider				
Doctor	57.9	42.1	1	
Nurse or midwife	76.8	23.2	0.42 (0.32-0.53)	< 0.01
Traditional midwife	0.0	100.0	Not feasible	
Another person	34.8	65.2	2.57 (0.21-31.68)	0.46
LPPC skilled provider				
No	25.0	75.0	1	
Yes	66.4	33.6	0.17 (0.02-1.63)	0.08
Reasons for not having received LPPC				
Absence of complications	78.4	21.6	1	
Not aware of the importance of the care	67.5	32.5	1.75 (1.46-2.11)	< 0.01
High cost	44.4	55.6	4.55 (3.60-5.75)	< 0.01
Long distance	66.7	33.3	1.82 (1.23-2.67)	< 0.01
Postpartum care service not available	77.5	22.5	1.06 (0.61-1.83)	0.84
Other	48.2	51.8	3.91 (2.58-5.93)	< 0.01
Antenatal care (ANC) received				
No	69.9	30.1	1	
Yes	72.0	28.0	0.91 (0.76-1.08)	0.26
ANC visit frequency (4 categories)				
0 visit	69.9	30.1	1	
1 to 3 visit(s)	72.6	27.4	0.87 (0.72-1.06)	0.17
4 visits	76.7	23.3	0.71 (0.57-0.87)	< 0.01
More than 4 visits	68.0	32.0	1.09 (0.90-1.32)	0.36
ANC provider				
Doctor	71.9	28.1	1	
Nurses or midwives	74.6	25.4	0.87 (0.73-1.04)	0.13
Doctor and nurses or midwives	70.2	29.8	1.09 (0.95-1.25)	0.24
Traditional midwives	58.0	42.0	1.86 (0.43-8.11)	0.41
Mode of delivery				
Vaginal delivery	74.8	25.2	1	
Vaginal delivery assisted by instruments	70.7	29.3	1.23 (1.07-1.42)	< 0.01
Caesarean delivery	68.8	31.2	1.35 (1.14-1.60)	< 0.01

Wanted caesarean				
Optional decision	70.5	29.5	1	
Before labour or by necessity	64.4	35.6	1.32 (0.99-1.75)	0.06
After the onset of labour	75.1	24.9	0.79 (0.48-1.30)	0.36
Birth attendant				
Nobody	83.2	16.8	1	
Doctors	71.6	28.4	1.96 (0.64-5.94)	0.24
Nurses/Midwives	73.0	27.0	1.83 (0.61-5.53)	0.28
Doctor+ nurses/midwives	67.4	32.6	2.38 (0.78-7.26)	0.13
Traditional Midwives	68.2	31.8	2.30 (0.75-7.06)	0.15
Relatives/Friends/Neighbours	74.5	25.5	1.69 (0.5465.24)	0.37
Another person	60.9	39.1	3.17 (0.85-11.85)	0.09
Skilled Birth attendant				
No	70.3	29.7	1	
Yes	71.9	28.1	0.93 (0.78-1.09)	0.37
Place of delivery				
Public hospital	70.6	29.4	1	
Delivery centre or health centre	75.3	24.7	0.79 (0.66-0.95)	< 0.01
Private clinic	72.9	27.1	0.89 (0.75-1.06)	0.20
Private surgery	74.1	25.9	0.84 (0.47-1.49)	0.55
Home	71.0	29.0	0.98 (0.83-1.17)	0.86
Place of delivery				
Home	70.9	29.1	1	
Health facility	71.8	28.2	0.96 (0.81-1.13)	0.61
Place of delivery-type of governance				
Public	71.5	28.5	1	
Private	73.0	27.0	0.93 (0.79-1.10)	0.40
Length of stay in a health facility after birth				
Less than a day (hours)	72.1	27.9	1	
From 1 to 7 days	72.1	27.9	1.00 (0.81-1.24)	0.98
A week or more	50.1	49.9	2.58 (1.45-4.58)	< 0.01

- **EPPC provision and PPM**

Having received EPPC appeared to be a protective factor against PPM, as it limited the risk of experiencing PPM by 32% (Table 5.9).

Appendix 5.5 indicates that the likelihood of receiving EPPC decreased by 22%, 61%, 63 and 87% for women who suffered from one, three, four and seven PPM compared to those who did not experienced PPM. Therefore, the less likely a woman was to receive a EPPC before discharge, the higher the frequency of PPM experienced. Each of the eight postpartum morbidities defined in the survey were independently associated with the absence of EPPC, as detailed in Appendix 5.5.

In summary, EPPC was a preventive factor of PPM.

- **LPPC utilisation and PPM**

According to Appendix 5.6, compared to no LPPC, the likelihood of PPM occurrence increased by 39% for women who used LPPC. Pelvic pain with fever represented 32% of the morbidities associated with LPPC utilisation. However, women who experienced

other symptoms related to delivery (not identified precisely in the database) were two times more likely to use LPPC than women who did not. No other PPM were significantly associated with LPPC utilisation.

The location of LPPC provision also influenced PPM because the PPM occurrence decreased by 68% when LPPC was delivered in public centres or delivery centres and 59% in private clinics, compared to public hospitals (Table 5.9). However, the comparison between health facility governance showed that women with PPM were 64% more likely to use LPPC in private establishments.

In addition, women who received LPPC from nurses or midwives were 58% less likely to suffer from PPM than women seen by doctors.

To conclude, within six weeks of delivery, the utilisation of LPPC was associated with the occurrence of PPM. Nonetheless, the findings suggest that LPPC provided by nurses or midwives in public health centres or in private clinics may have been used by women as a preventive approach and not to treat PPM. For the sub-sample of women who did not use LPPC, the findings were mitigated and will be clarified through further analysis (cf. Chapter 6).

- **ANC consultations and health issues during pregnancy**

As displayed in Table 5.9, ANC visits prevented PPM only when women attended four checks, since it reduced the risk of experiencing PPM by 29%, compared to women with no ANC.

Regarding health complications during pregnancy, they were an important determinant of PPM with a risk multiplied by four, in comparison with having no health issues (Appendix 5.7). Moreover, the greater the number of health complications during pregnancy, the higher the risk of PPM with a risk increased by two to 15 times for between one and eight health issues during pregnancy respectively.

- **Mode of delivery**

Deliveries through vaginal delivery assisted by instruments or caesarean sections were significantly associated with PPM occurrence compared to non-complicated vaginal deliveries. The risk was slightly higher (by 12%) in the case of caesarean section, which increased PPM incidence by 35%, compared to vaginal delivery with instruments which increased it by 23%.

- **Postnatal care, breastfeeding and contraception**

The incidence of PPM decreased by 29% when women's babies received a PNC before discharge from the health facility, compared to none (Appendix 5.7). Similarly, breastfeeding appeared to be a protective factor, diminishing the risk of PPM by 36% compared to not breastfeeding (Appendix 5.7). Moreover, women who were using contraception were 22% less at risk of PPM compared to those who did not.

To summarise some obstetric determinants such as having received EPPC, four ANC consultations, PNC for babies, breastfeeding and using contraception may protect women from PPM. Other factors such as experiencing health issues during pregnancy and delivering with instruments or by caesarean section were identified as potential risk factors. Finally, although all significant associations need further analyses to investigate the potential effect of confounding factors, the associations related to the influence of the conditions of LPPC utilisation (i.e. location and provider) were divergent.

5.4. Discussion

This analysis aimed to determine the scope of PPC utilisation in Morocco. The results from the explorative data analysis indicate that between 2013 and 2017 the extent of PPC utilisation in Morocco reached 62.6% before discharge and 21.3% within six weeks of delivery. The latter was inferior to the 57% LPPC utilisation in other LMIC as seen in the meta-analysis findings (Chapter 3). Moreover, the rate of PPM, which comprised eight defined, and other undefined, pregnancy-related morbidities occurring within six weeks after delivery, reached 28.3%. Among the 55 determinants analysed, 41 seemed to be predictors of EPPC, 32 predicted LPPC utilisation and 32 predicted PPM.

Several determinants appeared to facilitate PPC utilisation in Morocco as in other LMIC (cf. Chapters 2 and 3). Indeed, being aged over 30 years, higher level of education (at least at a primary level for women and preliminary for their husbands), being employed and computer usage were associated with PPC utilisation both before discharge and within six weeks after delivery. The higher the socioeconomic status, the more likely the utilisation of PPC was. A similar positive association was found for women living in Moroccan urban areas although in Morocco, inter-regional differences existed for PPC utilisation and PPM occurrence. These disparities could be due to a

geographical context (mountainous, desert areas), population size, or the repartition of health facilities. More recent studies based on DHS data confirmed these associations in Ethiopia (Ayele et al. 2021), Sri Lanka (Perera et al. 2021), and Pakistan (Iqbal et al., 2023). The type of setting was another important factor. Giving birth in a health facility was identified as a possible facilitator of LPPC uptake compared to home delivery. Overall, deliveries in private structures were positively associated with EPPC and LPPC utilisation. The same trend was observed in other LMIC (cf. Chapter 2 – Sudan (Izudi et al., 2017b) and Zambia (Chungu et al.2018)). Additionally, findings also indicated that attending four ANC consultations in private health facilities is as a possible facilitating factor for EPPC and LPPC and it seems preventing the occurrence of PPM.

Although caesarean deliveries increased LPPC utilisation by five times, which was similar to the rate reported for other LMIC (cf. Chapter 2 and recent studies (Ayele et al. 2021; Iqbal et al. 2023)), findings revealed that c-section is a risk factor for PPM compared to vaginal delivery without complications. The onset of PPM related to caesarean delivery were also observed in Tanzania (Litorp et al., 2014) and other LMIC in the systematic review and meta-analysis of Sobhy et al. (2019). Similarly, women who experienced health issues during pregnancy appear to be at greater risk of developing PPM. This observation was not reported in the systematic review, but further studies on near-miss corroborated it (Drechsel et al., 2022; Litorp et al., 2014).

Regarding women who did not use LPPC due to lack of knowledge about the importance of PPC, high cost, long distance from health facilities, or no PPC service available, they were less likely to have received EPPC and significantly more at risk of developing PPM, compared to women who did not use LPPC simply because of an absence of complications. Furthermore, the fact that decisions related to maternal employment status were taken by the husband for 49.7% of women in this sample suggests that maternal autonomy in decision making remains low for half of the study population. However, it should be noted that 51.4% of the data were missing for this variable, therefore this result needs to be interpreted with caution. Nevertheless, the systematic review (cf. Chapter 2) did indicate that a low level of maternal autonomy in decision-making was a barrier to LPPC uptake. Thus, women’s lack of autonomy in decision making appears to be a determinant that hinders PPC uptake in Morocco just like in other LMIC (cf. Chapter 2).

Concerning the relationship between the three study outcomes (EPPC, LPPC and PPM), findings indicate that women who received EPPC before discharge were more likely to use LPPC. They were also at a lower risk of PPM and even less likely to develop more than one PPM. These observations, which need to be confirmed by further analyses, suggest that continuous maternal healthcare after delivery could prevent PPM.

The comparison between factors associated with EPPC and LPPC also yielded interesting results. There was a clear difference between the strength of associations between factors and the type of PPC, with higher associations displayed for LPPC compared to EPPC. This trend was similar to the meta-analyses results for associations between LPPC and socioeconomic status, education, and place of delivery predictors (cf. Chapter 3). However, it was notable that in the meta-analysis, the results concerning LPPC uptake also included women who had EPPC. However, in the Moroccan database, the uptake of PPC before discharge and during the six weeks following delivery (i.e., post-discharge for women who gave birth in a health facility) were assessed independently from each other.

The strength of this study was to analyse PPC uptake and PPM specifically in Morocco with nationally representative data, which has not yet been investigated. This provided unique and novel insights into the situation in Morocco. The second value of the study was to analyse the dependent variables (EPPC and LPPC) through considering factors not explored in the systematic review, such as the number of PPM experienced, health issues during pregnancy or maternal computer usage, all of which were significantly associated with PPC utilisation and PPM. Additionally, the context of LPPC utilisation was analysed more comprehensively (LPPC providers, locations, reasons for non-utilisation of LPPC) than in the studies included in the systematic-review and meta-analysis, enabling a deeper level of understanding of the Moroccan context. Therefore, the results contribute to a better understanding of patterns of PPC uptake and PPM In Morocco, which could help with the implementation of public health interventions.

Nonetheless, the main limitation of this analysis lied in not having access to data pertaining to other pregnancy-related morbidities such as postpartum depression that

seemed to be associated with under-utilisation of LPPC as shown in the literature (Edhborg et al., 2005; Manso-Córdoba et al., 2020), as well as other reasons associated with the non-utilisation of PPC. Moreover, PPM data were based on self-reports by women and were not confirmed by medical records, hence social desirability bias cannot be excluded. Finally, although the results show that the absence of PPC before discharge and later was associated with PPM, and that PPM frequency was inversely proportional to the likelihood of using PPC, the survey design did not allow causal relationships to be concluded. Therefore, at this stage it is not possible to understand whether, within the first six weeks after delivery, women used LPPC to treat PPM or to prevent them. Further research is needed to ascertain the nature of the relationships.

5.6. Summary of the chapter

This chapter presented an exploratory analysis of a national database, which is representative of the situation of Moroccan women of childbearing age who gave birth between 2012 and 2018. Data were considered to be reliable, as very few analysed variables had missing data and the definitions of independent and dependent variables matched well overall with the Demographic and Health Survey questionnaire. Consequently, the findings can be compared with those from the systematic review and meta-analysis.

More than half of the women who gave birth in a health facility received a PPC before discharge, but only 21.8% of the total sample used PPC within the six weeks after delivery. The characteristics of women were reported to contextualise the influence of sociodemographic, environmental, and obstetric determinants on PPC utilisation, which was identical in Morocco to other LMIC. In Morocco, 28.3% of women experienced PPM and risk factors included poverty, the absence of formal education, urban residence, a lack of medical monitoring for women and babies, and health complications during pregnancy and delivery. Therefore, continuous maternal healthcare provided by healthcare professionals, in particular in private health facilities, from pregnancy to delivery and the postpartum period, were all determinants associated with PPC utilisation and a reduction of PPM.

This exploratory analysis identified several factors associated with PPC uptake and PPM occurrence. However, the results presented in this chapter should be interpreted with caution as the measure of associations was carried out without considering the effects of possible confounding factors. Therefore, the preliminary evidence of the exploratory data analysis established the basis for the next stage of analysis: the confirmatory data analysis, which will lead to more robust conclusions. This analysis is presented in the next chapter (Chapter 6).

Chapter 6
Predictors of PPC and PPM in Morocco using multivariate statistical analysis

This chapter presents the second part of the quantitative analysis on the Nationally representative database – Enquête Nationale sur la Population et la Santé Familiale (National Survey on the Population and Family Health (NSPFH)) - which aims to measure the state of health of the population to inform health policies, strategies and initiatives. This complements the analyses presented in Chapter 5 and aims to provide further insights into the associations between PPC uptake and PPM and their respective determinants.

6.1. Introduction

In the previous chapter, the obstetric characteristics of women who gave birth in Morocco between 2012 and 2018 were described while revealing their sociodemographic and environmental context. The postpartum care (PPC) utilisation rate reached 62.6% during hospitalisation and 21.3% after discharge and within six weeks after delivery. Postpartum morbidities (PPM) were reported by 28.3% of women. Finally, numerous predictors were identified as being associated with PPC uptake and PPM including sociodemographic, obstetric and environmental.

A confirmatory data analysis was conducted to verify the results of the univariate analysis (chapter 5) by controlling for confounding bias such as age. To do so, a multivariate analysis was performed and is detailed in this chapter. It aims to confirm the associations between PPC uptake and PPM and their determinants through a multivariate analysis.

The analysis had two objectives:

1) **To measure more precisely, compared to the univariate analysis, the associations between factors and PPC uptake and PPM in Morocco.** The expected outcomes are adjusted odds ratios (AOR).

2) **To assess the relationships between PPC utilisation and PPM in Morocco.** The outcomes are also expressed in AOR.

6.2. Method

A multivariate analysis using logistic regression is defined as a statistical method measuring the associations between predictors and an outcome by controlling for covariates simultaneously. This method is deemed appropriate to analyse the database because it enables the process of a large number of covariates that could be potential confounders (Pourhoseingholi et al., 2012) to predict a binary outcome i.e., use or no use of PPC and onset or non-onset of PPM. Indeed, in Chapter 5, a large number of independent variables, more precisely 55, were analysed.

Furthermore, the deleterious effect of multicollinearity was demonstrated in the literature (Dormann et al., 2013; Kim, 2019; O'brien, 2007). The presence of multicollinearity between predictors included in a regression model indicates that some predictors are correlated (i.e. shared information) which can bias the identification of significant relationships with the outcome variables as it is unclear which variable may contribute to the outcome more than the other. Consequently, the integration of a multicollinearity diagnosis in logistic regressions was highlighted as good practice in epidemiological studies by Vatcheva et al. (2016). Hence, a diagnostic test of multicollinearity was performed on the database to determine the predictors to include in the logistic regression. Only predictors that did not induce serious multicollinearity (Table 6.1) (Stoltzfus, 2011) and already used in the literature (cf. Chapters 2 and 3) were deemed eligible to generate reliable statistical regression models.

The predictor selection process was performed in four steps, which are detailed in the Appendix 6.1:

- Step 1: exclusion of 23 predictors which exhibited high level of intercorrelations to avoid duplication of information and/or misrepresentation of the predictors' relative influence in the logistic regression.
- Step 2: exclusion of four predictors with high levels of missing data
- Step 3: exclusion of 7, 10, and 12 variables that were not significantly associated with early PPC (EPPC), later PPC (LPPC), and PPM, respectively, in the univariate analyses (cf. Chapter 5).
- Step 4: this stage involves performing the multicollinearity diagnostic tests for each dependent variable with the remaining independent variables or eligible predictors. In the literature, there are no gold standards to determine the cut-off points indicating the

presence of multicollinearity, they are defined based upon the researcher judgement. Therefore, the following cut-off were applied to identify multicollinearity:

- If one of the variables had a tolerance value lower than 0.25, which is equivalent to a variance inflation factor (VIF) higher than 2.5 (in the coefficients table) (Johnston et al., 2018).
- if one of the dimension variables had a condition index higher than 30 with a variance proportion higher than 0.5 for each variable of this dimension (in the collinearity diagnostic table) (Belsley, 1991, p.139; Draper and Smith, 1998 p.382).

Based on these, 13, 14, and 11 variables were used as predictors for EPPC, LPPC, and PPM respectively. The Table 6.1 presents the predictors selected as a result of the diagnostic test.

Table 6.1. Predictors selected for the multivariate logistic regression for each outcome variable

Predictors	Categories	Dependent variables		
Sociodemographic and environmental predictors		**EPPC**	**LPPC**	**PPM**
Women's age	15-29/30-39/40-49	X	X	
Women's education	None/Primary/secondary and higher	X	X	X
Women's employment	Unemployed/Employed	X	X	
Socioeconomic status	Poorest/Poorer/Middle/Richer/Richest	X	X	X
Place of residence	Urban/Rural	X	X	X
Obstetric predictors				
ANC consultations frequency	0 /1 to 3/4/More than 4	X	X	X
Mode of delivery	Vaginal/Vaginal assisted by instrument/ Caesarean	X	X	X
Birth attendant	Doctor/Midwives or nurses/Doctors and midwives	X	X	
PPM frequency	No morbidity/1/2/3/4/5/6/7/8/9	X	X	
Occurrence of morbidities during pregnancy	No morbidity/1/2/3/4/5/6/7/8	X		X
PNC before discharge	Yes/No	X	X	X
PNC within six weeks	Yes/No	X	X	
EPPC	Yes/No		X	X
LPPC	Yes/No	X		X
Pelvic pain with fever	Yes/No		X	
Other postpartum symptoms related to the delivery	Yes/No		X	
Last ANC location	Public hospital/Public health centre/Private clinic/Private surgery/Home			X
Contraception usage	Yes/No			X

Caption: PNC: Postnatal care, ANC: antenatal care, PPM: Postpartum morbidity, LPPC: late postpartum care, EPPC: early postpartum care

Subsequently, a logistic regression analysis was performed independently for each of the three following dependent variables:

- Early postpartum care (EPPC) defined the postpartum care provided in a health facility before women's discharge[1]. Therefore, among the 5,593 study participants, the analyses related to it excluded the 837 women who delivered at home.
- LPPC corresponded to the PPC used post-discharge and within six weeks postpartum by all participants. This variable was independent from EPPC thus there was no duplication for women who delivered in health facilities.
- PPM referred to the onset of nine morbidities (i.e. acute vaginal haemorrhage, oedema and foot pain, smelly vaginal discharge with fever, pelvic pain with fever, lower back pain with fever, back pain with fever, urinary burning with fever, pain and swelling mammary with fever, other) within six weeks after delivery.

The multivariate regression was conducted through a hierarchical multiple regression analyses for each of the three dependent variables. This technique consists of entering predictors in blocks into the models in a predetermined order. The hierarchical method allows to control for some predictors and see if the other predictors entered in the next block are still able to explain some of the remained variance in scores for the dependent variable. In this analysis, two blocks of predictors were used; the first one consisted of sociodemographic and environmental predictors and the second of obstetric predictors, thus two models. Sociodemographic and environmental predictors were entered first into the regressions because they antedated obstetric predictors that were related to the pregnancy.

In model 1, sociodemographic and environmental predictors were entered to control for their possible confounding bias. In model 2, obstetric predictors were added to measure their effect on the dependent variable above and beyond that of predictors from model 1.

For all outcome variables, the interpretations of findings were based on the results of model 2 because it took into consideration all predictors and controlled for bias, thus

[1] Moreover, EPPC was different from the early PPC (EPPC) variable analysed in the meta-analysis that referred to PPC provided within the 48 hours after delivery regardless of their localisation (i.e. health facility or home).

it provided more reliable findings than the model 1 on its own. The goodness-of-fit for the data was measured and reported with the following three tests:

- the Omnibus test with a $p<0.05$ indicates that the fit of model increased significantly from model 1

- the Nagelkerke R-square (R^2) that defines how much of the variance in the outcome is explained by the predictors. Its value ranges from 0 to 1 and indicates the improvement in fit of the model to a prior model - here model 1.

- the Hosmer and Lemeshow test with a $p>0.05$ that indicates non-significant differences between observed and expected frequencies, this expresses the good fit of the model.

Moreover, to contextualise the interpretation of the findings, the percentage accuracy classification (PAC) of model 2 is used as it shows the accuracy of the model to predict the outcome.

The effect size of the association between the predictors and outcome variables were expressed with AOR with a significance level set at 5%. The p-values were also reported to confirm the null hypotheses at three cut-off points: $p<0.05$, $p<0.01$, or $p<0.001$. All of the analyses were performed with SPSS software (version 28).

6.3. Results

6.3.1. Associations between predictors and EPPC

The model to predict EPPC usage presented a good fit for the data with a significant Omnibus test ($p<0.01$) and a non-significant Hosmer and Lemeshow test ($p=0.21$) (see model 2 of the Table 6.2). Moreover, 56.8% ($R^2=0.57$) of the variance in EPPC uptake was explained by the model. The predictors predicted accurately 85.20% of EPPC provision among the sample.

Table 6.2. Predictors of EPPC uptake

	Adjusted Odds ratios with their confidence intervals	
Predictors	Model 1	Model 2
Women's age		
15-29	1	1
30-39	1.26 (1.10-1.44)***	1.16 (0.96-1.39)
40-49	1.49 (1.23-1.81)***	1.24 (0.95-1.64)

Women's education level		
None	1	1
Primary	1.26 (1.10-1.44)***	1.06 (0.88-1.29)
Secondary and higher	1.93 (1.52-2.45)***	1.23 (0.88-1.73)
Women's employment		
Unemployed	1	1
Employed	1.33 (1.07-1.66)**	1.14 (0.84-1.53)
Socioeconomic status		
Poorest	1	1
Poorer	0.75 (0.62-0.91)**	0.85 (0.65-1.11)
Middle	0.77 (0.62-0.95)*	0.83 (0.62-1.11)
Richer	0.87 (0.69-1.09)	0.86 (0.63-1.19)
Richest	1.03 (0.80-1.33)	0.85 (0.60-1.20)
Place of residence		
Rural	1	1
Urban	1.23 (1.04-1.45)*	0.98 (0.77-1.23)
Antenatal care received		
0 visit		1
1 to 3 visits		1.04 (0.75-1.44)
4 visits		1.00 (0.71-1.41)
More than 4 visits		1.08 (0.77-1.51)
Mode of delivery		
Vaginal		1
Vaginal assisted by instrument		0.85 (0.71-1.02)
Caesarean		2.60 (1.86-3.65)***
Birth attendant		
Doctor		1
Midwives or nurses		0.84 (0.63-1.12)
Doctors and midwives		1.13 (0.82-1.55)
Postnatal care (PNC) before discharge		
No		1
Yes		27.91 (23.29-33.45)***
PNC within six weeks		
No		1
Yes		1.13 (0.93-1.36)
LPPC		
No		1
Yes		2.65 (2.06-3.42)***
Postpartum morbidity occurrence		
No morbidity		1
1 morbidity		0.77 (0.61-0.97)*
2 morbidities		0.91 (0.62-1.34)
3 morbidities		0.31 (0.19-0.50)***
4 morbidities		0.23 (0.12-0.45)***
5 morbidities		0.71 (0.32-1.60)
6 morbidities		0.48 (0.19-1.25)
7 morbidities		0.04 (0.01-0.23)***
8 morbidities		0.35 (0.04-3.03)
9 morbidities		0.20 (0.02-2.37)
Number of morbidities during pregnancy		
No morbidity		1
1 morbidity		0.80 (0.65-1.00)
2 morbidities		1.07 (0.79-1.44)

3 morbidities		0.89 (0.63-1.27)
4 morbidities		1.00 (0.65-1.52)
5 morbidities		1.22 (0.72-2.07)
6 morbidities		0.75 (0.37-1.55)
7 morbidities		1.25 (0.39-3.97)
8 morbidities		2.87 (0.71-11.54)

Caption: * : p<0.05 ** : p<0.01 *** : p<0.001
Model 1: adjusted for sociodemographic and environmental variables
Model 2: adjusted for obstetric variables

The analysed sociodemographic predictors were the women's age, formal education level, employment status, and socioeconomic status. As reported in Table 6.2, when all predictors are taken into consideration alongside obstetric factors (model 2), sociodemographic factors were no longer significant predictors of EPPC. However, several obstetric predictors were significant in predicting EPPC use.

Of the seven obstetric predictors analysed (namely ANC visit, mode of delivery, birth attendant, PNC before discharge, PNC within six weeks, LPPC, number of PPM and number of morbidities during pregnancy), four were significantly associated with EPPC.

Delivery by caesarean section significantly predicted EPPC. Women who delivered by a caesarean section were 2.6 times more likely to receive EPPC compared to their counterparts who had a straight vaginal delivery. This might be explained by the fact that a caesarean is a surgery that must be followed by post-operative care which might be assimilated to EPPC, whereas a vaginal delivery is a natural process. Therefore, in heavy workload situations, health professionals (HPs) might favour a provision of EPPC to patients with caesarean.

Receiving postnatal care for the babies before discharge was another significant predictor of EPPC uptake. During hospitalisation, women and their babies' health are monitored after childbirth. Receiving PNC for the baby before discharge multiplied by 27.91 times the likelihood of having EPPC compared receiving no PNC. Thus, the PNC is an opportunity for HPs to examine both women and babies at the same time.

In summary, EPPC is more likely to be provided to women who have delivered through a caesarean section and those whose baby has had a PNC before discharge.

6.3. 2. Associations between predictors and LPPC

The analysis to predict LPPC uptake generated robust results in terms of the model's fit as model 2 revealed a significant Omnibus test ($p<0.001$) that represents a well fitted model alongside a significant Hosmer and Lemeshow test ($p=0.03$). Moreover, 39% ($R^2=0.39$) of the variance in LPPC uptake was explained by the model and the predictor variables predicted accurately 82.00% of LPPC utilisation among the sample.

Table 6.3. Predictors of LPPC uptake

	AOR with their confidence intervals	
Predictors	Model 1	Model 2
Women's age		
15-29	1	1
30-39	1.42 (1.22-1.67)***	1.23 (1.02-1.48)*
40-49	1.54 (1.23-1.92)***	1.17 (0.90-1.52)
Women's education level		
None	1	1
Primary	1.71 (1.45-2.01)***	1.34 (1.11-1.63)**
Secondary and higher	2.99 (2.38-3.75)***	1.79 (1.35-2.36)***
Women's employment		
Unemployed	1	1
Employed	1,01 (0.81-1.26)	0.81 (0.63-1.06)
Socioeconomic status		
Poorest	1	1
Poorer	1.18 (0.91-1.53)	1.33 (0.99-1.80)
Middle	1.25 (0.95-1.64)	1.25 (0.92-1.70)
Richer	1.34 (1.00-1.78)*	1.42 (1.02-1.98)*
Richest	1.74 (1.29-2.35)***	1.66 (1.18-2.34)**
Place of residence		
Rural	1	1
Urban	1.22 (1.00-1.50)	0.97 (0.77-1.23)
Antenatal care received		
0 visit		1
1 to 3 visits		1.64 (1.08-2.47)*
4 visits		1.88 (1.23-2.86)**
More than 4 visits		1.89 (1.25-2.86)**
Mode of delivery		
Vaginal		1
Vaginal assisted by instrument		0.90 (0.74-1.11)
Caesarean		2.50 (1.89-3.31)***
Birth attendant		
Doctor		1
Midwives or nurses		0.63 (0.48-0.83)***
Doctors and midwives		0.99 (0.77-1.27)
Postnatal care (PNC) before discharge		
No		1
Yes		1.15 (0.89-1.49)
PNC within 6 weeks		
No		1
Yes		6.97 (5.89-8.25)***

EPPC		
No		1
Yes		2.68 (2.08-3.45)***
Postpartum morbidity occurrence		
No morbidity		1
1 morbidity		1.36 (1.08-1.71)**
2 morbidities		1.24 (0.86-1.81)
3 morbidities		1.14 (0.64-2.03)
4 morbidities		1.19 (0.59-2.40)
5 morbidities		0.38 (0.16-0.95)*
6 morbidities		0.93 (0.30-2.91)
7 morbidities		0.29 (0.04-2.41)
8 morbidities		3.20 (0.32-31.96)
Postpartum pelvic pain with fever		
No		1
Yes		2.11 (1.35-3.31)**
Other postpartum morbidities		
No		1
Yes		2.03 (1.38-3.00)***

Caption: * : p<0.05 ** : p<0.01 *** : p<0.001
Model 1: adjusted for sociodemographic and environmental variables
Model 2: adjusted for obstetric variables

Age (30-39), higher level of education and higher socioeconomic status were all significant predictors of LPPC. Regarding the age predictor, women aged 30 to 39 were 23% more likely to use LPPC compared to younger women (aged 15 to 29). In addition, the formal education of women also facilitated LPPC uptake. Indeed, compared to no formal education, primary level and secondary or higher education level increased by 34% and 79% respectively, the likelihood of using LPPC. Therefore, the higher the level of education the higher likelihood of LPPC uptake. This suggests that education might contribute to a better understanding and awareness of the LPPC benefits which encourage women to use it.

Likewise, a high socioeconomic status predicted LPPC utilisation. The likelihood of using LPPC increased by 42% for richer women and 66% for the richest, compared to poorest women. With a high spending power, women living in rich households have greater financial means to be monitored from pregnancy to LPPC by a self-employed gynaecologist or midwife from the private sector. Thus, they may be more able to develop trustful relationships during the perinatal period which might encourage the continuity of care and LPPC check-ups post-discharge.

Furthermore, ANC consultations were also an important predictor of LPPC, alongside mode of delivery, type of skilled birth attendant, and late PNC provided to babies within six weeks after the delivery (Table 6.3).

Compared to non-attendance to ANC consultations, women who were monitored during pregnancy were more likely to receive LPPC. The likelihood of LPPC utilisation increased by 64%, 88%, and 89% for women who received one to three ANC check-ups, four visits, and more than four visits, respectively. Thus, the higher the frequency of ANC check-ups, the higher the likelihood of using LPPC. This suggests that women might be informed by HPs during the ANC visits about the importance of LPPC attendance. The type of HPs who assisted the delivery also had a predictive value on LPPC. The presence of only midwives or nurses decreased by 37% the likelihood of LPPC uptake compared to a delivery assisted by a doctor. This could be explained by the fact that the regulation in force related to midwifery authorises midwives to supervise uncomplicated vaginal delivery without the assistance of doctors (Law 44-13: Practice of midwifery, 2016). Therefore, women who give birth through vaginal delivery, without health complications during labour, may be less prone to attend LPPC check-ups. In addition, as shown in Table 6.3, women who delivered through caesarean were 2.50 times more likely to use LPPC than their counterparts who gave birth through vaginal delivery. As for EPPC, LPPC in this case might be related to postoperative care. Moreover, another facilitator of LPPC ‘ was the provision of PNC to newborn babies within the six weeks after delivery. Table 6.3 indicates that women were almost seven times more likely to use LPPC when their babies received PNC within the same period of time, in comparison with women whose child did not receive PNC. This finding suggests that women might receive LPPC when they attend PNC for their baby’s vaccination.

To conclude, LPPC uptake post-discharge was more likely to be used by women aged between 30 to 39 years old with higher level of education and socioeconomic status as well as women who attended ANC consultations, delivered by caesarean section and attended the post-discharge PNC consultation for their baby. However, LPPC uptake was potentially reduced for women assisted by nurses or midwives only during their delivery.

6.3.3. Associations between predictors and PPM

The tests assessing the goodness-of-fit of the regression model to predict PPM occurrence was satisfactory: Omnibus test ($p<0.001$) and a Hosmer and Lemeshow test ($p=0.05$). Moreover, 20.1% ($R^2=0.20$) of the variance in PPM occurrence was explained by its association with predictors. Finally, the predictors predicted accurately 75.30% of PPM occurrence among the sample.

Table 6.4. Predictors of PPM onset within six weeks after delivery

	AOR with their confidence intervals	
Predictors	Model 1	Model 2
Women's education level		
None	1	1
Primary	0.95 (0.82-1.11)	0.97 (0.82-1,15)
Secondary and higher	0.71 (0.56-0.91)**	0.71 (0.54-0.93)*
Socioeconomic status		
Poorest	1	1
Poorer	1.03 (0.80-1.31)	0.96 (0.73-1.25)
Middle	1.27 (0.98-1.64)	1.16 (0.88-1.53)
Richer	1.09 (0.83-1.44)	1.10 (0.81-1.48)
Richest	1.03 (0.77-1.38)	0.99 (0.72-1.36)
Place of residence		
Rural	1	1
Urban	1.29 (1.07-1.57)**	1.17 (0.95-14.5)
Antenatal care received		
0 visit		1
1 to 3 visits		0.30 (0.14-0.64)**
4 visits		0.23 (0.11-0.50)***
More than 4 visits		0.31 (0.14-0.66)**
Last antenatal care location		
Public hospital		1
Public health centre		0.60 (0.44-0.83)**
Private clinic		0.50 (0.32-0.80)**
Private surgery		0.60 (0.44-0.81)**
Home		1.00 (0.07-14.46)
Mode of delivery		
Vaginal		1
Vaginal assisted by instrument		1.24 (1.04-1.48)*
Caesarean		1.15 (0.92-1.43)
Postnatal care before discharge		
No		1
Yes		1.06 (0.86-1.31)
EPPC		
No		1
Yes		0.65 (0.52-0.79)***
LPPC		
No		1
Yes		1.76 (1.46-2.13)***
Contraception usage		
No		1

Yes		0.88 (0.70-1.09)
Occurrence of morbidities during pregnancy		
No morbidity		1
1 morbidity		2.10 (1.72-2.56)***
2 morbidities		4.21 (3.32-5.34)***
3 morbidities		5.81 (4.42-7.64)***
4 morbidities		6.96 (5.06-9.57)***
5 morbidities		6.84 (4.59-10.18)***
6 morbidities		13.17 (7.37-23.54)***
7 morbidities		15.33 (5.43-43.26)***
8 morbidities		7.37 (2.18-24.90)**

Caption: * : p<0.05 ** : p<0.01 *** : p<0.001
Model 1: adjusted for sociodemographic and environmental variables
Model 2: adjusted for obstetric variables

Among sociodemographic predictors, only education was significantly associated to PPM occurrence. Indeed, compared to the lack of formal education, a secondary or higher education level tended to decrease by 29% the risk of PPM within six weeks after delivery (Table 6.4). Therefore, the higher level of education, the less exposed women were to the risk of PPM. This might be because they had higher knowledge and were better informed on PPC importance.

Furthermore, among the obstetric predictors analysed, some had a protective effect, namely ANC visits, and others were identified as risk factors of PPM, such as the mode of delivery or experiencing morbidities during pregnancy (Table 6.4).

Compared to women who did not receive any ANC visits, those who received at least one ANC consultation during their pregnancy were less likely to experience PPM. The likelihood of PPM onset decreased by 70%, 77%, and 69% when women received one to three consultations, four consultations, and more than four consultations, respectively. The results also show that the location of ANC visits is associated with PPM occurrence. Compared to pregnancy monitoring in public hospitals, public health centres offering primary care were associated with 40% less risk of PPM within six weeks after delivery. The ANC visits in private health facilities also had preventive associations with 50% less PPM for private clinics and 40% in surgeries, compared to public hospitals. Thus, women with a high risky pregnancy might had attended ANC in public hospitals where they could consult specialists.

Moreover, during pregnancy, health complications can occur, and to be precise, in the analysed database the morbidities considered were abnormal swelling of the face,

fingers, and feet; vaginal haemorrhage; convulsion not caused by fever; intense and persistent headache; blurry vision; intense pelvic pain; hyperventilation; fever with difficulty standing up; and water break six hours before labour. According to the multivariate analysis (Table 6.4), compared to no pregnancy morbidities, women who suffered from at least one of these health issues were significantly more likely to experience PPM. The associations were multiplied by 2.10, 4.21, 5.81, 6.96, 6.84, 13.17, and 15.33 times for women who had from one to seven health issues during their pregnancy, respectively. Therefore, it seems that the more frequent pregnancy morbidities were, the higher the likelihood of PPM occurrence. The analysed morbidities are symptoms of pregnancy-related diseases such as gestational diabetes or hypertension causing preeclampsia that can sometimes persist after delivery.
In addition, the mode of delivery was associated with 24% more risk of PPM for women who experienced a complicated vaginal delivery requiring the use of instruments (forceps, vacuum) to facilitate birth, compared to women with uncomplicated vaginal deliveries. The use of instruments might require an episiotomy which is a surgical incision of the perineum made to facilitate the passage of the baby during childbirth to prevent perineal tears (Carroli and Mignini, 2009). If the episiotomy is not well performed by the HP or if appropriate personal hygiene and treatment to heal the scar are not followed by women, postpartum pelvic infection may occur.

Overall, predictors that can potentially reduce PPM incidence were women's secondary and higher education level, ANC visits attendance and EPPC provision. In contrast, PPM occurrence was associated with LPPC utilisation and instrumental vaginal delivery.

The following section demonstrates the relationships between PPC utilisation at different periods (EPPC during hospitalisation and LPPC post-discharge) and the onset of PPM in Morocco.

6.3.4. The relationship between PPC utilisation and PPM occurrence

A logistic regression analysis was conducted independently for each of the three study outcomes (EPPC, LPPC, PPM), which enabled their inclusion as independent variables in the models. For example in the logistic model analysing significant

predictors of LPPC utilisation, EPPC and PPM were entered as independent variable Figure 6.1 presents a diagram of the associations between these three variables.

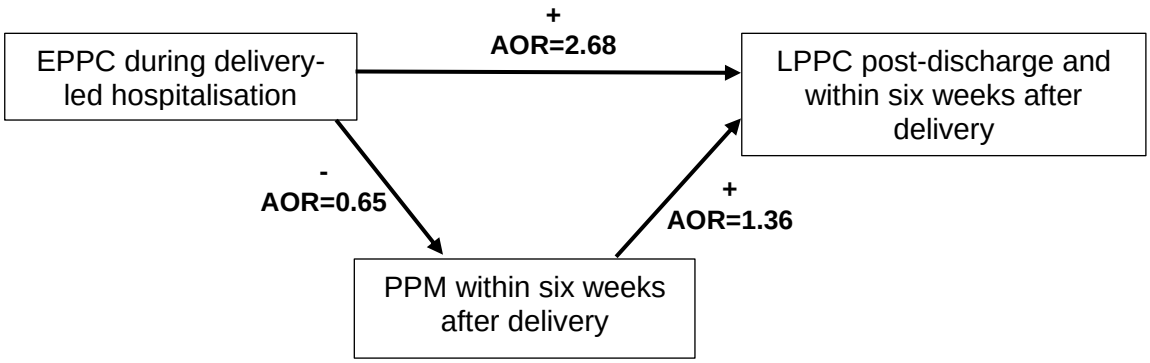


Figure 6.1. Framework illustrating the relationship between EPPC provision, LPPC utilisation, and PPM.

The results reveal a significant positive association between EPPC and LPPC. Results displayed in Table 6.3 show that women who received EPPC were 2.68 times more likely to receive LPPC post-discharge and within six weeks than those who did not receive EPPC. Similarly, women who used LPPC were 2.65 times more likely to have received EPPC during their hospitalisation (Table 6.2). These two measures of associations are almost similar, but the temporal factor implies that EPPC is provided before LPPC, therefore the measure of association in Table will be retained to characterise the relationship between EPPC and LPPC (Figure 6.1).

Findings in Table 6.4 indicate that women who received EPPC were 35% less likely to suffer from PPM than those who did not. Thus, EPPC seems to prevent the occurrence of PPM at a later stage (Figure 6.1). In fact, women who reported one, three, four, and seven PPM were 23%, 69%, 77%, and 96%less likely to have received EPPC respectively (Table 6.2). Therefore, the higher the number of postpartum morbidities experienced by women, the less likely they were to have received EPPC. These observations underline the importance of medical assistance during delivery and after.

Further, the uptake of LPPC was positively associated with the onset of PPM. Women who used LPPC were 76% more likely to experience PPM than those who did not (Table 6.4). Reciprocally, Table 6.3 shows that suffering from one PPM was significantly associated with a 36% increased likelihood to receive LPPC. However,

for women who experienced five PPM, the likelihood of LPPC uptake decreased by 62%. Moreover, women suffering from postpartum pelvic pain with fever were twice as likely to receive LPPC than those who did not; likewise for women with other PPM not described ('Other' category) in the database who were twice more likely to use LPPC. Therefore, women seem to consider LPPC check-ups as a curative approach and use it to seek medical assistance if they experience PPM (Figure 6.1).

To sum up the relationship between PPC utilisation and PPM, the provision of EPPC during the hospitalisation favoured the continuity of care after delivery, as it was associated with an increase in LPPC utilisation and vice versa. Moreover, the influence of PPC utilisation on PPM incidence differed depending on when PPC was provided. Thus, EPPC was related to lower risk of developing PPM, whereas the utilisation of LPPC was associated with PPM occurrence.

6.4. Discussion

The aim of this analysis was to confirm and quantify the associations between PPC utilisation and PPM and their determinants through a multivariate analysis. The results endorsed the influence of several predictors on PPC utilisation and PPM onset. Concerning EPPC, sociodemographic and environmental predictors had no predictive value on this variable, but delivering through caesarean section and receiving PNC during hospitalisation were identified as facilitators of receiving EPPC.

With regards to LPPC, being aged between 30 and 39 years old, having received some form of education (all levels) and living in rich(er) households positively predicting LPPC. This was in addition to having received at least one ANC check-up, having delivered through c-section and having received PNC post-discharge. Among the obstetric predictors, PNC provided to newborn babies was the predictor with the strongest association with PPC utilisation in both early and later postpartum period. Thus, during the stay in the maternity ward or during the six weeks following the delivery, the care provided to babies was related to the care provided to women.

Conversely, the only identified barrier (negative predictor) to LPPC uptake was being assisted through delivery by midwives or nurses without doctor's presence.

Regarding PPM, only secondary and above education level, having had a complicated vaginal delivery requiring instruments and experiencing pregnancy-related morbidities

positively predicted the occurrence of PPM. By contrast, the risk of PPM occurrence diminished with the number of ANC check-ups (at least one) attended in public health centres or private clinics and surgeries.

Comparison with the univariate analysis' results (cf. Chapter 5):

Overall, the logistic regression analyses also indicated that several predictors were no longer significantly associated with PPC uptake and PPM when compared with the univariate analysis (cf. Chapter 5, section Result). This observation concerned women's employment status, place of residence, and contraception usage. Therefore, this suggests that the univariate findings of these predictors were biased with confounding factors.

Moreover, the multivariate analysis confirmed the relationship between the three outcomes (EPPC, LPPC, PPM) identified in Chapter 5, that is to say that EPPC provision before discharge promoted LPPC uptake. Besides, the likelihood to develop PPM was lower when EPPC was used but higher with LPPC utilisation.

Comparison with the results from the systematic review (cf. Chapter 2):

The identification of some predictors as facilitators or barriers to PPC uptake in Morocco were similar to other LMIC based on findings obtained in the systematic review (Chapter 2). It concerns the facilitating influence of formal education, and higher socioeconomic status, ANC consultations, and caesarean delivery. The situation was also identical for the assistance of midwives or nurses without a doctor during delivery, which reduced PPC uptake. In Morocco, public hospitals were the location for most of deliveries assisted by midwives or nurses only, whereas antenatal and postpartum consultations were mainly provided in other types of health facilities (cf. Chapter 5). In this context, the delivery is an event that create a short and temporary relationship between women and HPs in public hospitals. This could explain a possible lack of engagement of midwives and nurses to encourage women in attending LPPC elsewhere. They might consider that their work is limited to the care performed in the hospitals. Conversely, a longer relationship is created for women who monitor their pregnancy in the surgery of a private gynaecologist and chose to be assisted by the latter to give birth in a clinic. Therefore, before discharge, doctors might recommend their patients to consult them for LPPC within six weeks because their duty of care is not limited to a location but rather to the women they are caring.

Furthermore, this study did not confirm the significant associations of women's employment and their place of residence with LPPC uptake, in contrast to other studies based in LMIC (cf. Chapter 2, (Abota and Atenafu, 2018; Benova et al., 2019; Berhe et al., 2019; Chungu et al., 2018; Darega et al., 2016; Khaki and Sithole, 2019; Ndugga et al., 2020; Ononokpono et al., 2014; Solanke et al., 2018)).

Strengths and limitations:

This study has the merit of defining, at the Moroccan national level, the patterns of PPC uptake and PPM occurrence, and of identifying the predictors associated with them. Although these results address two objectives of the research, (i.e. to determine the patterns of PPC uptake in Morocco and the factors associated with it, and to investigate the relationship between PPC utilisation and PPM in Morocco), they do not indicate if women use LPPC because they suffer from PPM or if PPM get diagnosed during LPPC consultations women attend as part of their routine care. A qualitative study may help to gather insights on the reasons that encourage women to use LPPC and their perception of postpartum care and morbidities.

The study's findings must be interpreted with caution because of two main limitations, already mentioned in chapter 5. Although associations were found, it was not possible to conclude on any causality relationships due to the cross-sectional design of the study. Additionally, PPM were self-reported by women without any medical verification (through a diagnosis or data collected in medical files) to corroborate the women's declarations. Therefore, PPM may be under-reported. Finally, data were not precise enough in terms of number of PPC check-ups provided to women to measure the frequency of PPC utilisation. Hence it was not possible to assess the proportion of women who received four PPC consultations as recommended by the WHO.

6.5. Summary of the chapter

This second part of the quantitative study confirmed that being aged 30-39, formal education, higher socioeconomic status, receiving ANC increased the utilisation of LPPC in Morocco (Table 6.6). By contrast, the unique significant barrier to LPPC uptake was delivery assistance with only nurses or midwives (without doctor).

The results also indicate that caesarean delivery and PNC for babies increased both EPPC use before discharge and LPPC utilisation (Table 6.5 and Table 6.6).

Table 6.5. Summary of barriers and facilitators of EPPC provision based on the multivariate analysis

EPPC (before discharge)	
Barriers	**Facilitators**
- PPM	- Caesarean delivery - Postnatal care for newborn baby before discharge

Table 6.6. Summary of barriers and facilitators of LPPC uptake based on the multivariate analysis

LPPC (post-discharge until six weeks postpartum)	
Barriers	**Facilitators**
- Birth attendant (nurses or midwives only)	- Age (30-39) - Education (all level) - Rich(er) socioeconomic status - ANC consultations (at least one) - Caesarean delivery - Postnatal care for newborn baby post-discharge - PPM - Pelvic postpartum infection - Others PPM - EPPC

Moreover, women's education and ANC consultations in public delivery centres as well as private clinics and surgeries seemed to prevent PPM onset. However, the risk of PPM onset increased in case of complicated vaginal delivery with instruments and pregnancy-related morbidities (Table 6.7).

Table 6.7. Summary of protective and risk factors of PPM based on the multivariate analysis

PPM (within six weeks postpartum)	
Risk factors	**Protective factors**
- Vaginal delivery assisted by instruments - Occurrence of morbidities during pregnancy - LPPC	- Secondary and higher education - ANC consultations (at least one) - ANC location (public delivery centre, private clinics and surgeries) - EPPC

In addition, the relationship between PPC utilisation and PPM occurrence was confirmed by this logistic regression indicating that EPPC prevents the onset of PPM and that women tend to use LPPC once they experienced PPM (Table 6.6 and Table

6.7). Further investigations are necessary to clarify the direction of the relationship between LPPC and PPM and to identify the ‘other PPM’ (not defined in the analysed database) that were associated with PPC.

Thus, the next chapter will explore the perceptions and experiences of women and health professionals with regards to PPC to provide additional knowledge on the patterns and experiences of PPC uptake and PPM in Morocco.

Chapter 7

Postpartum care in Morocco: women's experiences

This chapter focuses on the research objective 4 which is to explore women's experiences of PPC and PPM in Morocco. A qualitative approach was used, and semi-structured interviews were conducted with women. The findings are presented and discussed in this chapter.

7.1. Introduction

Several factors have been identified as promoting and limiting the use of PPC and the occurrence of PPM at the national level from the national database analysed (cf. Chapters 5 and 6). However, in order to gain a better understanding of the situation regarding PPC and PPM and to find out whether other factors may be involved in the stagnation of PPC utilisation since 2011, a qualitative study was conducted. This chapter presents the study results.

The study aimed to answer two research questions:

- **How do women experience PPC and what are the reasons they use or do not use PPC?**
- **What are their experiences of PPM?**

7.2. Method

The researcher travelled to Morocco to collect data. A convenience sample was used. Participants were recruited through the researcher's third supervisor based in Morocco, the researcher's own network as well as through direct contacts with private surgeries. Associations helping vulnerable women were also contacted but none authorised the recruitment of their members. Data collection with women took place between the 1st of March and the 17th of April 2022.

7.2.1 Women's data

A total of 20 women were approached to take part in the study. Of those, two refused and one did not complete the interview because it caused her some distress; thus altogether 17 women were interviewed. Three women were recruited directly from a hospital maternity ward they were visiting for a postpartum consultation. A midwife

informed them about the study and after obtaining verbal consent, accompanied them to a private room where the researcher welcomed them and ensured that they were well informed about the study and the modalities of the interview by providing the information sheet. Only the researcher and the participant were present during the interviews.

The other 14 women participants were recruited through the researcher's network or through participants already recruited (snowballing). After giving women a period of reflection (two days on average), women were contacted by the researcher to check whether they were happy to take part and to set an interview date. Illiterate participants and those recruited via telephone were read the information sheet to and their consent was recorded.

Eight participants were interviewed face-to-face in health facilities (n= 5) or at their homes (n= 3). The remaining nine interviews were conducted by telephone due to geographical distance. Interviews lasted between 15 and 40 minutes. The shortest interviews were conducted with women who had come for a LPPC consultation. All participants, except one, agreed to their interviews being recorded. The interviews were conducted in Arabic with 14 participants and in French with three.

7.2.2 Data analysis

Data analysis showed that data saturation was reached after 17 women. The data were analysed using thematic analysis (see Chapter 4: Method). Codes were categorised in sub-themes, and sub-themes into themes (cf. Table 7.3). To enhance rigour, the coding frameworks were shared with the supervisory team. Discrepancies were discussed and a consensus reached.

7.3. Findings

Women's experiences of PPC and PPM

Participants' characteristics

The researcher collected demographic as well as obstetric data. This information was used to put the findings into context. The profile of participants is displayed in Tables 7.1 and 7.2.

Table 7.1. Sociodemographic characteristics of women participants

	Age	**Education level**	**Location**	**Medical coverage**
Mariam	28	Primary level	Kenitra- Urban	RAMED
Kawtar	20	Primary level	Not asked	RAMED
Wafa	between 20 to 30	Secondary school level	Salé-Urban	RAMED
Zahira	between 20 to 30	Higher level (postgraduate)	Témara-Urban	Not available
Hajar	between 20 to 30	Higher level (postgraduate)	Rabat or Casablanca	Not available
Safia	38	Went to school but illiterate	Salé-Urban	RAMED
Ines	34	Higher level (Postgraduate)	Mohammedia-Urban	CNOPS
Zina	36	Higher level (undergraduate)	semi-urban city in Casablanca neighbourhood	AMO
Anissa	39	Higher level (undergraduate)	Casablanca-Urban	CNSS
Nayla	28	Primary or secondary level	Casablanca-Urban	RAMED
Aisha	about 30	Not asked	Drarga-Semi-urban	Private insurance
Nora	about 30	Higher level (university)	Drarga- Semi-urban	No medical coverage
Nisrine	26	secondary school level	Inezgane- Semi-urban	RAMED
Sawsan	33	Higher level (postgraduate)	Berkane-Urban	CNOPS
Alia	26	Higher level (Postgraduate)	Berkane-Urban	Private insurance
Amira	Not asked	Not available	Tetouan-Urban	CNOPS
Marwa	about 30	Not available	Agadir-Urban	No medical coverage (5000Dh cost of delivery)

Caption: RAMED : Régime d'Assistance Médicale (free health insurance for the poorest population), CNOPS: Caisse Nationale des Organismes de Prévoyance Sociale (health insurance for employees from public institutions), CNSS: Caisse Nationale de Sécurité Sociale (health insurance for people employed in private companies), AMO: Assurance Médicale Obligatoire (new compulsory health insurance that should progressively become the only public health insurance)

Overall, participants were aged between 20 and 39 years (mean 30.8). Their level of education varied, one participant had never attended school and was illiterate, two had primary education, two had secondary education and eight had higher education. The participants lived in mostly urban and semi-urban areas, three of them in the north of Morocco (Berkane and Tetouan), and the other participants were spread out in the centre of the country, six in the Rabat-Salé region, four in the Casablanca region and four in the Agadir region.

Women were not asked explicitly about their socioeconomic status, but the coverage of healthcare costs indirectly informs on this. Six participants received the RAMED (Medical Assistance Plan) reserved to poor households. Six participants were insured by different organisations (CNOPS (National Social Security Insurance), CNSS (National Social Security Fund), private insurance, compulsory medical insurance), which implies that they probably were from a middle to high socioeconomic background. However, one (Marwa) did not have medical insurance and had to pay for her care.

Obstetric characteristics

Table 7.2. Obstetric characteristics of women

	Parity	Place of delivery	Mode of delivery	Length of hospitalisation	Number of ANC visits
Mariam	2 children	Public hospital	Vaginal delivery (VD) +episiotomy	28 hours	At least 1
Kawtar	2 children	Public maternity hospital- level 3	VD+ episiotomy	3 days	1
Wafa	2 children	Public hospital	VD+ episiotomy	2 days	5 or 6
Zahira	1 child	Private clinic	Caesarean	2 days	Not asked
Hajar	1 child	Private clinic	Caesarean	4 days	Every 10 days by choice no medical indication for close monitoring
Safia	2 children	Public maternity hospital- level 3	VD+ episiotomy	16 hours	2 visits
Ines	2 children	Private clinic	VD without episiotomy	24 hours	Not asked
Zina	1 child	Private clinic	Caesarean	5 days	2/month for the first 3 months, then 1/month
Anissa	2 children	Clinic (semi-public)	Caesarean	3 days	1/month even more if complications- risky pregnancy
Neyla	2 children (but had 3 deliveries, 1 infant dead)	Public hospital	Caesarean	3 days	4 with private general practitioner (GP)
Aisha	2 or 3 children	Private clinic	Caesarean	2 days	She had ANC (but I didn't ask how many)- normal pregnancy
Nora	3 children	Public provincial hospital	Caesarean	3 days	3 with private gynaecologist

Nisrine	2 children	Public provincial hospital	VD+ episiotomy	24 hours	4 with GP
Sawsan	2 children	Public hospital	VD+ episiotomy	2 days	3 or 4 with private gynaecologist
Alia	1 child	Public hospital	VD+ episiotomy	3 days	At least 1 visit with private gynaecologist
Amira	1 child (2 deliveries- 1st ended by miscarriage)	Private clinic	Caesarean	3 days	1/month with private gynaecologist
Marwa	1 child	Private clinic	Caesarean	3 days	Not available

The average parity was 1.7 children per woman, which is under the national Moroccan fertility rate (2.38) (Moroccan Ministry of Health, 2018). Nine participants had received three to four antenatal visits as recommended by the WHO. However, none had attended a birth preparation course. All participants gave birth in a hospital facility, either a public hospital (nine participants), a semi-public polyclinic under state supervision (one participant) or a private clinic (seven participants).

The length of hospitalisation varied from 16 hours to five days, depending on the mode of delivery. Nine women gave birth by caesarean section (more often in private clinics) and were hospitalised for between two and five days. Eight women had a vaginal delivery, followed by hospitalisation lasting between 16 hours and three days. None of women who gave birth in a public hospital had an epidural and all women who had a vaginal delivery had an episiotomy except one. Seven of them delivered in a private clinic and did not have an episiotomy.

To summarise, there were almost as many caesarean sections as vaginal deliveries, but caesarean sections were performed more frequently in private clinics than in public hospitals.

The data analysis identified five themes that convey women's postpartum experiences and thoughts about PPC. These themes, presented in Table 7.3 include the nature of care provided, postpartum morbidities (PPM), barriers to PPC, facilitators to PPC, and the impact of the setting in which women receive care.

Table 7.3. Coding framework of women's postpartum experience and perception of PPC

Themes	Sub-themes	Codes	Quotations
Theme 1: The nature of care provided	Care provided by HPs	Routine EPPC during hospitalisation	Kawtar(61-65+73-80), Nora (51-55), Amira (80-86),Zina(78-84), Nisrine(49-50+109), Anissa(142-158+174-176), Nayla(55-56+75+118-123+154-155+193+196-198+240), Marwa(8), Ines(55-57), Safia(102-108), Mariam(97-99+ 172-173),Wafa(57), Sawsan(130-134+141-146), Alia(89-99)
		Routine LPPC after hospitalisation	Anissa (159+162-163+245-246), Amira (113-120+147-149+152-155+163-171+185), Nora(78), Zina(91-92+97-104+142), Zahira(47-54), Safia(64+68-71+109+123-126), Hajar(68-70+109+123-126), Aisha (73+75),Nora(80-81), Aisha(33-36+38-40+61+ 73+75)
	Informal care	Women's family support	Nayla(402-403),Mariam(191-192), Kawtar(106), Anissa(221-223+231-237+239-240),Marwa(16),Alia(217-220),Sawsan(314-315),Safia(130+135-136),Nora(114-115),Amira(102-107),Ines(49+103-106)
		Overlap with the care provided by the health system	Nora(118-123),Nisrine(141-163),Alia(135-154), Sawsan(119-124+173-176+185+195-209),Nayla(67-69+115-116+183-184+174-179)
		Nutrition	Zina (115-120+124-128), Anissa(331-333+342-347), Nayla(416-427), Alia(154+200), Safia(143-148), Nisrine(139-151+158-159+162-165), Sawsan(128-133+149-150+173-176), Nora(123+127-129), Marwa(24), Amira(242-246), Mariam(204-209), Hajar(141), Zahira(128-133+185-187), Ines(160-171)
		Massage	Amira (231-240), Anissa (324-326), Hajar(187-193+199-203+212+218+225-234)
Theme 2: PPM	Physical PPM	Symptoms	Nisrine(12+121-124), Ines(112-113+126-127), Safia(117-118+247), Mariam(75-84+133-134), Marwa(10-15), Amira(147-149+152-155+167-171), Alia(135-138), Ines(68-70+77+80+134-136), Nora(55+60), Wafa(64-65), Nayla(38+40-41+125-126+149+132+308-309+314-315+365-366+377-381+396+396+448-449), Aisha(33-34+54-60+110-112), Kawtar(37-43)
		Specific care to treat physical PPM	Mariam(137-144), Zina(152),Ines(139-141+147-148),Nora(60+116-123), Wafa(61-62+73+77+95-99+175-176), Nayla(130+205-206+210+383-386), Nisrine(154)
	Psychological PPM	Symptoms	Aisha (18-19+27), Hajar (25+32-33+37+81-82+87-88), Nora(57), Marwa(12-23), Wafa(92-93), Nayla(362-365), Anissa(179-193+199-201)
		Post-traumatic stress related to delivery experience	Aisha(180-184+190), Wafa(194-196), Ines(225-228), Mariam(85-96)
		Seeking help (family, religion)	Anissa (179-201+212-216), Hajar(77-79+91+95+119), Marwa(13-14), Sawsan(309+314-316)

		Not seeking medical help	Zahira(59+141-143), Hajar(100-103+109-111)
		Lack of family support	Aisha(192-200), Zina(40),Anissa(185-189+204-208)
Theme 3: Barriers to PPC	Lack of PPC awareness and promotion	Not aware of WHO standards	Kawtar (109-110), Wafa(127), Zahira(98),Safia(180),Ines(89), Nayla(259+306-307+320),Nora(135),Nisrine(212),Alia(187),Sawsan(237)
		Awareness not raised by HPs	Anissa (262-264+315-317), Amira (141+181+206-207140+217-220), Safia(110-111+192-195), Ines(81-82), Kawtar(110-111), Aisha(226-228), Anissa(262-264), Nayla(331-333), Aisha(226-228), Alia(129-132)
		Lack of promotion of LPPC from HPs in public hospital before discharge	Sawsan (152-154)
		Women's enquiries about LPPC perceived as non-necessary by HPs	Nayla(320-323+332-333), Kawtar(110-111), Safia(110-111),Ines(81-82)
	Women's attitudes towards PPC	Normalisation of pain	Mariam (158),Nora(106-109)
		Minimisation / lack of awareness of PPM symptoms	Wafa(174-175), Nora(106-109)
		Lack of PPM symptoms means LPPC unnecessary	Nora(131-132),Sawsan(169),Alia(176-179), Zina(137-140)
		No financial means	Hajar(158),Zina(137-139), Aisha(61-63+219-224+239), Marwa(21)
		No time to look after their health	Wafa(173+179)
		Lack of time / too busy as looking after baby	Hajar(158), Ines(93-95)
		Lack of support from other	Wafa(175-177)
	Difficult relationships with HPs	Lack of communication /miscommunication	Nisrine (185-187+192-193), Aisha (38-40+46-47+51+61+75-78), Nayla(75-77), Mariam(112-113+192), Wafa(147-178)
		Power imbalance between women and HPs	Sawsan(66-67+92-102)
		Lack of physical support from HPs	Nayla(48-51+56-58+280-281+286), Kawtar(181-186), Aisha(27-29+205-206)
		Lack of psychological support from HPs	Alia(39-41+196-197), Mariam(112-113+192), Wafa(147-178), Aisha(28-29),Sawsan(294-307)
		Unhelpful behaviour of HPs in public hospital	Amira(174-177)
		Medical nomadism	Wafa(111-112), Nayla(261-262+354-355+465-466), Aisha(114-119)
Theme 4:		Choice of doctor for whole perinatal period	Amira (125-126), Anissa (298-301), Alia(172), Sawsan(164-167)
		Respect of women's modesty	Amira (122-136)

Facilitators to PPC	Good relationships with HPs	Attention to women's needs	Mariam(47+99-103), Safia(45-48+93), Ines(203-207+213-218),Safia(45-48+93), Amira(68-74), Ines(203-207+213-218)
		Women's trust in doctors	Ines(49)
		Good attitude from HPs	Kawtar(36-37+51), Safia(37+39-40+266-268), Ines(40-43+232-235), Mariam(47+99)
		Birth preparedness	Hajar(179-181)
		Support during delivery	Alia(64-65),Mariam(97-103),Sawsan(95-100)
		EPPC delivered before discharge	Nisrine(233)
	Raising awareness and developing education about PPC	Women would use LPPC if informed by HPs	Kawtar(118-120+132-134), Wafa(129),Safia(300-301),Anissa(270),Alia(205-208),Sawsan(240-242),Neyla(141-142+322), Safia(222-228)
		Women want to be informed	Kawtar(118-120+132-134), Amira(202-205), Zina(143-146)
		Raising awareness of LPPC to women's family	Zahira(176-179)
		Promote LPPC usage at each consultation	Hajar(166-172)
		Knowledge of WHO standards	Anissa(302-304)
		HPs responsible for informing women about LPPC	Kawtar(122-125), Safia(198-199),Anissa(285-286),Nisrine(238),Alia(214-215)
	A dedicated pathway	Curative	Wafa (138-143), Nisrine (204+220), Zahira (69-71), Amira (147-149+152-155+167-171), Aisha (75-78+86)
		Scheduling LPPC before discharge	Safia (107-108+180-182+185), Kawtar (113-114), Nayla (331-332), Zahira (47-54), Hajar (54-55), Ines (61-62), Amira (113-117), Zina(102), Anissa(158-159), Nora(85-86)
		Dedicated medical team from prevention to LPPC	Sawsan(320-331)
Theme 5: The impact of the healthcare setting	Women's perception of public vs private organisation of care	Women's perception of their delivery experience differs according to the setting	Hajar(63-65), Ines(232-235), Nayla(292), Sawsan(294)
		Big or many differences in the quality of care perceived	Mariam(218), Wafa(145), Hajar(147),Ines(189),Aisha(159), Nisrine(176)
		Benefits of private health facilities compared to public ones	Hajar(150-151), Mariam(218-222), Amira(109), Aisha(16)
		Long waiting time in public structures	Nayla(373-374+211-219), Wafa152-153), Safia(60-62+66-68+272-284+286-290)
		Cost of hospitalisation and LPPC	Marwa(17), Nora(72-74)

	The monetary value of care	Link between quality of care and payment	Anissa(373-376+119-133), Wafa(147-148), Nayla(81-109)
		Care in exchange of money (extorsion)	Nayla(81-109), Anissa(372-376+377-408), Nisrine(89-99)
		Burden of cost of childbirth	Nayla(208-222+98-101+229-230+235-238+311), Aisha(38-40+61-64)

Caption: EPPC: Early postpartum care, HPs: Health Professionals, LPPC: Later postpartum care, PPM: Postpartum Morbidities, WHO: World Health Organisation

Theme 1 : The nature of care provided

The first theme is about the nature of care provided. After delivery women receive different types of care which can be curative, preventive, or even educational that is provided by HPs and women's entourage.

Care provided by healthcare professionals

Care provided by HPs included EPPC - defined here as care provided during hospitalisation[2]- and late LPPC provided after discharge. Women reported receiving EPPC from HPs, consisting of taking their vital measurements (temperature and blood pressure), being asked about pain levels, checking the risk of infection, postpartum haemorrhage and anaemia. For example, Nora described: *'they examine the scar, they check for haemorrhage because I have anaemia, they took a blood sample'.*

This routine EPPC was also an opportunity for women to receive advice on breastfeeding and prepare them for the postpartum period post-hospitalisation. Zina reported: *'she examined my breasts to see if there was milk, she told me that I must breastfeed my daughter'.*

Nevertheless, EPPC was sometimes perceived to be inadequate by women in terms of identifying signs of possible PPM. Nayla deplored the lack of monitoring following her caesarean section. She commented: *'I came out of the operating theatre, they put me on a stretcher asleep, nobody came to see me or anything'*. She also reported that her pain was dismissed: *'they came, I was in pain, I asked them to give me some medicine to calm me down and the doctor said "are you sure you have pain? Be careful if you don't have pain and they give you medicine"'.*

Some women also reported a lack of inquiry about their mental health. Kawtar stated that she was not asked about her mental health: *'they only asked you about the pain. They don't ask about your mental health if you're fine or not? No'.*

During hospitalisation, the timing and frequency of EPPC varied. Women in private clinics were usually monitored once or twice daily by their doctor, in addition to the

[2] EPPC and LPPC definitions differ according to studies. In the systematic review and meta-analysis (chapters 2 and 3), early PPC (EPPC) refers to the care received during the first 24 hours after delivery, whereas in the quantitative and qualitative studies (chapters 5 to 7) EPPC refers to the care provided during the hospitalisation post-delivery even if it lasts for more than 24 hours.

care provided by paramedical staff. Other participants only received one or two visits, often just before discharge. Others had none such as Sawsan who declared: *'you do the discharge and that's it, once you completed your 48 hours you are allowed to leave… you take your discharge form and you leave, there's no consultation or anything'*. Thus, women's experience of EPPC may be lacking, particularly in public hospitals.

Yet for some women, PPC shortcomings were considered to be less problematic than those experienced during childbirth. Mariam commented that *'even if they [HPs] didn't check on me, it's not a big deal, the most important thing is that the woman who helped me during birth behaved well with me'.* Thus some women placed more importance on receiving caring and respectful medical assistance during delivery than immediately after the birth.

After discharge, 12 participants had a LPPC consultation within the 40 days post-delivery. Women consulted either the gynaecologist who assisted their delivery (private sector) or a general practitioner (private or public sectors). Those who consulted in the public sector went in health centres or exceptionally in the maternity hospital where they gave birth. These consultations often involved checking that women had recovered well physically and advising them on contraception, as Zina reported:

'It was her [gynaecologist] who asked me to come and see her to examine the scar, to examine the ovaries, to examine the state of the uterus, to choose which type of contraceptive pill to use during breastfeeding'.

Although the majority of consultations were about physical health, mental health was occasionally alluded to. Amira believed that her doctor was checking her mental wellbeing when they asked *'how are you? How is the baby?'*. However, systematic inquiries about possible psychological complications did not occur, which could sometimes expose women to serious risks. The case of Aisha illustrates this well. She experienced signs of postpartum depression but did not have the opportunity to discuss her concerns with the HP, because they demanded payment for her care. Aisha's reported the doctor saying to her: *'before I talk to you, you have to pay 6,000 Riyals to talk to me ... if you want to talk to me you have to pay, if you want to consult you have to pay'.*

This was problematic for her because of the significant amount of money this sum represented and because she already had to pay for the care of her seriously ill baby.

In summary, most women received EPPC, and two thirds received at least one LPPC consultation. However, only one third had received the minimum of four medical consultations post-delivery. Furthermore, one third of participants had no medical follow-up post-discharge.

Informal care

In addition to routine medical care provided by HPs, friends and family also played a role in women's postpartum well-being. Women turned to their families for nursing care during hospitalisation or for suture care once at home. Nayla explained: *'At home I buy the sterilised compresses, I buy the Betadine and I ask my sister to clean it [suture infection] it's my sister who's taking care of it'*. In some cases, care from HPs and families overlap with each other. Indeed, helping women dress or move around was often left to cleaning lady or families to do this. Nayla stated:

'*I stayed naked until mum came to see me, then she dressed me..., it's the lady who does the cleaning who fed my daughter ... because I was naked at the time, I couldn't get up to take my newborn baby to give her milk ... it's mum who brought the sanitary protections, she put the sanitary protections on me … when I wanted to go out, they [HPs] came to change my dressing*'.

Similarly, during their stay in public hospitals, women sometimes had to rely on their families to provide food. This may be due to a shortage of meals reported by some women (Nayla), or the provision of meals not considered suitable for the postpartum period (Sawsan). Thus, during visiting hours, families often mitigated the lack of professional care. In the absence of external help, women also help each other as they shared rooms, as Nayla highlighted: '*we hold each other, you see the women who gave birth we held each other, this one held me, and I held her, and we helped each other until we got into the toilet*'.

Moreover, to compensate for the unmet needs in the public sector, the help of families was also essential in bringing medicines prescribed by HPs, as Nora mentioned: '*they prescribe you medicine that you have to buy yourself, they don't give you medicine,*

blankets, or food'. To compensate for the absence of nursing assistants, women could count on the help of cleaning ladies to give bottles to babies '*they are the ones who give the feeding bottle to your baby*' (Nayla).

Finally, other participants turned to herbal medicine alongside the treatment prescribed by HPs to heal their sutures. These included cataplasm with herbs (e.g., henna, mugwort), or infusion. They perceived this alternative approach as more effective than medication. Sawsan mentioned:

'This spray I didn't want to take it because it's not good, it didn't help me at the beginning, that's why I decided not to use it, I decided straight away not to solely use products from the pharmacy. I decided to use henna… it is well known that it's good for scars'.

Furthermore, post-discharge and with the help of their relatives, women relied on culinary traditions and comfort massage, whose benefits are boasted by cultural beliefs, for their health. For example, Zina reported that: *'they say that 'sellou' has many benefits, it produces milk, organic eggs also produce milk'*. The postpartum nutrition favoured by women is consumed specifically during the postpartum period because it is thought to provide energy, help to prevent iron deficiencies, as wells as promote milk production and lochia delivery. Nisrine reported:

'We do a lot of free-range chicken with raz el hanout, onions for the blood [lochia], if it's left in your body… you have to do this, when you drink something hot so that it continues to come out'.

Another cultural practice women engaged postpartum was the pelvic massage. This wellness treatment experienced by Amira is usually a massage given by hammam workers. This massage, called "the closing of bone", is practised around twenty days post-delivery. Hajar described it as a moment of mental and physical relaxation. According to cultural beliefs reported by Hajar *'during childbirth there is an opening of the joints, so it's like it [the massage] closes them'.*

In summary, PPC is not solely provided by HPs, which is surprising for EPPC in a medical setting. Women rely on their families to provide nursing care during and after hospitalisation, often with the use of traditional and herbal medicine. However, when they encounter health complications, they rely on the healthcare system.

Theme 2 : Postpartum morbidities (PPM)

Of the 17 participants in the study, 13 reported having physical or psychological symptoms of PPM.

Physical PPM

The physical symptoms most commonly mentioned by women were haemorrhage, pelvic infection, breast problems and abdominal pain. In addition, anaemia and vitamin D deficiency were reported. Six women developed a postpartum infection either after caesarean delivery or vaginal delivery with episiotomy. Some of these women felt that their infections were due to medical negligence. Wafa could not visit a doctor when the symptoms of infection first appeared, and it was 20 days after the delivery that she discovered a forgotten compress, which prompted her to consult a doctor. She reported:

'*This compress that prevents bleeding when she sews, she forgot about it, she didn't take it off. The compress continued to absorb blood, and this created a foul smell, I thought it was the lochia, but day after day the smell got stronger and stronger until one morning as usual, I was doing my intimate hygiene and the treatment [to heal the episiotomy] and I touched something hard, I used a mirror and I saw something inside my body, I took it out and I discovered a big compress. ... First thing, I went to them [HPs] to see her [the midwife], I didn't find her, so I went to a private doctor who examined me and prescribed antibiotics and medicines'.*

For Nayla, the situation lasted four months, as she was unable to consult a doctor at the local health centre because he was absent, so it was her mother and sister who regularly monitored and treated her scar with sterile compresses and an antiseptic recommended by her pharmacist. At the time of the interview she was still unwell.

The experiences of these participants illustrate the difficulty they may have in identifying the signs of infection, which delays appropriate medical care. Sometimes, they relied on the experiences of family members to appraise their own. Alia compared her experience to that of her sister:

'I asked her, I told her this is what I feel, I have pain here and here, she told me it was normal, so I said to myself that it's fine, it's a question of time and that's all, it's not something serious'.

As she listened to her sister, Alia normalised her pain, but doing so means that she may miss important PPM symptoms.

Psychological PPM

Signs of psychological complications were also identified. Symptoms included anxiety, low moods and depression that could be experienced for a few days or sometimes several months after birth. Some of them were linked to physical complications. This was the case of Nayla and Wafa who experienced psychological distress as a result of the severe abdominal pain and infections, which they believed were caused by medical negligence. Nayla declared that:

'I'm fed up, I'm not lying to you, I see the state I am in, I see it… [silence a bit in disarray], God only knows what they did to me to make the scar like this, now I have to find someone to, to, I'm the one who's going to pay the consequences especially as I have an infant that I'm breastfeeding'.

Anxiety could be linked to worry about the baby's health, as mentioned by Aisha *'they transferred my son who couldn't breathe to hospital H., I was anxious',* or more generally concerns about how they would cope with the new arrival. Hajar reported: '*I was depressed even before the birth, during the pregnancy I was anxious… I found it a bit difficult because my child was not very calm, he was a bit difficult to manage'.* Whatever the causes of anxiety, Aisha's and Hajar's mental health deteriorated into what could appear to be postpartum depression with signs such as irritability and difficulty coping with her children. Aisha reported: *'my mood was catastrophic, I have no more patience with my children, I keep shouting…"it's all of you [her children] who are annoying me", I don't have the patience to talk to them anymore'.*

Difficult birth experience and conflicting relationships with the medical community could also have a detrimental impact on women's postpartum health. Women showed signs of post-traumatic stress disorder after a troubled relationship with HPs, marked by nightmares as related by Wafa: *'I don't want to go there [hospital where she delivered] anymore, I have nightmares about it',* and Aisha who commented that '*with all that I've been through, when I think back on it, it makes me sick, I cry all the time, I wonder why'*. Mariam also panicked on learning she was pregnant again: *'I didn't want to go back [to hospital], I didn't want to go through delivery again, I cried day and night, I don't want to give birth anymore, I don't want to hear about something called delivery'.*

Women may need a long time to consider a new pregnancy, as was the case of Ines who remained traumatised by the care she received during her first delivery in hospital. She related with precision her story as her birth was progressing slowly:

'I didn't know what to do, I wasn't assisted, for a start there were midwives who were very angry, so much so that they,… in the room where I was giving birth there were other women who were giving birth at the same time and there were just curtains between us and at one point she [midwife] closed the curtains on me and told me "you don't want to give birth, so you'll kill your son", so she left me, she just left me, thank God it was 8:30 in the morning, the doctor was doing his rounds and he came and she [the midwife] said "she can't push, she didn't even know how to push"… I had decided not to give birth anymore because of the first experience and I waited six years to maybe forget about it, but I didn't forget it'.

Other women reported symptoms of postpartum depression and possibly even psychosis once they returned home. For example, Anissa sought help from her mother because she was worried she would harm her baby: '*mum sleep with me because I feel like I'm going to strangle the baby'*. Thus, the lack of medical follow-up after hospitalisation is detrimental to women's mental health. During the interviews only Aisha mentioned mental health complications spontaneously, and most women reported not confiding in HPs about their mental health during consultations, either because they preferred to wait and see how their mental health would evolve (e.g. Zahira), or because they were afraid of being prescribed antidepressants and being unable to care for the baby because of the side effects. Hajar explained that:

'I asked to see a psychiatrist to talk to him about the anxiety, about this depression but I was afraid of anti-depressants and all that will let me sleep and, I didn't have anyone to take care of the baby which didn't enable me to consult'.

To deal with their low moods and the absence of medical care, women turned to their mothers or husbands when these were receptive or like Hajar, hired a nanny to look after the baby: *'I had exams, I had a lot, a lot of stress, even after the birth it lasted until my child was 10 months old, until I had a housekeeper, a nanny with me'.* Other participants sought comfort in their religious beliefs like Anissa who reported: *'thanks to God, I help myself with the Quran, the invocations, and I ask for forgiveness until this [wanting to strangle her baby] disappears'*. But women could not always count on

their relatives for support, because of the distance between them, the lockdowns caused by the Covid-19 or because of their husband's lack of consideration. Indeed, for Anissa, society dictates that husbands provide material but not emotional support:

'When you leave the clinic there isn't this attitude from the husband that you expect anything from him ... It is impossible to explain that to him at that time, because if you say something, you are going to look like a person who, as they say, you're seeking attention, …, even if we are very close in age, it remains that the Moroccan man has no empathy'.

The difficulty that women have in talking about their postpartum psychological discomfort during interviews or with their family and HPs shows that mental health remains a taboo in Morocco.

In summary, physical or psychological PPM were diverse and common among the women interviewed. They relied first on their families if these are willing to help them and secondly on HPs in case of physical but not psychological complications.

Theme 3: Barriers to PPC

A number of barriers to PPC uptake were identified through the interviews with women.

Lack of awareness and promotion

One of the barriers to PPC uptake reported by women was the lack of knowledge and promotion of PPC. Indeed, none of the participants were aware of the WHO recommendations (4 consultations), and several reported not having been informed about PPC during antenatal visits or delivery. Kawtar stated: *'I didn't know… if I had known I would have come'*. Similarly, participants who had a consultation early on post-discharge (i.e. about 10 days after delivery**)** did not return for the last LPPC consultation (around 40 days post-delivery) as recommended by the WHO. This was often because their doctors felt it was not necessary. Nayla was not encouraged to consult; on discharge she asked the HP if she should come back for a post-operative check-up (caesarean section) but was told it was not necessary: *'When you want to leave and you ask them if you should come back to see them, they tell you "No it's ok you gave birth"'.* This implies that giving birth is seen as a natural process that does not require follow-up care. Even during postnatal consultations for the baby, women

were not always offered a postpartum check-up for themselves: *'When you go for your child's vaccinations, did they check you? No'.* (Aisha).

In public hospitals, the low PPC uptake may be due to the fact that HPs-women's relationships end as soon as women return home and thus there is no follow-up (Sawsan). The lack of awareness and promotion of PPC can be an issue since some women develop PPM and do not consult a doctor, as Nayla acknowledged: *'I haven't seen a doctor yet about this scar problem ... they didn't tell me to come back'.*

Women's attitudes toward PPC

Other barriers to PPC uptake were based on women's attitudes towards it. Women tended to normalise their pain *'We all have these pains, so I thought it's normal'* (Mariam), they also minimised the symptoms of PPM or lacked the knowledge to identify them. Nora explained: *'the main reason is that people are unaware of the symptoms, and they think that it will pass but if there is something serious, they will necessarily consult'*. Furthermore, some women did not see the value of LPPC consultations in the absence of issues or PPM: '*after the delivery I didn't go back because I didn't feel anything that hurt or worried me'* (Sawsan).

Paying for a consultation in the absence of symptoms could be seen as a waste of money for women with low economic resources: *'I feel that everything is fine, so I don't need to go, I'm not going to go and waste money'* (Zina). This was also the case when the care was free of charge in health centres, maybe due to the costs of travelling.

Lack of time was cited as another barrier: *'they're busy with the baby, with the new life'* (Ines). Finally, the social context must also be considered such as the absence of family support to look after the baby (Wafa). Thus, the economic and family situation of women can be an obstacle to PPC uptake.

Difficult relationships with HPs

Other barriers identified related to conflicting relationships with HPs, whether in the past or the present. Few women reported relationship issues with HPs in the private sector, and most reported issues occurred in public hospitals. Conflicts between women and HPs were often caused by a lack of communication or miscommunication between them. In these situations, women blamed HPs for not taking the time to listen to their questions, and their symptoms. Nisrine reported that during a consultation,

when she was nine months pregnant: *'he [the doctor] didn't even let me ask any questions, I just wanted to ask him if I had a girl or a boy'*. Women alluded to a power imbalance in these relationships, feeling subordinate to the decisions of HPs, without free will, which infantilised them and made them feel vulnerable. For example, the honesty of women who complained of postpartum symptoms could be questioned by HPs as Nayla recounted:

'I was in pain, I asked them to give me some medication to calm it down and the doctor said "are you sure you have pain? Be careful… if you don't have pain and they give you medicine" I said "I swear I have pain" then she gave me an injection'.

Moreover, the non-assistance reported by some participants (Nayla, Aisha, Kawtar) to get up and move around is explained by the absence of HPs or their refusal to help:

'When she [HP] wanted to move me from my place she said, 'try on your own, we're not going to help you", that is to say that you are going to get up on your own, I stayed like that'.

When multiparous women were asked about their relationships with HPs, they often compared these with their previous experiences. Sometimes they avoided seeking LPPC following an unsatisfactory delivery experience, like Mariam who did not receive any support during her first delivery:

'She didn't show me how to give birth as if I knew how to do it … I was suffering, I was suffering, and I noticed that she was discussing with her colleagues in front of me, I said to her: please save me, she told me "shut up I'm not taking any money and I'm patient with you"'.

Similarly, Sawsan shared the midwife's reprimands during her delivery:

'I had contractions, I pushed as the baby was coming out, there was nobody to hold my hand, I was just screaming, I was screaming at her [midwife], she was saying to me "you're making a scene with your screams" when she came in, she realised that it was true [I was about to expulse the baby], she thought I was lying to her, when she came, she realised that it's true…I had reached the stage of expulsion so she has to help me, then she helped me'.

Both Mariam and Sawsan did not engage with LPPC after their first birth experiences. Unhelpful birth experiences are not conductive to fostering trust between women and HPs and thus negatively impacts upon women's decision to go for LPPC.

Consequently, there can be medical nomadism among women who refuse to be treated again in the institution where their needs have been neglected and prefer to go to other HPs (private doctors or pharmacists) for their postpartum conditions. As Aisha stated: *'I'm going to see a general practitioner, I'm not going to see a gynaecologist'.* Medical nomadism may complicate PPC uptake, because women have to recreate a bond of trust with new HPs, who may have difficulty to follow the medical history of women who do not have a record of their maternal healthcare.

Theme 4: Facilitators to PPC

The analysis also identified several factors that seemed to facilitate PPC uptake.

Good relationships with HPs

Whilst conflicting relationships with HPs was identified by women as a barrier to PPC uptake, being treated with empathy, respect and dignity was a facilitator. To women, a positive birth experience was more important than having access to PPC or LPPC. Mariam declared: *'even if they didn't check my health, it does not matter so much, the most important thing is that the woman who helped me giving birth behaved well with me'.*

Women defined good care as consisting of frequent visits during hospitalisation to inquire about their health, attentive listening to their needs, and a benevolent response with empathy and respect. For example, Ines stated that:

'During the delivery I was assisted, I was told: "you have to do this, you have to breathe, you don't have to scream, you don't have to", in a way for me it was very very elegant, so much so that it only took me half an hour to deliver'.

Consequently, the support provided by HPs makes women feel secure and creates a relationship of trust.

One important criterion for PPC uptake reported by women was their need to feel comfortable during examination. Hence some expressed a preference for a woman doctor rather than a man (Anissa). However, other women reported being satisfied with the attitude of male doctors because they respected their modesty, as described by Amira: *'he covers you, you wear an outfit like a dress and he doesn't look at you at all, he never looked at me directly'.*

Amira's experience implies that feeling comfortable with HPs contributes to LPPC utilisation:

'This doctor since I started seeing him, he behaves well that's why I felt comfortable to complete my care [LPPC visit] with him after the delivery even if at the beginning I said to myself that I absolutely have to be followed by a woman doctor but it's my friend who encouraged me to go and see him because she gave birth with him'.

Finally, better communication from HPs could contribute to good care and thus, to PPC uptake. Good communication involved responding to women's concerns, *'explain to her what the problem is and how the delivery went, how the operation (i.e. caesarean) went, did the operation go well, how the baby came out'* (Nayla).

In summary, meeting women's expectations could improve their experiences of care, their opinions of HPs, and in turn encourage them to use LPPC. A good relationship between women and HPs is a collaboration in which each party contributes in a complementary way to the preservation of maternal and child health.

Beyond the relationship with HPs, women also stated that raising awareness and education of women about PPC would facilitate its utilisation.

Raising awareness and developing education about PPC

Some participants expressed the desire to be informed about the benefits of LPPC for their health and indirectly for their babies' health as Kawtar emphasised:

'You have to tell them [women] to come [to have LPPC] and check their health for the sake of their children because they still have a long way to go to look after their children and themselves, so that they don't neglect themselves, and they have good health'.

Women also suggested that families should be educated too because of their role in caring for women during the postpartum period. Zahira explained that it is important :

'To explain especially to the family, to the whole family, because the woman who has just given birth, I don't think that she will remember the instructions and the information concerning the next consultation'.

Women feel that the best time to promote and educate women about PPC is during antenatal visits and straight after delivery, both in the public and private sectors, as

these can enable them to discuss PPC with HPs if they do not bring it up. Hajar reported:

'The truth about how to encourage [PPC] is during the follow-up, during the pregnancy, really insist on sharing this message at each consultation. …in antenatal we don't talk about postpartum.

Interviewer… even in the private sector we don't talk about it?

Hajar: Oh yes!'

However, they still think that it is up to the HPs to inform them like Nisrine who mentioned: *'when the doctor comes, he prescribes the medicines, he should tell her [about LPPC]'.*

The communication about PPC is an essential step in increasing utilisation, and seven participants reported that they would have used LPPC if it had been recommended by HPs. The fact that the information comes from the HPs is important because it may override the deterrents of their relatives. Safia's experience illustrates this; she went against her husband's opinion. He considered LPPC 'not worth it', but she nonetheless attended a LPPC consultation: *'I had to go because they asked me to do a check-up…. if something happens to me, they will tell me why you didn't come back to do the check-up?'.* Her comments suggest that her decision to use PPC is motivated by a sense of obligation to consult following the medical recommendation, which may be to avoid liability in the event of PPM.

A dedicated PPC pathway

Finally, another facilitator identified by women consists of having an organised and dedicated PPC pathway.

When women used LPPC, it was for two specific reasons, namely, to choose a contraceptive method *'she prescribed me the pill'* (Zahira) and to seek medical advice if they have concerns about their health. Zahira took the initiative to consult her doctor because she *'suspected an infection'* and Nisrine, who didn't use LPPC, stated that she would have *'if I had felt anything [symptoms]'.*

In the case of hospital maternities, which are fully-fledged public institutions (unlike maternity units that are part of hospitals) an appointment is scheduled before patients are discharged for a LPPC consultation one week after delivery. This appointment

scheduling is also effective for LPPC visits among women who have been cared for by private physicians like Zina who mentioned: *'it was her who asked me to come and see her to examine the scar'*. Finally, it is also a solution suggested by women giving birth in public hospitals (Nayla). To do this, they also advise creating a medical team dedicated to prevention that could be in charge of LPPC in public hospitals.
Thus, awareness of LPPC could be raised during the antenatal period by informing women about the postpartum health pathway and organising public health structures so as to provide consultations without losing sight of women after delivery.

Overall**,** women expect support from HPs mainly during delivery and the early postpartum period. The attitudes and care of the HPs determine women's trust in the medical profession and their willingness to use LPPC. Raising awareness of PPC and organising a dedicated pathway to use LPPC in the public sector are measures suggested by women to increase PPC uptake. The differences between public and private facilities and their effects on PPC and PPM were also identified as important factors in women's experiences of PPC and are detailed in the section below.

Theme 5: The impact of the setting on PPC and PPM

The setting of PPC provision was viewed as having two influences: one on the organisation of care and second, its cost.

Women's perception of public vs private organisation of care

Overall, participants who gave birth in public maternity hospitals and private clinics were satisfied with their delivery, as illustrated by Hajar who *'couldn't expect better'*, while those who delivered in public hospitals were generally more dissatisfied like Nayla *'the delivery in the public [hospital] is bad'.* Several women felt that there was "a big difference" in patient care between the private and public sectors, like Mariam who said: *'There is a difference, yes there is a big difference'*. The private clinics were considered more satisfactory in terms of hygiene, medical follow-up (Hajar), and the possibility for the husband to attend the delivery (Mariam, Amira). Therefore, it seems that the private sector offered a better EPPC experience than the public sector as detailed in the Theme 1 : The nature of care provided.

Other constraints to PPC are related to the operation of public hospitals. Women regret the long wait for an EPPC like Kawtar experienced: *'they (HP) let people wait a long*

time, he goes to so-and-so, goes back to so-and-so, take this back to so-and-so'. The provision of EPPC also seemed insufficient in the public sector since the five participants who did not receive EPPC were all cared for in public hospitals.

Although public health care is free, the testimonies of some participants suggest that the resources and the organisation of facilities can affect the quality of care. Thus, this health context creates an inequality of access to satisfactory care for the population which cannot afford care in the private sector.

The monetary value of care

In the private sector, women are expected to pay for healthcare, including LPPC consultations, while in the public sector it depends on their medical coverage. The costs of delivery and LPPC consultations vary, a consultation with an ultrasound in a private practice can cost 400 dirhams (Marwa). The RAMED allows the poorest women to access free care in public facilities, and for those who do not have medical coverage, care is not free, even in public hospitals (Nora).

According to some women, the care provided by HPs must be monetised to be considered of good quality (listening, attention, medical assistance). Anissa explained that:

'As far as we are concerned in Morocco, when you pay, they [HPs] take care of you, but if you are in the public sector if they fear God, I will say frankly, if they fear God they can behave well with you, if you meet people who don't fear God they ask for money and they could hurt you with their behaviour and everything'.

The care provided during LPPC in the private sector can be incomplete due to a lack of financial means. Systematic inquiries about possible psychological complications did not occur, which could sometimes expose women to serious risks. The case of Aisha illustrates this well. She experienced signs of postpartum depression but did not have the opportunity to discuss her concerns with the HP, because they demanded payment for her care. Aisha's reported the doctor as saying to her: *'before I talk to you, you have to pay 6,000 Riyals to talk to me... if you want to talk to me you have to pay, if you want to consult you have to pay'.* This was problematic for her because of the significant amount of money this represents and because she already had to pay for the care of her seriously ill baby.

Nayla, who had to give birth by caesarean section, had to pay the 1000 Dirhams (equivalent to one third of the monthly Moroccan minimum wage) requested by the operating theatre staff of the public hospital. This amount of money only covered the caesarean section and not postpartum follow-up care, which was non-existent for her. She reported:

'I had to give money ...

Interviewer: Did you give this money at the beginning or once you entered the room?

Nayla: No once I got into the operating theatre.

Interviewer: if you don't give that money you don't get into the operating theatre?

Nayla: they tell you "Go, you still have time, it's not time for you to give birth yet" when my water broke.

Interviewer: right, so even though you paid no one came to see you?

Nayla : no one, I paid for the delivery, I paid for me to deliver but not for the monitoring'.

These comments indicate that ethical standards are not always upheld, and that women can be subject to financial blackmail, in particular those from the most disadvantaged social classes. However, women can also rely on those HPs who respect professional ethics and offer good care without asking patients for financial compensation or accepting gifts from them. Anissa stated:

'Basically in this polyclinic they behave well with the patients, that is to say that there is no financial contribution…. if you want for example just to make a gesture because they took good care of you, even a gift...they don't accept'.

Thus expenses related to delivery could hinder access to care, especially since women also have to finance health expenses related to their newborn baby (growing-up milk, medical care), which they prioritise to the detriment of LPPC, even in the private sector (Aisha). Aisha reported that: *'I didn't pay him [her gynaecologist] anymore because my son is ill and I have problems, until now I still haven't gone to see him, until now, now!'.*

In conclusion, women perceive differences in care between public facilities, which would benefit from improving their services, and private facilities, which offer a certain level of comfort. The perceived quality of care depends on the financial effort that women can make to receive care, including PPC, regardless of the setting.

7.4. Discussion

This qualitative study aimed to explore women's experiences of PPC and PPM and their reasons for not using PPC. The way women approach the postpartum period seems to be influenced by the importance they attach to their health, their place in their family (respect, autonomy of decision in relation to the husband or mother-in-law) and in society (education, traditions, taboos). In this study, only five women received the full PPC as recommended by the WHO (e.g. four consultations within six weeks post-delivery). The main obstacle to PPC was the lack of knowledge about it and a dissatisfaction with the quality of care during delivery, which deterred women from coming back for LPPC. Conversely, women's awareness of PPC, good relationships with HPs and a quality of care that meets women's needs during hospitalisation for delivery seemed to encourage LPPC uptake and reduce the occurrence of PPM. Care delivered in the private sector appeared to be more satisfactory to women than care received in the public sector, which may be explained by the fact that private facilities have better resources.

This qualitative study provides new insights on the reasons for the low rate of PPC utilisation in Morocco. For example, the quality of care received during the pregnancy journey was an important factor. Indeed, the long waiting time for an appointment, the deleterious attitudes of some HPs, the lack of medication provided by institutions are all elements that degrade the quality of care and may in some cases even lead to the occurrence of PPM. The same conditions of care are also documented in other developing countries, particularly in Africa, as reported in the scoping review by Ansu-Mensah et al. (2020).

Another novel insight concerns women with low economic resources who reported informal payment being requested by HPs in the public sector in exchange of assistance for giving birth. A payment refusal puts women at risk of medical neglect, inattention to their expressed needs and disrespectful attitudes from HPs. This

practice also takes place in other developing countries such as Bangladesh (Afsana, 2004), Cambodia (Ith et al., 2013), or India (Coffey, 2014) and disturbs the balance of power as well as fuels coercion in public facilities. This supports the sparse literature on informal care payments in Africa (Schaaf and Topp, 2019). A study by Kankeu and Ventelou (2016) indicated that in 2005-2006, this type of practice affected 57.6% of patients attending public facilities for general care in Morocco, which represented the highest level of corruption of the 33 African countries studied. According to Kankeu and Ventelou (2016), HPs' motivations are linked to inadequate salary. Consequently, the commodification of care may shift HPs' perception of women who are considered more as clients than patients. Yet all HPs should follow medical ethics which encourage the provision of quality care without distinction (The health system and the supply healthcare., 2011). If quality of care is measured by how much women can afford to pay for it, then HPs and institutions are discriminating.

The qualitative findings also show that the care received from HPs represents only a fragment of the care women receive because families are also significantly involved in caring for women, and customs play an important role during the postpartum period. In Morocco and other non-Western countries (Ali-Saleh et al., 2022; Kim-Godwin, 2003), women practise postpartum cultural traditions (food, seclusion) according to family and societal norms that confer properties on these customs for postpartum well-being. As in Morocco, other studies showed that families can have a positive or negative impact upon women's postpartum well-being (Ali-Saleh et al., 2022; Qutteina et al., 2018). Kim-Godwin (2003) pointed to differences between Non-Western practices that consider birth as 'part of a holistic and personal system, involving moral values, social relations, and relation to the environment' from Western postpartum practices that are 'based on the biomedical model … the role of the woman is less important than that of the physician during giving birth' (p.77).

Comparison between the qualitative and quantitative findings:

The qualitative study supports some of the findings identified in the quantitative analyses (chapters 5 and 6). Indeed, among the women who were interviewed and who delivered by caesarean, all stated that they had received EPPC and most also relied on LPPC. This corroborates the associations identified in the national database between caesarean delivery and PPC utilisation. Moreover, in the qualitative study, caesarean sections were performed more frequently in private clinics than in public

hospitals which supports the wider literature (Hernández-Vásquez et al., 2020; Singh et al., 2018; Vieira et al., 2015). Furthermore, most of the women who did not use LPPC reported being assisted by midwives and not doctors during their delivery, which is in line with the negative association evidenced in the quantitative study between LPPC use and highly skilled birth attendant (Chapter 6).

The peripartum (delivery and postpartum) period is a sensitive period that tests the relationships between women and HPs because of the risk to the maternal and infant health. Thus women's relationship to HPs is an important factor influencing either positively or negatively PPC uptake. Obstetric violence is a worldwide concern (d'Oliveira et al., 2002; Perrotte et al., 2020; Silal et al., 2012; Small et al., 2002; World Health Organisation, 2015c) that can take different forms. These include non-consented care, verbal and physical harm such as no anaesthesia provided for painful care like episiotomy, and the absence of curtains and blanket during examination (Bohren et al., 2015; Perrotte et al., 2020). In this study some women reported interactions that could qualify as obstetric violence during their delivery, such as verbal abuse, disrespect, neglect or refusal to care, with often detrimental consequences. Indeed, obstetric violence can have a long-term impact upon women's representations of HPs, mental health (i.e. post-traumatic stress disorder), and family planning (El Founti Khsim et al., 2022). In their systematic review, Perrotte et al., (2020) reported that obstetric violence during childbirth leads to women's reluctance to use healthcare services including LPPC. Therefore, the power dynamics in the HPs-women relationship including during PPC can be unbalanced and can be influenced by the HP's status (salaried, self-employed), a paternalist vision of care provision, and the mode of functioning of the health facilities where women are cared for (public or private governance). A considerate medical assistance, respectful and free from violence, is therefore essential. This is particularly the case in public hospitals where the presence of the husband or other family member is not allowed during the delivery and outside visiting hours (*Bulletin officel- Réglement intérieur des hôpitaux publics* (Official journal- Public hospitals rules and regulations), 2011, p.298).

Furthermore, all of the women who had not used LPPC had attended antenatal consultations which contrasts with the quantitative findings suggesting that antenatal consultations increase the likelihood of using LPPC. Antenatal consultations are not always sufficient to raise awareness on LPPC, and the early postpartum period is also

a crucial phase to do so. Indeed, women who did not use LPPC had attended antenatal consultations in private surgeries and delivered in public hospitals. This suggests that when women are not encouraged to use LPPC by HPs from either the public or private sectors during pregnancy and delivery-led hospitalisation, they are not aware of the preventive value of LPPC for their health. This lack of knowledge is one of the reasons why women are not willing to invest the time and sometimes the money for LPPC.

Moreover, in contrast to the quantitative findings, in this qualitative study, factors such as age and women's level of autonomy in decision-making were not mentioned by women as barriers or facilitators to PPC uptake (see chapter 6). It may be possible that women felt that this was something difficult to discuss.

The quantitative results also show that apart from postpartum haemorrhage, symptoms of pelvic infection, vascular and breast problems, other unidentified PPM are associated with LPPC utilisation. These qualitative findings also show that symptoms of pelvic infection incite women to use LPPC and other studies may help identify what these other PPM are. For example women reported issues related to nutritional deficiency symptoms, especially anaemia, something not captured in the quantitative study. Importantly, this study points to mental health difficulties experienced by women during the postpartum period, something that is absent from the quantitative study. In fact, the majority of women reported not being asked about their mental health during the PPC they receive. On the other hand, this study shows that women can experience psychological problems without discussing them with HPs. Hence, postpartum psychological complications appear to be under-reported and under-diagnosed. The factors that seem related to psychological distress were negative birth experience due to unhelpful relationships with HPs, physical PPM, and lack of family support. These causes of psychological PPM are corroborated by a study investigating postpartum depression in Morocco (Agoub et al., 2005) and other literature (Bener et al., 2012; Grekin and O'Hara, 2014; Righetti-Veltema et al., 1998). Further research in the Moroccan context is needed.

Strengths and limitations:

The study provides further insights particularly on the context within which women receive care and the overall impact on their postpartum health, the use of cultural practices and the role of the people surrounding them during and after delivery. In

addition, the findings are based on data collected from several regions of northern and central Morocco, ensuring ecological validity and enabling the inclusion of women with diverse backgrounds.

Nevertheless, this qualitative study has limitations. Women interviewed lived mostly in urban areas, with little representation of views from women living in rural areas. Some interviews had to be cut short to ensure women could attend their consultations, meaning that some data could not be collected such as age, level of education, number of antenatal visits, traditional practices, or knowledge of the WHO recommendations on PPC. Even though the researcher verified that all participants met the inclusion criteria, three women were chosen/selected by other HPs raising the issue of selection bias. Moreover, social desirability bias in participants' response cannot be ruled out and participants may have reported what they thought was expected from them, not what they experienced in reality. Seven interviews with women could not be completed and integrated to this study because of the presence of HPs in the room who interfered during the interviews by commenting on women's responses.

7.5. Conclusion and implications for the thesis

In conclusion, this chapter addressed the objectives 4 of this research (i.e., to explore women's experience of the postpartum period and their perception of PPC) by highlighting the diverse perspectives of women on the issue of postpartum maternal health, PPC and PPM.

The findings revealed that PPM mostly reported by women during PPC were mainly physiological ones, and that psychological complications seemed to be under-reported. PPC was provided by HPs and/or outside the healthcare system by families. The findings also indicated that some measures could be put in place during pregnancy and childbirth to encourage women to attend LPPC check-ups (e.g. promotion campaigns). However the main barrier to PPC uptake is women's lack of knowledge about PPC and PPM. Educating women, and their family, about the preventive nature of PPC is therefore important. In this way, women will become aware that the standard maternal care pathway does not end at delivery, but at the LPPC visit six weeks after delivery or beyond in case of PPM.

Finally, the qualitative study demonstrated the importance of the relationship between women and HPs and the quality of care. A good experience of maternity care and a good postpartum health go through listening, respect and mutual cooperation.

For clarity purposes, Table 7.4 summarises the main factors involved in PPC uptake according to women's accounts.

Table 7.4. Summary of barriers and facilitators of PPC uptake reported by women

Women's study	
Barriers	**Facilitators**
- Women's lack of knowledge on PPC - Women's attitudes toward PPC (no utility in absence of pain, normalisation of pain, waste of money, lack of time) - Difficult relationships with HPs	- Raising awareness and developing education on PPC and PPM - organised and dedicated PPC pathway - Establishing a trusting relationship with women

The next chapter will focus on HPs' experiences of providing PPC to women.

Chapter 8:
Health Professionals' experiences of postpartum care provision in Morocco

The findings based on women's experiences of PPC (cf. Chapter 7) identified a complex pattern of PPC utilisation that underlined the influence of the women's family, cultural practices, as well as the quality of care and the relationships with HPs. As health professionals (HPs) are crucial to women's experience, it was important to understand their own perceptions and attitudes towards delivering PPC. This chapter focuses on HPs' experiences of providing PPC. That were explored through a qualitative study. The experiences and perceptions of PPC between women and HPs are also compared as part of this chapter.

8.1. Introduction

To get an in-depth understanding of the pattern of PPC utilisation in Morocco and the reasons for its low utilisation by women, it was important to capture the experiences of PPC providers i.e. HPs such as gynaecologists, general practitioners, nurses, and midwives. This chapter addresses the second part of the qualitative study and answers research objective 5 which is **to explore HPs' experiences in providing PPC**. It addresses the following research question: what are HPs' experiences of providing care to women? And how do they see their roles ?

8.2. Method

8.2.1 Healthcare professionals' data

Data collection with HPs took place between the 1st of March and the 17th of April 2022. Altogether 28 HPs were approached to participate; of those eight refused because they were not interested or had no time, thus altogether 19 HPs were interviewed. Thirteen were recruited through third parties (e.g. external supervisor, researcher's contacts, and one from snowballing), and six were recruited directly from their workplace. Most participants were given a 48-hour 'cooling-off period' to decide whether to take part in the study (even those interviewed in their place of work), but eight were interviewed on the same day they were recruited. All interviews were

conducted face-to-face at the HPs' workplace except for the traditional birth attendant who was interviewed by telephone because she worked in women's homes and because of geographical constraints. The interviews lasted between 15 minutes and 48 minutes. The interviews were conducted solely in French with eight participants, in both Arabic and French with nine participants, and solely in Arabic with two. Most HPs opted for their interviews to be recorded, but eight refused without providing a reason. For these interviews, data were collected through notetaking.

8.2.2. Data analysis

Data analysis showed that data saturation was reached after 19 interviews with HPs. The data were analysed using thematic analysis (see Chapter 4: Method). Codes were categorised in sub-themes, and sub-themes into themes (cf. Table 8.). To enhance rigour, the coding frameworks were shared with the supervisory team. Discrepancies were discussed and a consensus reached.

8.3. Results

8.3.1. Health professionals' experiences and perception of PPC

Health professionals' characteristics and healthcare settings

The characteristics of the 19 HPs are presented in Table 8.1.

Table 8.1. Profile of healthcare professionals

Pseudonym	Job type and level	Workplace	Sector	Site location	Number of PPC reported as being provided to women
Fatna	Senior midwife	Level 3 maternity	Public	Rabat-Kénitra - Urban	LPPC: 1 at D10/15
Zakia	Senior midwife	Level 3 maternity	Public	Rabat-Kénitra - Urban	LPPC: 1 at D10/15
Nadir	Junior gynaecologist	Level 3 maternity	Public	Rabat-Kénitra - Urban	LPPC: 1 at D10/15
Ghada	Senior nurse	Level 3 maternity	Public	Rabat-Kénitra - Urban	LPPC: 1 at D10/15
Fatima	Senior gynaecologist	Own surgery	Private	Rabat-Kénitra - Urban	LPPC: D7 + D40
Amna	Senior midwife	Own delivery house	Private	Rabat-Kénitra - Urban	LPPC: D7 + D40
Sarah	Senior Radiologist	Association	NGO	Rabat-Kénitra - Urban	Information not provided
Laila	Senior midwife	Health centre (level 2)	Public	Rabat-Kénitra- Urban	LPPC: D15 + D40

Malika	Senior midwife	Health centres and hospitals	Public	Rabat-Kénitra - Urban and rural	Information not provided
Marzoq	Senior gynaecologist	Own surgery	Private	Casablanca-Urban	LPPC at D10, more if needed
Issam	Senior gynaecologist	Own surgery	Private	Casablanca-Urban	LPPC: D10 + D40
Bassir	Senior gynaecologist	Own surgery	Private	Casablanca-Urban	LPPC: D7
Nima	Senior midwife	Maternities in hospitals and clinics	Public	Casablanca-Urban	EPPC only (prior to discharge
Mustafa	Senior gynaecologist	Own maternity	Private	Agadir-Urban	LPPC
Maha	Senior midwife	clinic	Private	Agadir-Urban	EPPC LPPC if recommended by a doctor to treat PPM
Nadia	Junior midwife	Delivery house	Public	Souss-Massa-rural	LPPC: D7
Mona	Senior General practitioner	Delivery house + health centre	Public	Souss-Massa - rural	EPPC LPPC if patient referred by midwife
Kamilia	General practitioner	Own surgery	Private	Souss-Massa - semi-urban	LPPC are rare
Amani	Senior traditional midwife	Patient home	Private	Marrakech- semi-urban and rural	EPPC only

Caption: D: day after delivery, e.g. D7: seven days after delivery

NGO: Non-governmental organisation

Level 2 health centres: health centres that offer on top of consultations with a general practitioner specific care such as dentistry and ophthalmological care.

Level 3 hospitals: university hospitals with enough resources to admit patients with healthcare needs such as neonatal intensive care, or high-risk pregnancy and delivery

The participants included eight midwives, one of whom was a traditional midwife (without a medical degree), seven obstetrician-gynaecologists, two general practitioners, one nurse and one radiologist. One of the participants was a policy maker (not mentioned in the table to safeguard anonymity) in maternal health. All participants had over 10 years' experience in maternal health in Morocco except Nadir and Nadia who were more juniors. The participants provided PPC to urban, semi-urban, or rural populations in the regions of Rabat, Casablanca, Agadir, and Marrakech. They worked in various establishments, either private (clinics, surgeries, delivery centres n=9), public (hospital maternity wards, health centres, delivery centres, n=9) or non-governmental organisation (associative health centres, n=4). As for the traditional midwife, she worked in women's homes and mainly provided EPPC, with LPPC provided only on request.

All participants declared providing EPPC, but only four of them, three women (Fatima, Amna, Laila) and one man (Issam), followed the WHO standards and provided two LPPC consultations (at two weeks and six weeks postpartum).

Four themes were identified from the interviews, which are summarised in Table 8.2. These include: PPC as a duty of care, barriers to PPC, facilitators to PPC uptake, and the impact of the healthcare setting.

Table 8.2. Coding framework of health professionals' perceptions on PPC and their reflexions about their relationship with women

Themes	Sub-themes	Codes	Quotations
Theme 1: PPC as a duty of care	HPs' perception of their role during PPC	Legal responsibility	Bassir(14+8-10),Amna(41-42+336-337),Issam(17-19+34-38), Malika(33-34)
		Offering continuity of care	Zakia(36-48+336-358),Fatima(73-74),Nima(136-138),Laila(347-348+354-355)
		Reassuring and supporting women	Fatima(86-88+287-289+309),Fatna(19-23+ 11-13+27-30)
		Educating women in terms of maternal health	Fatima(102-106+240-242+254-255+278-280+ 307-308)
	Early Postpartum care	Physical examination	Fatima-40-41,Ghada(12-13),Amna(270+ 396-397)
		Focus on self-care (episiotomy, hygiene recommendation)	Amna(460-461)
		Focus on prevention of PPM (e.g. breastfeeding to prevent haemorrhage)	Nadia(127-142+150-153),Ghada(60-61),Marzoq(400-403),Amna(348+399-406),Nadir(228-230)
		Hands-on PPC (traditional massage, HPs accompanying women to hospitals)	Amani(238-239+230-234+258)
	Late Postpartum care after discharge	Thorough physical check	Amna(192-193+ 574-577),Fatima(58-59+74-86+311-312),Laila(25-36+38-44),Mazroq(196-199+ 234-247),Zakia(101-102),Amani(272-275),Mustafa(42-43)
		Focus on preventing PPM	Nadia(794), Sarah(81-84),Issam(29-30), Mazroq(83-87)
		Inquiry into psychological wellbeing	Fatna(8-9),Fatima(300-303),Zakia(106-115+283+117-118+189+192+200),Mustafa(42-43)
		Focus on contraception	Issam((44+58),Fatima(95-101),Mazroq(225-226)
		Focus on prevention of women's health issues such a breast cancer.	Issam(69),Laila(67-75+76-78+80-82)
	Psychological PPM	Difficulties in diagnosing psychological PPM	Amani(302), Fatima(116-118), Issam (line-64),Nadir (79-81), Nadia(793-795)
		Difficulties for women to express psychological distress	Malika(176-178),Mustafa(78-79)
		Skills needed to diagnose psychological PPM	Malika(188-190), Laila(135-136),Fatima(311-313+297-301)
		Psychological PPM diagnosed and their management	Mazroq(275-276+279-280+293-294), Fatima(118-127),Zakia(141-142+146-149+152-154),Ghada(26-29), Issam (52-57+61), Laila(156-172+138-139+187-190)
Theme 2: Barriers to PPC uptake	Barriers related to aspects of care	Difficult relationships with women	Laila(433-436+319-323),Malika(247-249),Nima(320-324),Kamilia(24-25),Issam(70-71)
		Shortage of HPs in public hospitals and health centres	Mustafa(64-65), Laila(286-290+313-315), Fatna(2-3),Nadir(236-239)
		HPs' lacklustre attitude toward PPC	Amani(306-310),Laila(315-323),Issam(84-87),Sarah(297-302)
		Lack of awareness of WHO standards	Bassir(28),Nadir(98-103 +202-203),Issam(65),Zakia(173-176)
		Lack of PPC awareness from women	Sarah(207-213+ 232-235+ 288-295),Malika(77-79+ 252-254),Laila(302-303+ 340-342),Amna(58-64),Issam(14-16+ 75-77)

	Barriers related to women's situation	PPM seen as curative (not preventive)	Malika(252-257), Sarah(46-48), Laila(303-305),Kamilia(18),Nadia(728-731),Nima(140-142)
		Financial issues	Nadir(105-109+114+187-189), Sarah(257-259+261-262), Fatima(374-375),Maha(27),Mona(19)
		Distance to faciltiies	Sarah(151-155),Marzoq(169),Issam(73-74+90-91),Maha(29-30),Mustafa(3639), Nadia (431-437)
		Lack of support from others (e.g. looking after the baby)	Malika(330-336+ 344-348+ 364-371),Maha(28-29), Kamilia(19), Marzoq(369-370),Zakia(110-111)
		PPM is taboo	Sarah (24-30)
	Cultural barriers	Lack of decisional autonomy	Sarah(255-256+266), Nadir(166-167),Malika(340-345), Bassir(23-24),Nadia(226-227+231-234+250-251+269),Amna(514-518)
		Social norms	Fatima(196-203+280-281+252-253+256-258),Sarah(24-30+173-184+188-191),Ghada(35-36),Malika(305),Nadia(68-71+170-178),Fatna(14-16),Zakia(231-242+252+257-259),Amna(449+478-485+489-492+510-511),Laila(472-475),Kamilia(20-23+41-42),Bassir(16), Issam (97-98)
Theme 3: Facilitators to PPC uptake	Raising awareness and educating women about PPC	Educating women and their family about PPC	Nadir(59-61+ 67-71+118+125-126+169-179+182-189+252),Fatima(88-89+195-196+189+282-283), Nadia(320-325+715-719+772-774),Zakia(271-289),Maha(31-33),Amna(173-177+184-187),Issam(58-60),Moustafa(34-35+45-46), Ghada(18-19),Mazroq(79-82),Bassir(17),Malika(356-359)
		Using different communication methods	Malika(79-89+207-208),Fatna(17-18)
		Offering parenting and mother classes	Fatna(8-9+27+32-36),Malika(73-77+87-93+100-105+111-114+120-124+328-330),Nima(180-190)
		Health promotion (TV campaign, …)	Fatna(17-18),Sarah(272-281),Mazroq(407-410+468-480+493-494+502-504+509-515), Fatima(393-397),Kamilia(26-27),Amani(358-360),Moustafa(52),Laila(333-335),Nadir(128)
	Establishing a trusting relationship with women	Cooperation, respect and mutual trust	Zakia(244-250), Marzoq(172-175+529-532+32-33+100-102+106-109+112+125-129), Issam(45-46), Mustafa(85), Nadia(277-281+560-561+947-961+969+976-980+988-990), Nima(221-222),Amani(261-262) Fatima(297), Amna(201+203-207+216-217+219-221+228-229), Bassir(15-18)
		Word-of-mouth/reputations	Nadia(703-707),Laila(379+383-397)
	Organisation of care	Coming to health centre to get the baby vaccination	Nadia (399), Amna(370-377),Laila(324-328),Malika(70-72),Mona(13-14)
		Staffing levels and specialism	Moustafa(61),Laila(291-292+313)
		Scheduling LPPC appointments in advance	Laila(45-47+54-60),Nadia(753-771),Maha(20-21)
		Monitoring LPPC attendance closely	Sarah(88-91+127-131)
		Mobile medical units to provide LPPC	Moustafa(55-57+63-67),Sarah(197-201+284-288)
	Financial measures	Finance LPPC check-up by institutions	Issam(32-34+82-83+93-94),Moustafa(60), Nadir(105+128)
		Generalisation of the compulsory health insurance scheme	Mazroq(446-453)
		Offering gift to use LPPC	Nadir(133+142)

Theme 4: The impact of healthcare setting	Differences in care provided between public and private structures	Availability of HPs and medicines	Amna(62-66+87-88),Laila(313-317)
		Quality of care	Laila (403-406+406-414+556-558),Mazroq(559-561),Sarah(293-296),Nadia(601-620+626-628+633-636+655-656),Fatima(145-147+151-152+207)
		Financial implication	Nima(48-51+156-159),Mazroq(314-317+323),Fatima(225-228)
		Different pattern of care utilisation by women	Maha(3-6),Issam(12-13), Moustafa(40-41),Laila(367-373),Fatima(206-207),Mazroq(105-109+125-129), Amani(113),
	HPs' attitudes in the private vs public sector	Close and personalised care in the in the private sector and rural areas	Fatima(297), Amna(201+203-207+216-217+219-221+228-229+739-757),Maha(60-61), Mazroq(32-33+100-102+106-109+112+125-129),Nadia(560-561+969+976-980+988-990),Amani(261-262),Bassir(15-18)
		Temporary and difficult relationships with women in the public sector	Malika(225-227+237+240-241), Nadia(956-957),Nima(122-123+129-132+149-150+226-233+244-246),Laila(200-206),Maha(54-56),Amna(107-109+ 99+113-115)

Caption: PPC: Postpartum Care, LPPC: Late PPC post-discharge, EPPC: early PPC during hospitalisation, PPM: Postpartum Morbidities, HPs: Health Professionals, WHO: World Health Organisation

Theme 1: Postpartum care as a duty of care

Health professionals' perception of their role during PPC

The relationship between HPs and women is seen as essential to HPs in terms of PPC uptake and delivery. Underpinning this are HPs' views on their role during PPC.

Self-employed HPs stated that they do not neglect PPC because a postpartum complication related to delivery engages their professional responsibility. Amna reported that self-employed midwives *'have to be able to take responsibility in general for everything'*. It is also a way for them to reassure themselves of their patient's postpartum health (Issam), which is why some HPs (e.g. Bassim, Fatima) do not charge for the LPPC consultation two weeks after delivery. Fatima said: *'At D6 [i.e. six days post-delivery] these consultations are free, I insist on this because they are in the continuity of the delivery'.* In the public sector, PPC is part of the pregnancy and childbirth surveillance programme (Malika), which attests to their necessity.

HPs have a versatile role in PPC delivery. According to Fatima: *'we [HPs] are a bit of everything in our society. So elsewhere, in some countries, there's the nursery nurse, there are lots of people who intervene. Here we do almost everything'*. In other words, HPs' position requires medical and social skills to reassure and support women, even in relation to family difficulties women may experience that relate to the birth or the baby. For example, Fatna counsels postpartum women with relationship problems but also warns them *'that it is their responsibility to make efforts to save their couple'.* Although the arrival of a baby can disturb the family's organisation and relationships, this type of message could unconsciously make women feel guilty for having difficulties in coping with postpartum medical and social problems.

Early postpartum care

According to HPs, EPPC mainly consists of a physical examination during hospitalisation with a change of dressing in case of a caesarean section, or episiotomy care before homecoming (Fatima). Others show and teach patients how to care for themselves at home. Amna reported: '*about the episiotomy after the delivery I do her care and I show her how she should do it, so she remembers'.*

The focus of EPPC is on preventing PPM. This may occur through recommending breastfeeding because '*it prevents the woman from haemorrhaging'* (Amna). But often, it is a continuation of antenatal consultations during which PPM prevention is already a focus. HPs may recommend that women avoid certain practices, such as eating cinnamon or steam treatment with incense which are traditionally used to accelerate the delivery, because they endanger women's health (postpartum haemorrhage) and the health of the baby during delivery (asphyxia). Nadia reported that:

'You tell the woman "If you are in labour you relieve well, you avoid drinking cinnamon" you tell her, you warn her, but sometimes there are some who perfume themselves with incense, fumigation, that goes in and the baby who doesn't breathe well'.

As for Amani, who assists with home deliveries, she monitors women's health and performs EPPC, including massage, at their home after delivery: *'once she's delivered you examine her to see if she has tears and you do some movements to "put her together", you massage her'*. In addition, she believes that she is able to intervene in cases of postpartum haemorrhage because of skills she learned from her grandmother, herself a traditional birth attendant. Nevertheless, in cases of severe complications, she accompanies women to hospital and stays with them. If the HPs do not allow her to actively assist the woman she accompanies, she remains to observe their work.

Later postpartum care post-discharge

Eight to 20 days after delivery, HPs perform LPPC consultations during which they measure vitals, ask women about symptoms of PPM, and complete a physical examination.

During LPPC consultations, Mazroq assessed if: *'everything's normal, is she smiling, no? Is she feeling well … Is she breastfeeding? Is everything normal in terms of transit? Is there no urine leakage? Because from time to time there are fistulas, you have to be careful. … Are there urinary problems, problems with bowel movements, bloating? Is there any bleeding? Is there fever, or oozing? Is there a fetid smell?'.*

The clinical examination is very important because HPs know that some women do not report symptoms because they either do not realise they have an issue or feel embarrassed. Amna mentioned:

'You examine her [the woman], but she doesn't tell you that she has itching, she doesn't tell you that she has urinary burning, so I ask these questions and then she says I have this. But why doesn't she say that'.

In addition, HPs such as Laila or Malika adapt their language and recommendations to the socio-demographic characteristics of the women, considering their age, socio-economic and educational levels, and their place of residence (urban, rural).

Fatna and Fatima also reported focusing on the psychological well-being of patients by listening and providing information and advice about maintaining their health. Fatna works in a specialised reproductive health centre (public): '*So, the most important thing is that we give advice, the woman can stay more than ten minutes just to talk about breastfeeding, vaccination'.*

LPPC is also the opportunity to educate women on hygiene, nutrition, breastfeeding, PPM symptoms and family planning. Zakia reported the importance she places on what is known in Morocco as the Information Education Communication (IEC): *'It's valuable because I consider it [IEC] to represent 80% of care. You know, it changes a person's behaviour'*. Moreover, this last consultation can also be an opportunity to raise awareness of breast cancers by teaching breast self-examination. Thus, the HPs' position implies that for them the role of PPC may be more preventive than curative.

Psychological PPM

The data indicate that psychological PPM are not often diagnosed. Several factors may explain the difficulty in diagnosing these, including denial of their existence by the traditional birth attendant who considered that *'we don't have that [psychological complications] here in Morocco '*, and lack of training and experience. Fatima reported: *'it's a pathology that's not very frequent and maybe we don't read enough about it I think, it must be, it must exist but maybe we don't detect it much except when it's serious'*.

However, the quality of training in maternal psychology is not in question according to other HPs who consider psychological conditions to be more difficult to diagnose than physical ones because women do not easily express their symptoms. Malika explained that:

'So that's a complication, really, which I wouldn't say is not taken into consideration, but it's a complication that really needs to be screened by someone who has more experience in screening for this kind of complication because ... the midwife conducts an interview with the woman and when it's a woman who is shy, too discreet or whatever, so it's a bit difficult to have access to information'.

There is a societal explanation for this that could justify women's embarrassment since *'psychological issues are taboo in conservative Morocco society'* according to Mustafa. However, active listening to women is deemed important as Fatima mentioned: '*it is not negligible in gynaecology because a postpartum examination you do it in 30 seconds, everything around can sometimes take more than an hour'*. Thus, the analysis of patients' discourse allows experienced HPs, such as Zakia, Marzoq and Fatima (Table 8.2), to detect severe cases for which a psychiatrist's opinion is required. Marzoq explained:

'Postpartum psychosis, postpartum neurosis, postpartum depression, there are a certain number of things that happen, so from time to time when it's too much for us, we can get help from psychiatrists or psychologists to get through it'.

In addition, the Postpartum Depression Screening Scale (Eberhard-Gran et al., 2001) is used by nurses and midwives in hospitals if needed (Ghada).

Low moods (referred to as 'baby blues') were the psychological complications most frequently observed by HPs. Issam estimated that it affects 80% of women. Laila described her approach with a patient reporting low moods:

'We will reassure her, she must feel at ease with the provider and then explain to her that it is temporary, she must have confidence in herself. If she had a bad experience during delivery, we explain to her that "Thank God you are healthy, your beautiful baby will grow up, it will pass, there are people like you who went through the same thing, but they tried to improve, [as said] you have to work on it". And also, we talk to the family, to the father: "you have to value her a little, you have to take care of her", the family must not focus on the baby and leave the woman aside'.

Hence HPs may support women and also approach their close family.

The fact that low moods is considered a frequent, temporary and benign syndrome can lead HPs to normalise it without considering women's discomfort.

In summary, HPs consider that providing PPC is part of their duty. HPs' discourse suggests that they do what is necessary during PPC to prevent or treat physical PPM during the first six weeks postpartum. However, the management of psychological problems and the awareness of psychological PPM is not optimal.

Theme 2: The barriers to PPC uptake according to HPs

Barriers related to aspects of care

HPs were aware that complicated relationships do not encourage women to use LPPC as it leads to a lack of trust in the medical staff. It can also create a medical nomadism for women who want to go for an LPPC consultation to treat PPM. For example, public health centres can be avoided because, according to Laila, HPs in the public sector are overwhelmed by the workload: *'It doesn't mean that we can't communicate with people, but we are forced, we are overwhelmed. If you see the lack of staff now, it's catastrophic'.*

The participants in the Souss-Massa and Rabat-Salé-Kénitra regions considered that the shortage of medical staff is an obstacle to PPC and prevents them from carrying out good consultations focusing on PPM prevention; instead they focus on emergencies. Moreover, due to the shortage of staff in public institutions, Nadir acknowledges that it is difficult to provide health education to women to raise awareness of PPC and PPM during antenatal visits: *'Normally it must be done, but since we are not many doctors, we are not many midwives, we do not do that. We do the prenatal consultations'*.

Moreover, the frequency of PPC as recommended by the WHO was not known by some HPs. This could explain why they do not recommend women to use LPPC. Zakia commented about the WHO updated recommendations: '*the dissemination has already been done? I don't know. Normally at birth, three weeks and six weeks. Normally there were three [PPC] … I think we do it in an indirect way'.*

If HPs identified barriers to PPC uptake based on the healthcare system, they also reported barriers relating to women's situations.

Barriers related to women's situation

One barrier to PPC uptake identified by HPs is women's lack of education and knowledge about PPC, particularly women admitted to public health facilities, women living in rural areas and those who have not had antenatal care. Sarah became aware of these gaps during the prevention workshops she organised: *'we've understood through trying to raise patients' awareness that there are many gaps. For example, people don't understand when to consult'*. For Malika, who supervised the maternal health programme in public facilities, education is a factor:

'Talking with a cultured person is not the same as an illiterate person because, as I can confirm, people, except in urban areas, are, as I said, mostly illiterate. So this type of people, for them, there is no point in prenatal care consultations just as there is no point in postnatal care ones, so for them, they go to the health centre or to the hospital only if they have a real problem, so they don't adhere to the word prevention. It's mostly curative for them, not preventive'.

HPs were aware that some women may neglect LPPC unless there is a medical need because they are unaware of the preventive value of PPC.

According to HPs, other sociodemographic barriers also limit LPPC uptake including financial considerations, as well as distance and transportation to health facilities. Although distance to health facilities hinders LPPC uptake, Marzoq see patients from rural areas in his urban practice: *'we see everyone, we see everything'*. The lack of support from women's entourage, for example to look after the baby so she can attend her appointment, is another barrier mentioned by HPs. Indeed, Malika reported the lack of consideration displayed by some in-laws towards women: *'it's like a machine that is made just to have children, so it's not a human being who should be supported, really well taken care of in her family circle'.* The postpartum health of these women can be neglected by in-laws who, on the other hand, do what is necessary for the postnatal care of the baby, by taking him/her to health centres, sometimes without the mother. Malika stated:

'Sometimes even in the postpartum period you find mothers-in-law who bring the babies without their mothers. And for us, if the mother doesn't have a postnatal consultation, we can't accept this because normally it's a consultation that includes the mother and child and not just one of them'.

Moreover, women's fear of embarrassment or of being judged is also reported by HPs as preventing women from consulting, even if they experience PPM symptoms. For example, cystocele (i.e. organ dehiscence) is a frequent PPM according to Sarah but it remains a taboo subject for women who are apprehensive about reporting it during PPC consultation for fear that their husbands will know about it and the consequences related to it. Sarah explained:

'These are very frequent reasons for consultations, and it is a bit taboo in Morocco. I'll explain why, because when you have a cystocele, it's something that is dehiscent, that is felt by the patient, and it's a patient who is afraid to consult because perhaps her husband will be informed of it and for her, it can prevent her from having other children and from having intimacy with her husband'.

Cultural barriers

Finally, according to HPs, there are some cultural barriers to PPC uptake. Although the position of women in Morocco has evolved in the past decades, giving them more rights (Graa, 2021; Mellakh, 2007), some cultural norms persist which could explain women's lack of autonomy to take initiatives, including whether to access LPPC or not. According to Bassim, all social classes are affected by lack of autonomy, but for others, this applies more to women under 20 years old (Mona) or those living in rural areas (Nadia).

Moreover, seclusion, which consists of women remaining in their home for 40 days after birth and is thought to no longer be practised except in rural areas (Issam, Kamilia) is still observed in some working-class, urban settings as reported by Sarah who co-runs a Non-Governmental Organisation. Sarah reported women practising seclusion and testified of its negative consequences on women's health:

'the first influence that is noted: when you give birth, you must not go out, you must not let the baby out, it has an impact because the woman who gives birth, who has complaints, who has complications and who does not consult on the basis that she must not go out because it is bad for her, … it is a bad spell for the baby, it can be harmful, it has an impact. Of course it has an impact on medical practice. …I have seen women here, I have seen women after two months of delivery, two and a half months, who have told me "I never went out and I never took the baby out"'.

Finally, HPs are aware of the traditions described by some women and the influence of women's families in their practices. Even though HPs advise their patients against customs that may endanger postpartum health, they are aware that their recommendations are not always followed. Fatima deplored that: *'Some people listen more to what the neighbours say than to what the doctor says, but you have to persevere'.*

In summary, HPs posit that PPC uptake is limited by the organisation of care as well as by a range of socio-demographic and cultural factors related to women's situation. It can also be hindered by the healthcare setting as will be described in Theme 4: the impact of the setting.

There are, however, a number of facilitators to PPC reported by HPs.

Theme 3: The facilitators to PPC uptake according to HPs

Two main facilitators to PPC uptake were reported by HPs. These are women's awareness of PPC and education about its value, as well as trusting relationships with women. Other facilitators reported related to the organisation of care and financial measures.

Raising awareness and educating women about PPC

Informing women and their families about PPC is the main measure proposed by HPs to increase PPC uptake, and in particular LPPC (Table 8.2). PPC can be promoted during pregnancy, antenatal visits, and hospitalisation. Zakia reported:

'They give this IEC [Information Education Communication] in the postpartum ward during the doctor's visit [EPPC]. Why do they [women] come in LPPC? It's because they are already informed during their hospitalisation about the usefulness of postpartum checks'.

Different communication methods can be used by HPs such as Communication for Behavior Change (the three Cs approach, i.e. *Communication pour le Changement Comportemental*) defined by Malika as: *'a way of changing women's habits because throughout our work, in postpartum for women, it's the baby that must be taken care of and not the mother' but that's not true, there must be care for the mother-child couple'.*

HPs discuss initiatives that may increase PPC uptake such as encouraging women to have more decision-making autonomy (Fatna), creating a campaign to promote PPC disseminated through mass media (TV, flyers, posters, social networks, internet) and medical and paramedical institutions. Sarah mentioned: *'we should work on clip, TV clip (advertisement). A two-minutes capsule in Arabic, in Morocco it could be useful, but we can't find it'*. Another initiative is to broadcast messages on screens in waiting rooms to promote maternal health. This method is used in Mazroq's surgery's waiting room but currently does not display content on PPC or PPM. According to him, it is an effective intervention since patients asked him about the information that has been communicated:

'it's really excellent, because people, when you go into a surgery, you see this [in the waiting room], you're maybe a little bit more aware, they come in here [doctor's office], they ask questions, how should we do this, how should we do that? I saw it on the screen outside, can you please tell us more about that? And so, you must take the time to explain, to do things in the right way and I think it's a good initiative'.

Establishing a trusting relationship with women

To be heard, HPs must first and foremost be accepted by the population, gain and retain their trust. HPs' good behaviour with women is a guarantee of good relationship and reputation (Zakia). Respect and mutual trust foster cooperation between HPs and women in the interest of maternal health. According to Nadia: *'at first, they don't listen much to your recommendations and then when they notice that you stayed [in the health facility], and they get to know you… that's when the trust is established'.*

Thanks to word-of-mouth and by providing a good car experience to women, this goal can be achieved. Laila explained the influence of word of mouth in rural areas:

'The information is there through listening… in the rural area if the woman is taken care of properly, they know that they have to come after the delivery, she has to be taken care of during a postnatal consultation… be sure that at least ten women will come and do the same thing'.

Therefore, the trust women have in HPs can encourage them to attend LPPC as stated Mazroq:

'In the private sector, there is a feeling of trust. There are people who come from all over the place when there is a feeling of trust…it's important. She [the woman] has to feel absolutely confident. And then, when this feeling is there, it's finally very

difficult to change one way or the other … she prefers to come to the doctor who delivered her, why? She thinks that he has my file, he knows this, he knows that…it's preferable not to do this again with someone else'.

Organisation of care

The organisation of care can also facilitate PPC uptake according to HPs. They reported that their patients take the initiative to consult for LPPC if they experience PPM symptoms. However, LPPC is also provided to women coming to health centres to vaccinate their babies as mentioned by Nadia: '*she's getting two services namely for the vaccinations of the baby and her health when she comes to see me here'.*

However, to improve the provision and quality of PPC, some HPs point to the necessity to increase staff (in general) so more time can be dedicated to PPC. Laila indicated that:

'A nurse or the midwife is responsible for doing both the vaccination of the newborn, the care of the newborn and the woman for postnatal consultation. It's a bit of a workload, there should be a dedicated person to ensure the quality of the service…, for me that's [lack of staff] the big concern'.

HPs also reported that when they take the initiative to schedule LPPC appointments before discharge, women are encouraged to attend. For example staff from the maternity hospital where Zakia works, schedule outpatient LPPC appointments before discharge for women who have had an episiotomy or caesarean section. The NGO that Sarah co-runs on a voluntary basis in addition to her other commitments go further. Staff at the NGO remind women of their appointments by phone and monitor their attendance.

The creation of mobile medical units that deliver care in rural areas also facilitate LPPC. For Sarah it is about: *'getting closer to the vulnerable population. We must not only have fixed structures, but we must also approach them through caravans, we must work on that'.*

Financial measures

Several financial measures can also encourage the uptake of PPC according to HPs such as the first LPPC consultation post-hospitalisation being free of charge in the private sector, or consultations being paid by international organisations as reported

by Nadir: *'other world organisations can pay for these consultations to motivate women to attend'.*

The rollout of compulsory medical coverage is also an important public health measure as it enables the refund of at least half of the cost of LPPC check-ups. Marzoq adopted the 'official' rhetoric when he stated:

'I hope that with the project of His Majesty King Mohammed VI, we are doing everything we can… the maximum of doctors… we are doing everything we can for the success of this great Royal project'.

Another idea proposed by Nadir is to reward women who come for LPPC in public facilities with a gift, so that they have additional benefits from attending. These rewards could include: *'mosquito nets or something, so that when she sees that the consultation has other benefits… that there will have a benefit for example like a watch, a little thing that encourages women to go to the consultations'.*

Although these measures can facilitate PPC uptake, it remains that one of the main factors impacting PPC is the setting in which it takes place.

Theme 4: The impact of the setting

Differences in care provided between public and private structures

In this study, LPPC consultations were mostly provided in public facilities because fewer women went to private settings and even those who did tended to receive LPPC from public health centres at the same time as getting their babies vaccinated. Thus their experience mainly reflected the situation in public settings.

Unlike the private sector, a shortage of staff was reported in public facilities, which not only increased waiting times, but translated into lower levels of care and attention being provided to women – although staff is reactive in case of emergencies. Laila acknowledged:

'It's normal when there's this type of workload, you're going to focus on the emergencies, the things that need to be done and done well. Also it's a consultation, it's very interesting of course the postpartum consultation, but for me if there are a lot

of tasks to be done, so we minimise the 'package' [care that should be provided according to the maternal health programme]'.

Some participants also refer to a 'mass medicine' in the public sector as opposed to personalised care in the private sector. Marzoq and Fatima explained:

'The private practice is case by case. Now in the public sector, I worked for 15 years in the public sector, it should be the same, except that often consultations are not personalised, they are mass consultations… they should be no difference between public and private'.

Conversely, Laila considered that the HPs in the public sector provide a better quality of care thanks to better training and broader experience:

'The quality of the service is in the public sector because we have qualified, trained staff with experience, an experience that commands respect…, in the private sector, there is luxury, the setting, the communication, the facility … there are enough staff. Once you are in a clinic there is a reception unit with staff who will direct you or do this, that, it is the sophisticated side, but the service is still a question mark. Are you going to find a doctor, or a midwife or a nurse with experience who know what to do'.

Other HPs see no differences in the care provided between the two sectors. According to Mazroq: *'it's the same service whether it's here or there'.*

The commitment of HPs in promoting PPC is neither related to their work setting (public or private) nor training according to Sarah: '*it is a question of conviction. You can be well trained, but you don't have the conviction to explain because your time is precious to you, ok, that's a conviction of the health provider'.*

On the financial side, there are notable differences between sectors since LPPC is free in the public sector and charged for in the private sector. Mazroq considered that it is normal for women to receive a better quality of care when they pay for a service, in this case LPPC. To him the level of care provided in the public sector depends on the willingness of HPs:

'It's quite normal, we are a little more attentive [in the private sector] and this happens everywhere. When you pay, you demand a little bit more from the service you're paying for. In hospitals, it depends a little on the conscience of each person'.

HPs also reported that women's utilisation of maternity care differed across sector. Nima encourages women to consult at any time. However, in public facilities, women seem to avoid it unless necessary, while they do not hesitate to contact private doctors.

She reported: *'In the private sector you know they go for consultations; she will pay 500 or 600 dirhams for a consultation, but she listens to what the doctor is telling her, she follows her treatment, she calls the doctor if there is something abnormal, and even the doctors tell them to come at any time. We [in the public sector] also tell them, the hospital is open 24 hours a day, but maybe what is free doesn't seem right to them'.*

It is interesting to see that some HPs perceive that one possible barrier of women's use of PPC is that they may not value the care when it is provided free of charge.

With regards to traditional midwives without accredited medical training, Amani felt that she provides similar care than qualified HPs, especially as her skills have been praised by a gynaecologist. However, the comparison of quality of care between registered and traditional midwives is limited as the latter do not officially practise in medical environments.

In conclusion, the care offered in the private sector can be more tailored to women's needs. In contrast, in the public sector, which is more commonly used for PPC, it is more difficult to offer a similar quality of care due to the high flow of patients and insufficient resources. However, some HPs see the public sectors as offering better quality care thanks to high levels of training and experience. Another factor relating to the healthcare setting which was identified by HPs as being key in women's utilisation of PPC is their own attitudes towards caring for patients in the private vs the public sector.

HPs' attitudes in the private vs public sector

HPs' involvement with their patients can depend on the setting they operate in. HPs working in the private sector tended to provide more care and at time, some struggled with setting boundaries with their patients.

This was the case of Amna who works alone in her private delivery centre and who has close relationships with her patients: *'I try to behave with her as if she was my daughter. I let her feel the spontaneity, she has to feel like she's with her mother'.* As

a result of her highly personalised care, Amna was on call night and day even to advise women during the postpartum period.

Nevertheless, Amna retains agency as she chooses her patients and refuses to take care of women with whom she does not feel comfortable, those who do not trust her, and those who expect the same level of services as in private clinics. Moreover, Maha, a midwife in a private clinic, admitted that relations can be complicated with patients who are very demanding with the paramedical staff.

Furthermore private-sector doctors are easily accessible, especially on their mobile phones, which allows their patients to contact them directly if necessary. Mazroq stated:

'The private sector is a bit different from the public sector because she has our mobile number and we can be reached, she doesn't have to go through the secretary, even if she calls at 3 am in the morning, she knows that it's the doctor who answers ... this is a Moroccan specificity'.

In public settings, HPs tend to suffer from a poor reputation because of prejudices about their level of qualification. According to Malika:

'For the population, the HPs are not qualified to receive them, so they [the population] think that they won't benefit from a favourable welcome, they won't be taken care of properly. For them, HPs are always looking for payment corruption. So there are a lot of negative things that are transmitted by word of mouth and in most cases it's not right'.

These prejudices can be detrimental to the relationship between HPs and women, and HPs working in the public sectors report incidents where women can be 'agitated' (i.e. defensive), as Malika explained:

'When she comes, she has prejudices ... there are people who come in an agitated state without having problems with the staff. So as soon as they are admitted to the health facilities, they start to create problems and you can see it everywhere'.

Nevertheless, HPs in public health centres and birthing centres can create a bond of trust with women through repeated contact during antenatal and postnatal care, but this is not the case for hospital staff who assist women in delivery. Deliveries in public sector mean temporary relationships between women and HPs and standardised care. Nima, who works in both sectors, compares the two. Working in the public sectors may

be less stressful because it is less emotionally charged, but it is also possibly less rewarding. She stated:

'For example, I am a gynaecologist, this woman is going through her pregnancy with me, that is to say she trusts me completely, that is to say that she has to be healthy and the baby has to be healthy, so I am stressed with her during her delivery, so at the slightest opportunity I am going to do a caesarean section so that I am not worried and the baby is healthy, whereas at the hospital [public] I don't know you, you don't know me, and you came in urgently to give birth. ...So I behave with you according to the rules, I do what needs to be done, I take care of you even if the baby suffers a little, I can wait with you ... for example the one who has a dirty liquid, a tension, she can give birth normally at the hospital'.

Thus, the analysis of HPs' experiences indicates that their working environment and the population they are in contact with influence their relationship with women, which in turn influences the care they provide. The continuity of care post-delivery is favoured by the close relationships that HPs working in the private sector develop with their patients, in contrast to the, sometimes, difficult relations experienced in public hospitals.

After elaborating on HPs' perceptions of PPC and their relationships with patients, the next section will compare HPs' and the women's perspectives using both data.

8.3.2. Comparing HPs' and women's perceptions and experience of PPC

While each participant had a unique experience of PPC, the analysis highlights similarities and differences in perceptions and experiences of PPC and PPM management. The women's views on PPC were contrasted with the views of HPs who provide PPC to identify similarities and differences. These have been illustrated in the table below (Table 8.3).

Table 8.3. Comparison of women and healthcare professionals' opinions on PPC and PPM

Women's perceptions	HPs' perceptions
1) **The nature of care provided** - Care provided by healthcare professionals (HPs) - Informal care	1) **PPC as a duty of care** - HPs' perception of their role during PPC - EPPC - LPPC post-discharge - Psychological PPM

2) **PPM** - Physical PPM - Psychological PPM	2) **Barriers to PPC** - Barriers related to aspects of care - Barriers linked to women's situation - Cultural barriers
3) **Barriers to PPC** - Lack of awareness and promotion - Women's attitudes toward PPC - Difficult relationships with HPs	3) **Facilitators to PPC** - Raising awareness and educating women about PPC - Establishing a trusting relationship with women - Organisation of care - Financial measures
4) **Facilitators to PPC** - Good relationships with HPs - Raising awareness and developing education about PPC - A dedicated pathway	4) **Impact of the setting** - Differences in care provided between public and private structures - HPs' attitudes in the private vs public sector
5) **Impact of the setting on PPC and PPM** -Women's perception of public vs private organisation of care - The monetary value of care	

Caption: HPs: health professionals; PPC: postpartum care; PPM: postpartum morbidities
EPPC: early PPC; LPPC: Late PPC (post-discharge)

Similarities

HPs and women shared a common understanding of PPC on several aspects. These included the nature of care provided and some barriers and facilitators to PPC.

Most of the procedure of PPC consultations was described similarly by women and HPs. Both groups of participants described similar physical check-ups and treatments being provided / received (e.g. cleaning suture, checking vitals).

Both women and HPs considered that the lack of knowledge and awareness of PPC was one of the main barriers to its uptake. In addition, the conflicted relationships with HPs reported by women as hindering PPC were corroborated by some HPs, particularly those working in the public sector. HPs considered that their working conditions and women's state of "*agitation*" (Malika) or defensiveness in public hospitals may contribute to women's dissatisfaction with the quality of care some reported, which could, in turn, lead to medical nomadism.

A common recommendation to increase PPC uptake from women and HPs was to schedule LPPC appointments before discharge and run promotion campaigns.

Divergences

There were also some key differences between the groups. No HPs testified to the absence of EPPC. However, four women participants (Mariam, Wafa, Sawsan, Alia), all of whom delivered in public hospitals, reported receiving no EPPC. This difference warrants further examination.

Regarding LPPC consultations, these were mostly perceived as preventive by HPs as opposed to curative by women. The fact that women did not perceive the preventive value of PPC suggests that awareness of PPC and of PPM symptoms during antenatal visits and delivery is currently not optimal, and HPs from the public sector acknowledged this situation.

Other divergences were observed regarding the barriers to PPC. The level of women's decision-making autonomy and women's age were not identified by women as barriers to LPPC, contrary to the HPs' opinion. Furthermore, if the influence of family and cultural traditions relating to maternal health were not considered by women as detrimental to their postpartum health, some HPs viewed these as having a negative impact (such as seclusion) on PPC uptake and PPM.

Regarding PPM, one of the main differences between groups related to the screening and treatment of psychological complications. Most HPs reported being attentive to their patients' situation in order to detect possible psychological conditions. However, few actually asked women about their mental health, and most women reported not being asked about it. Meanwhile, some women stated experiencing psychological issues without discussing them with their doctor. Hence, postpartum psychological complications appear to be under-reported and under-diagnosed. Therefore it is essential that, during PPC, HPs ask women about their state of mind and offer them appropriate support if needed.

8.4. Discussion

This qualitative study aimed to explore HPs' perceptions of PPC provision. HPs mainly considered PPC as an opportunity for early detection of PPM even if some of them recognised the difficulty in identifying psychological PPM. HPs viewed providing PPC as their responsibility, especially when self-employed. However, HPs also pointed out that working conditions and difficult relationships with women, particularly in the public

sector, could hinder PPC uptake as well as women's sociodemographic situation, cultural practices, lack of PPC awareness on PPC and of decision-making autonomy. Additionally, the provision of PPC appeared to be impacted by the healthcare setting. To increase PPC uptake, HPs highlighted the need to raise awareness of PPC, build good relationships with women through better communication and practices, and to reorganise care delivered in public settings.

New insights, not evidenced in the quantitative analyses (Chapters 5 and 6), were provided by this qualitative study such as the significance of psychological PPM experienced by women. These contribute to a more accurate understanding of the factors that influence postpartum health in Morocco. The analysis of women's (cf. Chapter 7) and HPs' data suggests that mental health issues may still be a taboo topic in Morocco. The insights about Moroccan women's psychological distress during the perinatal period has been reported in the literature. Indeed Assarag et al. (2013) reported that in Marrakech area, mental distress was the most reported PPM by women but the least diagnosed PPM compared to other physical PPM. This could be explained by the present study findings revealing that HPs lack training to make a psychological diagnosis, as well as the lack of resources in the public sector, which leads to HPs focusing on what they consider to be essential during LPPC (which does not include psychological PPM).

Furthermore, according to HPs, there is a discontinuity of care during pregnancy for patients from the public sector, with few (1 to 2 visits) or no antenatal visits nor participation in mothers' classes (i.e. birth preparedness). Thus, the lack of antenatal follow-up is a missed opportunity to raise awareness of PPC among women.

Finally, this last phase of the research provided insights regarding the relationship between PPC utilisation and PPM onset. The experiences of women (cf. Chapter 7) also provide insight into some of the associations between variables identified in Chapter 6. This study findings explained the relationships identified in Chapter 6 between the three main outcomes of this research (EPPC, LPPC and PPM). According to HPs' accounts, EPPC ensures that women return home in good health, which may explain why just after hospitalisation there is less risk of PPM. The study also suggests that LPPCs use may be greater when HPs inform women about LPPC or even schedule LPPC appointments during the EPPC before discharge. This system of

healthcare provision, which facilitates continuity of care after returning home, could explain the positive relationship between EPPC and LPPC evidenced in the quantitative study, in which EPPC provision leads to LPPC utilisation (Chapter 6). Furthermore, the women's qualitative findings (cf. Chapter 7) showed that women take the initiative to use LPPC when PPM occurred, which is consistent with the results of the logistic regression (in Chapter 6).

Strengths and limitations:

This study provides further insights on the context of PPC provision and the role of HPs in women's journey from pregnancy to LPPC. It also sheds light on HPs' relationship with women that are largely dependent on the healthcare setting and the use of cultural practices that are sometimes in opposition to HPs' recommendations. In addition, data were collected from different types of health facility in several regions of northern and central Morocco, ensuring ecological validity and enabling the inclusion of HPs with diverse professional backgrounds.

Nevertheless, this qualitative study has limitations. There was a relatively high number of refusals to participate in the study among HPs who were eight times more likely to refuse participation than women. This suggests a certain unease or possible mistrust on the part of the medical profession to discuss PPC, despite being assured of confidentiality. Even though the researcher verified that all participants met the inclusion criteria, ten HPs were chosen/selected by other HPs raising the issue of selection bias. Moreover, social desirability bias in participants' response may have distorted some of the data collected. For example, HPs may have minimised issues with regards to waiting times. They may also have reported the number of PPC consultations provided as per the WHO recommendations rather than what is happening on the ground.

8.5. Conclusion and implications for the thesis

In conclusion, this chapter addressed objectives 5 of the research (i.e. to explore HPs' experience in providing PPC) by highlighting the diverse perspectives of HPs on the issue of low PPC uptake and PPM.

As PPC providers, HPs recognised the importance of PPC for women's health but in the public sector they encountered relational and organisational difficulties in

delivering it. The working conditions of HPs, their involvement in care and their sense of ethics are factors that influence women's satisfaction with the care they receive.

Moreover, HPs' involvement is essential to overcome one of the main barriers to PPC uptake that is the lack of knowledge about PPC and PPM among women and their family. Indeed, health education is part of HPs' role, and this requires clear, fair and appropriate communication with women and their families so that they can endorse PPC's preventive as well as curative value.

HPs' and women's positions were similar regarding PPC procedures and the need to raise its awareness. Both groups were also in agreement that conflicted relationships between them do not favour LPPC uptake. Nevertheless, they also differed in their views on the usefulness of PPC, the influence of families as well as cultural beliefs and practices upon maternal health along with women's level of decision-making autonomy.

For more clarity, Table 8.4 summarises the main factors involved in PPC uptake according to HPs' accounts.

Table 8.4. Summary of barriers and facilitators of PPC uptake reported by healthcare professionals

Healthcare professionals' study	
Barriers	**Facilitators**
- Aspects of care (complicated relationships, shortage of staff, lack of knowledge on the frequency of PPC recommended by the WHO) - Women's situation (lack of education and knowledge about PPC, distance from health facility, financial constraints) - Cultural norms and practices (seclusion, low autonomy of decision-making, influence of women's families in their practices)	- Raising awareness on PPC importance - Provision of postnatal care for the baby - Scheduling LPPC appointments before discharge - Increasing staff in public health facilities, dedicated HPs for PPC - The creation of mobile medical units - Financial measures

Caption: WHO: World Health Organisation, PPC: postpartum care, LPPC: later postpartum care post-discharge until six weeks postpartum

The next chapter will bring together the findings of the various phases of the research. It will conclude the thesis by discussing measures that could encourage PPC uptake and decrease the occurrence of PPM.

Chapter 9
Discussion of main results and conclusions

This chapter presents a summary of the main findings of the research and offers a triangulation of the quantitative and qualitative findings that demonstrates how the patterns of PPC utilisation and PPM onset in Morocco corroborate and complete each other. The chapter also discusses the methodological and practical implications of the research, as well as its limitations. A reflective account on conducting this research is presented and directions for future research are also suggested.

9.1. Introduction

The aim of this research was to determine the factors contributing to low postpartum care (PPC) utilisation in Morocco and how PPC use relates to postpartum morbidities (PPM). The first phase of the research consisted in conducting a systematic review (Chapter 2) and meta-analysis (Chapter 3). Both answered the first research objective by describing PPC uptake in LMIC. The analysis also enabled to drawn hypotheses that were later tested in the Moroccan context.

The second phase of the research answered objectives 2 and 3. It consisted of a secondary quantitative analysis of a nationally representative database focusing on Moroccan maternal health. The study was carried out in two steps, firstly an exploratory analysis described the population of study and identified the patterns of PPC uptake as well as the type of PPM experienced by women (Chapter 5). A confirmatory analysis using a multivariate logistic regression was then performed to determine the relationship between PPC uptake and PPM and their respective determinants (Chapter 6).

The third phase of the research consisted of a qualitative study that explored first-hand women's and health professionals' perceptions of PPC and their experiences of it (Chapters 7 and 8). This final phase answered the research objectives 4 and 5.

9.2. Summary of the key findings

9.2.1. Main results from the systematic review and meta-analysis (chapters 2 and 3)

Twenty-four cross-sectional studies pertaining to PPC uptake in LMIC between 2013 and 2020 were included in the systematic review. Overall, 55.4% of women attended PPC, with a slightly higher proportion in Africa (55.6%) compared to Asia (51.6%). This review was conducted using a multifactorial approach by identifying and categorising 21 determinants (sociodemographic, obstetric, environmental) that are shown to be associated with PPC uptake in the literature. PPC facilitators identified included: urban dwelling; having received formal education; awareness of PPC and knowledge of postpartum health complications; higher frequency of antenatal care visits; having a skilled birth attendant; delivering in a health facility (as opposed to home); caesarean delivery; women's autonomy in decision-making; wanted pregnancy; primiparity; exposure to mass media (radio, TV, newspapers); women's partner's level of education; and women's employment. Barriers to PPC uptake included: poverty; long distance from health facilities; single marital status; unwanted pregnancy; and some cultural beliefs.

Based on this systematic review, a meta-analysis was conducted based on nine articles that analysed data from the Demographic and Health Survey in 35 (LMIC), involving 198,402 women. Education was found to be an important determinant and indicated that education is strongly related to PPC utilisation, particularly for women who have achieved primary and secondary education compared to those with no formal education. Socioeconomic level was also strongly associated with PPC uptake. Indeed, compared to the poorest women, those from poor, middle, richer and richest households were more likely to use PPC.

9.2.2. Main results from the quantitative study (Chapters 5 and 6)

The quantitative study was based on a secondary data analysis of a nationally representative data set of 5,593 women of childbearing age who delivered babies in Morocco between 2012 and 2018.

The analysis shows that 62.6% of women received PPC before discharge (EPPC), 21.3% of women used later PPC (LPPC) within 6 weeks after delivery and 28.3%

reported having experienced PPM. Factors positively associated with LPPC utilisation were women's higher level of education, higher socio-economic status, higher frequency of antenatal care visits, caesarean delivery, and receiving postnatal care for babies. Conversely, the absence of doctors during delivery was associated with lower LPPC uptake. Furthermore, the provision of EPPC before discharge was more likely in case of caesarean mode of delivery and postnatal care for the baby.
With regards to PPM, the risk of experiencing these decreased with secondary and higher education, and having received antenatal care, whereas it increased with instrumental delivery and morbidities during pregnancy.

The timing of PPC utilisation influenced the associations with PPM – that is to say, the risk of PPM occurrence decreased with receiving early PPC (EPPC) before discharge but increased with LPPC utilisation. Finally, receiving EPPC encouraged LPPC utilisation.

To sum up, these findings showed that PPC utilisation remains low in Morocco, and that PPM persist. Both were marked by social health inequities with a clear social gradient based on education and socio-economic status. Moreover, pregnancy monitoring encouraged continuity of care and reduced PPM.

9.2.3. Main results from the qualitative study (chapters 7 and 8)

The qualitative study highlighted the diverse perspectives of women and health professionals (HPs) on the issue of postpartum maternal health. Women considered PPC principally as curative whilst HPs saw it as preventive. New factors, not captured in the quantitative analysis, were identified as being associated with PPC uptake– namely, cultural practices and social norms regarding the postpartum period, family involvement, the relationship between women and HPs during pregnancy and delivery. The latter factor was also associated with PPM occurrence including psychological PPM.

The analysis identified four themes in each data set (women's and HPs'), with some differences and commonalities. Women's themes included: 1) the nature of care provided; 2) PPM; 3) barriers to PPC; 4) facilitators to PPC; and 4) the impact of the setting on PPC and PPM. Women reported a lack of knowledge about PPC and negative care experiences during childbirth, which deterred them from coming back

for PPC, as barriers to PPC uptake. This was particularly the case in the public sector, where the care provided could be seen at times as unsupportive. PPC was often provided by family in addition to or instead of HPs. Only five women reported having received the four PPC consultations recommended by the WHO. Most women reported physical PPM (pelvic infections, breast issues, nutritional deficiencies). Psychological PPM (low moods, postpartum depression symptoms) recounted by women were largely unreported to HPs during PPC, or/and untreated. Raising awareness of PPC, having satisfactory birth experiences, and organising the postpartum period before discharge, such as scheduling LPPC appointment, seemed to facilitate PPC uptake.

Regarding the HPs' data, the themes encompassed: 1) PPC as a duty of care; 2) barriers to PPC uptake; 3) facilitators to PPC uptake; 4) the impact of the healthcare setting. HPs considered the provision of PPC as a duty of care, especially HPs working in the private sector, which they reported gave them the opportunity to detect PPM. Nevertheless, HPs cited difficult work conditions particularly in public health facilities such as heavy workload and limited staff, and a lack of experience or training as barriers to providing PPC. These also prevented them from assessing women's psychological health.

Ultimately, women's and HPs' accounts were congruent on the way PPC is conducted, certain obstacles to PPC such as lack of knowledge and awareness of PPC and the impact of conflicted women-HPs relationships. The common proposed measures to increase PPC uptake across the two groups included scheduling LPPC appointments before discharge and running promotion campaigns. Conversely, women and HPs' perceptions diverged regarding the utility of LPPC (i.e. mostly perceived as preventive by HPs as opposed to curative by women), the impact of women's decision-making autonomy level (which was considered as a barrier by HPs but this factor was not mentioned by women), women's age (a young age under 20 was considered as a barrier by HPs but this was not mentioned by women), family influence and cultural practices (both were perceived as a barrier by HPs in opposition to women's perceptions). They also disagreed about the screening and treatment of psychological complications (HPs reported that they screen psychological PPM and refer women to

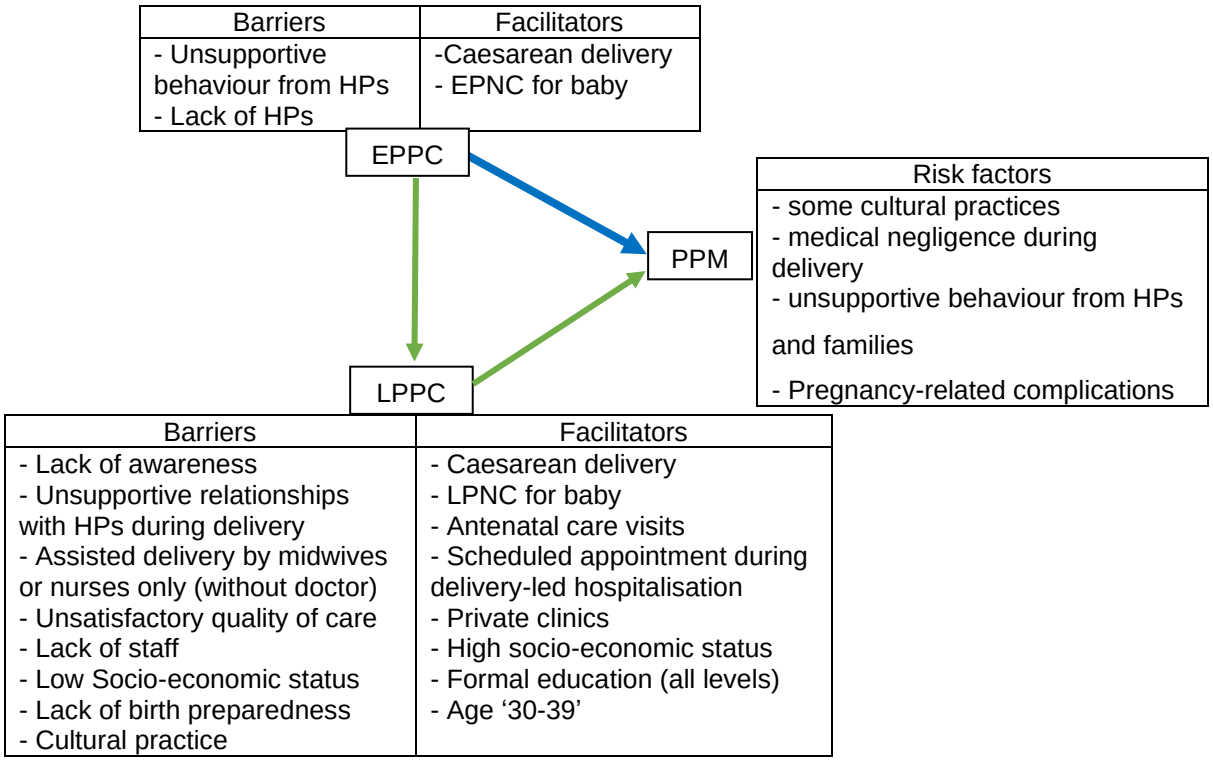
a specialist if necessary whereas women reported not being questioned about their mental health during PPC).

9.2.4. Combining the results from the literature review, qualitative and quantitative findings

The triangulation of findings has been partly addressed throughout the discussion chapters (chapters 5, 6, 7, 8) – namely, findings from the systematic review and meta-analysis were compared to the quantitative study findings (chapters 5 and 6) and the latter were compared to the qualitative study findings (Chapters 7 and 8). Thus, the present section will focus on the overarching findings of this research.

According to the Moroccan national database (Chapter 5), the main reasons for not using LPPC were the absence of PPM symptoms (70.63%), lack of knowledge on the importance of PPC (15.23%), financial difficulties (7.51%), distance to health facilities (2.79%), LPPC being unavailable (1.71%), other reasons (2.12%). The qualitative findings corroborated these barriers, with a lack of knowledge of PPC and absence of PPM symptoms as the main barrier to PPC reported by both women and HPs. LPPC being unavailable and financial difficulty were also mentioned in the qualitative study as impeding PPC use. The distance to health facilities was not reported as a barrier in the qualitative studies, but other reasons for low PPC utilisation such as conflicted relationships with HPs and quality of care during delivery, featured quite prominently, especially in the women's data. These were not observed in the quantitative analyses. This shows that inter-personal, 'softer' factors are important in understanding the relatively low PPC utilisation in Morocco.

Factors with significant associations with EPPC, LPPC, and PPM based on the logistic regression (Chapter 6) and those highlighted in the qualitative study as impacting on PPC uptake (Chapters 7 and 8) are categorised in Figure 9.1. This diagram illustrates the relationships between EPPC, LPPC, and PPM as well as the factors that may influence each of them, respectively.



Caption: EPPC: early postpartum care before discharge, LPPC: later postpartum care post-discharge and within six weeks postpartum, PPM: postpartum morbidities within six weeks postpartum, EPNC: early postnatal care for babies, LPNC: later postnatal care for babies, HPs: health professionals

: protective factor : facilitator

Figure 9.1. Framework of the relationships between EPPC, LPPC, PPM and the health determinants influencing them.

Regarding EPPC provision during hospitalisation, facilitators that were identified in the quantitative studies as well as the qualitative studies as facilitating EPPC were caesarean delivery and early postnatal care for the baby. The barriers to EPPC were highlighted in the qualitative study only –namely, the lack of HPs, especially in public hospitals, and their unsupportive attitudes (Figure 9.1).

For LPPC uptake after discharge and up to six weeks after delivery, both set of studies identified the same three facilitators (caesarean delivery, later postnatal care for baby, and PPM occurrence) and one identical barrier (assisted delivery by midwives or nurses without doctors) (Figure 9.1). The qualitative and quantitative studies also presented different results for factors influencing LPPC. The positive associations of sociodemographic determinants (being aged 30 to 39, women's education level, high socio-economic status) identified in the logistic regression (Chapter 6) were not evidenced in the qualitative study. But the latter revealed other facilitators such as the scheduling of the LPPC appointment during EPPC and delivery in private clinics.

In addition, the quantitative analyses (Chapter 6) indicated that other factors may significantly hinder LPPC uptake without clearly identifying them. This gap may have partly been filled by the qualitative studies, which pointed to several potential barriers to LPPC uptake, especially conflicted relationships with HPs and dissatisfaction with the quality of care during delivery, lack of awareness with regards to PPC, shortage of HPs in public health centres, and lack of birth preparedness (Figure 9.1).

The relationship between EPPC, LPPC, and PPM was investigated through the logistic regression (Chapter 6), but it was not possible to establish directionality – i.e. to distinguish whether LPPC was only used when PPM occurred, or whether PPM were not perceived by women and were only diagnosed during LPPC. However, based on women's and HPs' experiences (Chapters 7 and 8), most participants reported that PPM are diagnosed when women, concerned about their health status, take the initiative to seek LPPC, which seems to support the first hypothesis that LPPC is used when women experience PPM. Furthermore, women with PPM symptoms tend to seek LPPC in the private sector (with doctors) rather than the public sector (with midwives or nurses) (Chapter 5), which is corroborated by women's accounts (Chapter 7).

Several barriers to PPC uptake identified in Morocco (Chapters 5, 6, 7) were also reported in other LMIC (see the systematic review and meta-analysis; Chapters 2 and 3). These include the lack of knowledge about PPC, disrespectful care, cultural beliefs, poverty, and lack of formal education. Likewise, common facilitators to PPC were antenatal care, caesarean delivery, high socio-economic status, formal education, delivery in health facilities (compared to home birth), living in urban areas.
The other factors identified in the systematic review (women's autonomy in decision-making, distance from health facility, exposure to mass media, wanted pregnancy, parity) were not investigated in the Moroccan setting because data related to these factors were either not available or not collected.

9.2.5. Contribution to knowledge

This research filled a gap in knowledge relating to PPC use in Morocco. The three studies (systematic review/meta-analysis, quantitative secondary data analysis and

qualitative exploration of women's and HPs' experiences) showed the state of PPC uptake in Morocco and more widely in LMIC. The main contribution of the research is to explore a wider range of determinants of PPC compared to existing literature. For example, the systematic review presented in this thesis considered 13 more determinants than the previous one (Langlois et al., 2015). The quantitative and qualitative studies (chapters 5, 6, 7,8) analysed 59 factors altogether, which is more than previous studies investigating PPC in Morocco (Assarag et al., 2013, 2015; Elkhoudri et al., 2015, 2017). This enables a more granular understanding of the barriers and facilitators of PPC in Morocco.

The quantitative and qualitative studies confirmed that some barriers to PPC uptake reported a decade ago by Assarag *et al.* (2013) and Elkhoudri *et al.* (2017) still persist (i.e. low sociodemographic characteristics, primiparity, absence of PPM, lack of knowledge about the importance of PPC, financial difficulties, previous bad experiences at hospitals). This partially explains why LPPC utilisation has stagnated on a national scale at 21% since 2011 (Moroccan Ministry of Health, 2011b). In this research, new factors associated to PPC in various degrees, were evidenced, such as family influence, cultural beliefs and practices, and differences of quality of care between public and private health structures leading to health inequalities.

Another significant contribution of the present research is to demonstrate the importance of the temporality of PPC utilisation and its relationships to PPM occurrence, with EPPC preventing later PPM, and LPPC used and perceived by women as a recourse in case of PPM symptoms.

In addition, this research provides a more comprehensive outline of the PPM experienced by women in Morocco. Indeed, in addition to the PPM already documented among the Moroccan population, which were haemorrhage, fever, pelvic infection, breast issues, pregnancy-induced high blood pressure, urinary leakage and burning (Assarag et al., 2015; Elkhoudri et al., 2015), the quantitative study (Chapter 5) also analysed oedema and foot pain, as well as lower back and dorsal pain with fever. In the qualitative study, alongside the same PPM as those previously cited other PPM were identified (e.g. nutritional deficiencies). New insights were also provided regarding the occurrence and management of psychological PPM. The latter point

filled a gap since, to the best of our knowledge, there is no research on postpartum mental health issues in Morocco.

Based on the above, the present research provides valuable knowledge that can inform new public health measures to increase PPC uptake and reduce PPM in Morocco.

9.3. Implications of the research for policy and practice

9.3.1. Recommendations for practice

The research implications fall within a health promotion approach with the purpose of providing women with the opportunity to have good physical and mental postpartum health. With this in mind, relevant information needs to be communicated to the population, HPs and stakeholders. Additionally, the practical recommendations need to focus on the prevention of PPM. In fact, the suggested interventions would be useful to prevent the onset of PPM (primary prevention) or lead to their early diagnosis and prompt treatment (secondary prevention).

9.3.1. 1. Promoting behaviour change

In order to initiate behavioural change into the population and for the HPs to increase PPC uptake, three conditions are needed: namely, the capability, the motivation, and the opportunity. The COM-B model defined by Michie et al. (2011) is a theoretical framework that conceptualises behavioural change throughout these three components, and it can be used to propose practical recommendations addressed to the women and HPs (Figure 9.2).

Capability refers to psychological (cognitive ability, knowledge, skills) and physical capability (being able to actually attend the consultations) to engage in the behaviour, here to attend PPC (West and Michie, 2020). It is essential that individuals understand the social and health benefits of using PPC and its modalities (frequency and health facilities to use it) and are physically able to attend PPC. Indeed, informing PPC users and providers through health promotion campaigns or training would raise awareness to a large audience but it is not enough to change behaviour (Ogden et al., 2014, pp.221,233).

Opportunity encompasses ‘all the factors that lie outside the individual that make the behaviour possible or prompt it’ (Michie et al., 2011). This may include physical

opportunity (e.g., availability of health facilities to get checked) as well as the social opportunity (e.g., getting help such as looking after the baby so women can attend PPC consultations).

Motivation in the COM-B model comprises automatic motivation (e.g., forming new habits) and reflective motivation (e.g., goal planning). Motivation is defined as 'brain processes that energise and direct behaviour', including 'emotional responding and analytical decision-making' (Michie et al., 2011). Therefore, the drive for health prevention needs to be instilled in HPs and the general population. The promotional messages for later PPC should be perceived as personally pertinent, which will entail reflection work by women and their families to increase the value of women's health. Rewards may also be relevant to motivate women to utilise PPC. In addition, women who are constrained by social and family circle need to achieve enough autonomy to make decisions for their own health.

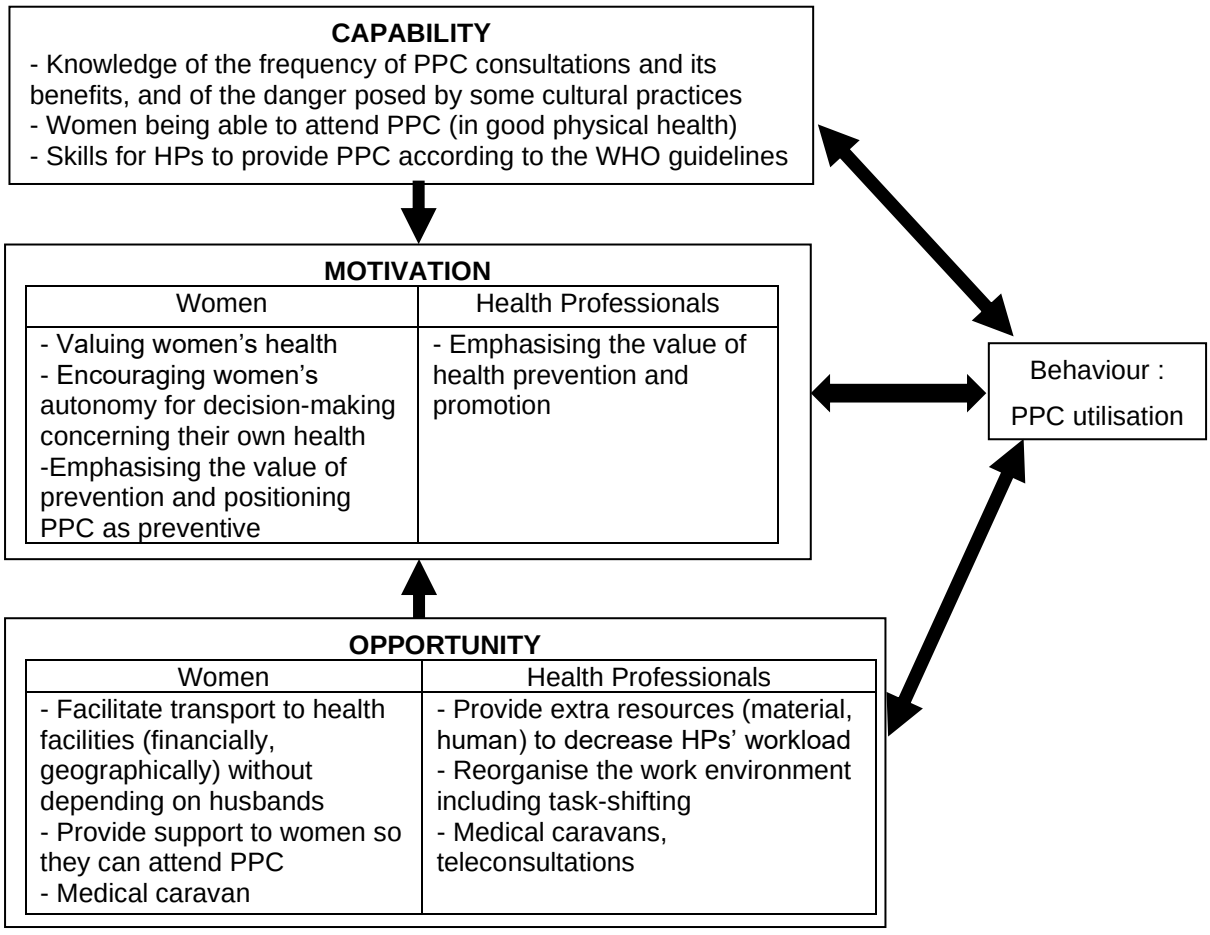


Figure 9.2. A COM-B framework designed for behavioural change in favour of PPC uptake.

9.3.1. 2. Strategies for women and their families

A. Prevention and promotion campaign

Dr. Hafid Hachri, working as an expert in the Moroccan WHO office, posited that the maternal health programme needs to be reinforced during the third trimester by developing a counselling programme (H Hachri 2022, personal communication, 23 March). Raising knowledge of the importance of PPC uptake should start from pregnancy. To achieve this, a promotion campaign on PPC uptake addressed to the general population, and especially to childbearing women, would be an efficient way to inform people about PPC, PPM symptoms and risk factors. To keep it cost effective, this campaign could be part of a wider campaign on maternal health. Several studies conducted in Sub-Saharan and South-Asian LMIC showed that the exposure to mass media campaigns was positively perceived by women and changed their attitudes toward maternal healthcare services by increasing their utilisation, including PPC (Chidinma, 2019; Fatema and Lariscy, 2020; Igbinoba et al., 2020; Ohaja et al., 2023; Zamawe et al., 2016). Therefore, the exposure to mass media can have a positive influence on maternal health awareness. Raising awareness of PPC can be achieved through a range of mass media, such as an advertisement on TV and the Internet, flyers and leaflets distributed in health facilities, pharmacies, rural high schools, and places specific to women, such as hammams and beauty institutes. In a French study evaluating the potential benefit of HPs' waiting rooms for health education, the authors revealed that the presence of leaflets in waiting rooms on its own is not sufficient to raise patients' awareness but that when used in conjunction with a reinforcement of the message during the consultation, these can have a positive impact (Gignon et al., 2012). Other method of communication could also be used to attract patients' attention such as audiovisual messages that seem to be effective (Berkhout et al., 2018; Penry Williams et al., 2019; Tamsuri and Widati, 2020). For example, in Morocco the Patient programme tool, financed by private health companies, that consists in broadcasting messages on screens in surgeries' waiting rooms to promote maternal health (cf. Chapter 8), could be distributed to more surgeries, including public facilities, and could be used as a support network for the PPC campaign. It is also an opportunity for HPs to personalise their preventive discourse according to women's questions and health status (as experienced Mazroq- see Chapter 8).

In addition, women could be contacted directly after antenatal visits and delivery through mHealth (mobile health) interventions which consist in sending text messages to women as a reminder to use LPPC. The use of mHealth interventions to support behaviour change in maternal health is used worldwide. Several systematic reviews especially in LMIC showed that mHealth interventions encourage the uptake of LPPC (Dol et al., 2019; Feroz et al., 2017; Gayesa et al., 2023; Sondaal et al., 2016; Watterson et al., 2015).

B. Birth preparation classes

The maternal classes interventions offered to pregnant women in public health facilities could be promoted to attract more women. A reinforcement of this programme is recommended to include updated WHO guidelines, such as the frequency of PPC check-ups, but also information on the role of HPs during labour, and signs of PPM (World Health Organisation, 2015b). Furthermore, maternal classes modalities could evolve as these classes are currently collective sessions for women, but according to the role of family members during the postpartum period, husbands and perhaps mothers-in-law could also be invited to attend. Another option could be the creation of father classes to raise awareness on fatherhood and encourage future fathers to provide emotional support to their wife during the postpartum period (H Hachri 2022, personal communication, 23 March). Studies based in sub-Saharan Africa and South Asia demonstrated that male partner involvement during antenatal care (ANC) consultations is important for women's postpartum health, especially for those with low autonomy in decision-making because it contributes to decreasing the risk of postpartum depression, increasing women's knowledge of PPM symptoms, and facilitate PPC uptake (Aguiar and Jennings, 2015; Suandi et al., 2020; Yargawa and Leonardi-Bee, 2015). Determinants that encourage men's involvement to attend PPC are their knowledge on PPC and symptoms of PPM, level of education, urban dwelling, close distance to a health facility (Abie et al., 2023). In contrast, possible barriers to males' participation in maternal health services are cultural norms, organisational constraints unfavourable to couples in health facility (e.g. collective delivery room), financial barrier, and pregnancy perceived as a woman's matter (Ganle and Dery, 2015; Gibore and Bali, 2020). Moreover, in Middle-East and North African (MENA) countries, including Morocco, no study has investigated the influence of men's

involvement on ANC, delivery and PPC attendance between 2012 and 2020 according to (El Ansari et al. 2023), and thus, this needs further research.

Private sector healthcare also lacks birth preparation classes, therefore private practitioners could be encouraged to prepare their patients and preferably the couples. This can occur individually during antenatal care visits or in groups under the supervision of HPs. Public practitioners could collaborate with self-employed midwives.

Birth preparation could also be a time to look at women's emotions. A better emotional health could be linked to PPC attendance because women would not avoid PPC, and it could also be a key in preventing psychological PPM. For women experiencing emotional difficulties during the perinatal period such as anxiety about delivery, postpartum low moods or depression, the implementation of psychosocial and psychological interventions would offer them the opportunity to talk about these and provide them with support. A substantial body of evidence in the literature revealed the positive effect of different type of interventions used in Western countries to address women's emotional difficulties, including peer and partner supports, mental health nursing, postpartum home-visits by nurses, midwives or health visitors, parent-child day care unit, and psychotherapy (Dennis, 2014; Dennis and Dowswell, 2013; Fenwick et al., 2015; Gamble and Creedy, 2009; Hadfield and Wittkowski, 2017; Werner et al., 2016). As a result, women become less distressed which enable them to experience motherhood with positivity and confidence and to create a healthy relationship with their baby and relatives.

9.3.1. 3. Strategies for health professionals

A. Improving relationships with women

In addition to word of mouth, patients observe HPs' attitudes to form their opinion on HPs' competency and trustworthiness. Thus it is essential that HPs, especially those in the public sector, gain the trust of their patients. A trusting relationship is a dynamic process based on, but not limited to, the frequency of contacts during pregnancy, delivery, and the postpartum period. In small health facilities, such as health centres and delivery centres, it is easier to establish a proximity and rapport with patients than in big hospitals (cf. Chapter 7).

However, in some cases, a trustful relationship established between HPs and women who met once, for example during delivery, can be a vector to build this trust, which can extend to the whole health facility. Indeed, evidence suggests that the population trusts the 'institution, medical science more than a particular HP, so being cared for by different health professionals is not necessarily a problem' (Jacques and Segalen, 2007, p.95). To enhance trust, it is necessary to improve the quality of care provided. This may be achieved by personalising the care according to the medico-social characteristics of each patient. With the right support (reduced workload) and a shift in attitudes, it would be possible for HPs to invest in their relationships with patients more fully, which can provide patients with a sense of privileged relationships. Moreover, the practice of bribery needs to stop as it is not only against HPs' ethical practices, but it also distorts the social opinion on HPs and the healthcare sector (mistrust), reduces utilisation of healthcare services, and deteriorates quality of care and patients' health status (Chattopadhyay, 2013; Mostert et al., 2012; Vian, 2008).

To create a balanced relationship between HPs and women, it would be beneficial for HPs to attentively listen to and respond to the needs expressed by women, discuss care options with them without infantilising them and get their agreement before proceeding. Moreover, it is important that HPs support women to act in the interest of their own health, i.e. regarding their role in delivery and postpartum self-care. Consequently, HPs' benevolent support during pregnancy and delivery could empower women to become autonomous during the postpartum period. HPs would also receive recognition and respect from women which is a source of motivation for them leading to better performance at work (Chichirez and Purcărea, 2018; Okello and Gilson, 2015). Ultimately, this could lead to a shift in social norms and cultural practices that promote safer health behaviours among the population.

B. Initial and ongoing training of HPs

Stakeholders and heads of wards should also be caring towards HPs, that is to say, be more attentive to their needs in the general interest of HPs and patients. Indeed, evidence show that when HPs' work conditions are good, better health is provided (Mathauer and Imhoff, 2006; Millar et al., 2017; Narasimhan et al., 2004). For example, a short-term stress management programme for HPs showed its effectiveness to improve quality of life at work (Shapiro et al., 2005). Likewise, the enhancement of

HPs' communication skills could contribute to a reduction of stress at work (Lee et al., 2002). Therefore, enhancing HPs' initial and lifelong training in several areas would also improve the quality of care provided and this is a necessity acknowledged by a Moroccan WHO expert (H Hachri 2022, personal communication, 23 March). Training in soft skills should be considered to help them manage difficult relationships with patients and to better screen psychological PPM. Moreover, information should be easily accessible and easily understood in nursing schools and health facilities using support such as the WHO guidelines tables. As a result, up-to-date knowledge would be highly visible even to HPs who do not look for updated good practice guidelines.

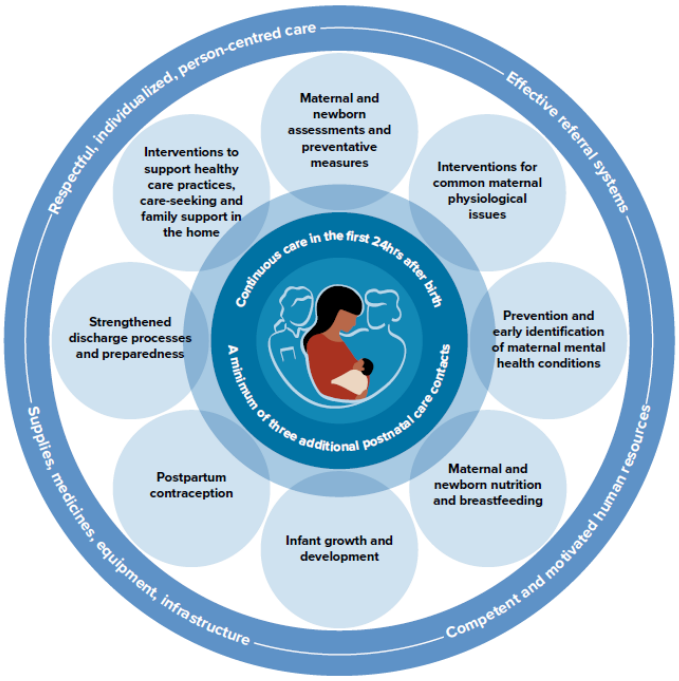


Figure 9.3. Schematic representation of the WHO postpartum care model, p.196 (World Health Organisation and Human Reproduction Programme, 2022)

The WHO model presented in Figure 9.3 involves four aspects of providing PPC in line with their guidelines. These guidelines would need to be clearly communicated to all HPs:

1) Effective referral systems: based on the research findings, this may need to be improved to avoid a loss of contact with women after discharge, especially in the public sector (cf. Section 9.3.1.4. Strategies for institutions and policies). Moreover, the scoping review of Camara *et al.* (2021) showed that community HPs can have a

bridging role between communities and health facilities. Therefore, if community HPs are acknowledged (with positive discussions and opinions) by community leaders and trained in PPC and PPM, they could encourage women to attend LPPC consultations, screen PPM and refer cases to health facilities.

2) Competent and effective human resources: it would be desirable to complete the HPs' training as discussed above so that HPs acquire more relational and medical skills (particularly in postpartum psychological health) and are updated on government and international recommendations concerning maternal health.

3) Supplies, medicines, equipment, infrastructure: the reinforcement of medicines and hospital supplies along with an improvement of the organisation of work in public facilities (cf. Section 9.3.1.4. Strategies for institutions and policies) would also be beneficial for both women's satisfactory delivery experience (e.g. getting food and support post-delivery) and HPs' working conditions. This could also strengthen the bond of trust between them.

4) Respectful, individualised, person-centred care: this is particularly needed in public hospitals (cf. Chapters 7 and 8) by creating trustful relationships with patients and improving ethics practices and soft skills as detailed previously.

C. Focusing on preventive measures

Alongside addressing postpartum issues when these arise, HPs following the WHO good practice recommendations for PPC should contribute to a better postpartum health for women (World Health Organisation and Human Reproduction Programme, 2022). According to the WHO guidelines presented in Chapter 1 (section 1.1.3 Postpartum care), preventive measures should be discussed with women before their discharge. For example, this could include advising women to attend LPPC consultations, educating them about the PPM symptoms and recommending breastfeeding. Additionally, although women participants reported the need to rest after delivery (cf. Chapter 7), in the absence of any contraindication, women should be encouraged to practise physical activities as recommended by the WHO *et al.* (2015).

Moreover, based on the qualitative findings (cf. Chapters 7 and 8), some of the WHO recommendations (cf. Chapter 1- section 1.1.2. Maternal mortality and morbidity in

low-and-middle income countries) do not seem to be currently applied in Morocco, such as psychosocial and psychological interventions to prevent psychological PPM. This also needs attention. Other guidelines could be better managed, for example the oral supplementation of iron to prevent anaemia that is a common PPM often reported by women and HPs participants (cf. Chapters 7). This could be achieved by ensuring that public health centres do not run out of drugs and supplements to distribute to women.

Overall, HPs should be encouraged to follow the WHO guidelines to provide a good PPC experience to women which, in turn, should reduce the risk of PPM.

9.3.1. 4. Strategies for institutions and policies

A. Quality of care

Due to the high number of patients in public health institutions, especially hospitals, there is pressure on the material and human resources that can negatively impact upon the quality of care provided (cf. Chapters 7 and 8). Therefore, measures are needed to improve the care delivered and the working conditions of HPs.

Stakeholders could consider increasing the capacity of public health facilities to provide sufficient hospital supplies such as blankets, gowns, and meals for patients during their hospitalisation. Likewise, the supply chain of drugs could be managed to avoid shortages that lead patients' family to purchase medicines (e.g. paracetamol, antiseptic, iron supplementation) from private pharmacies for women care during their hospitalisation.

The utilisation of ultrasound scanners and foetal dopplers in public health centres and delivery centres could be extended because as it is acknowledged by HPs working in the private sector (cf. Chapter 8), it is an attractive service that is appreciated by women, and which may encourage them to attend antenatal and postpartum check-ups. In Ethiopia and Nigeria studies showed that the availability of ultrasound scanners in health centres increased the use of antenatal care (Luntsi et al., 2022; Roro et al., 2022).

Moreover, to improve the experience of delivery, which influences LPPC uptake, institutions could implement a series of initiatives designed to render the experience as positive as possible (birth preparation classes, better access to pain management).

Therefore, to contribute to a positive delivery experience and postpartum recovery, it would be beneficial for women to be offered the choice of pain management method, including epidural if they wish to and if their medical condition allows it. The implementation of this measure would respond to some women's need but it would require the presence of a sufficient number of anaesthetists and/or the training of midwives. When women are given the opportunity to choose, with the help of HPs, methods of labour pain management, this results in greater satisfaction among women about their delivery experience and this strengthens the relationship between women and HPs (Lally et al., 2014; Pietrzak et al., 2022).

Above all, making sure that no women are discharged without having received one EPPC consultation should be a priority.

As the workload of HPs working in the public sector was reported as a barrier to providing PPC, it would be relevant to measure the extent of workload and staffing needs in public health centres and maternity wards. This assessment could be performed through the Workload Indicators of Staffing Needs (WISN) methodology that is already used for the same reason in other LMIC countries (de Menezes et al., 2022; Kpebo et al., 2022; World Health Organisation, 2016). Thus, in case of over workload identified by the WISN, an initiative would be to implement task-shifting between midwives (Colvin et al., 2013; Ishikawa, 2022) to reduce number of patients midwives had to care for. With fewer patients to care for, there would be a more effective distribution of tasks among HPs and a less stressful work environment. This would also be beneficial for patient safety, with a reduced risk of medical mistakes being made or mistreatments. HPs would be able to spend more time with women to provide prevention and health promotion counselling and emotional support.

B. New approaches to providing PPC

Other strategies could be implemented specifically to increase PPC uptake. Providing PPC remotely through teleconsultation could be envisaged in rural and semi-urban areas that lack HPs or for women experiencing transport difficulties. This strategy is already in place in Uganda, Bangladesh and Tanzania and is used for pregnancy and postpartum monitoring (Alam et al., 2019; Mangwi Ayiasi et al., 2015; Nyamtema et al., 2017). Another applicability of teleconsultation could be its utilisation by midwives

or general practitioners in rural health and delivery centres to get a second medical opinion from a gynaecologist in the case of suspected PPM. This method could also be an alternative in urban areas to deal with the long waiting times in health centres receiving women without appointments. It is the case in Chile where a teleconsultation program showed its efficacity to decrease waiting time to receive a consultation (Constanzo et al., 2020).

Medical caravans could also be used. These are mobile health clinics offering health services (curative, preventive, promotional) to isolated populations, often rural, located a long way from health settings (Khanna and Narula, 2016). They function for a limited period of time, require material and financial resources, and employ HPs either with a specific medical speciality or diverse specialities. In Morocco, medical caravans are currently organised and managed by NGOs or HPs in a private capacity, and have been effective in offering consultations, conducting surgeries and distributing medicines to rural populations (Cheikh Zaid Hospital, 2014; Ministry of Health, 2017; National Human Rights Council, 2013). Hence, it has been suggested by HPs working in NGOs and private clinics (cf. Chapter 8) that more medical caravans should be put into operation, publically managed, should be put into operation to facilitate access to PPC.

In addition, medical caravans could operate with a small team of HPs welcoming women in motorhomes refurbished as mobile medical surgeries. This option is already used to make mammography accessible to American vulnerable women more at risk of breast cancer (Trivedi et al., 2022). In France refurbished motorhomes or buses are used by regional health delegations for public health priorities identified in their territories *(Agence Régionale de Santé Auvergne-Rhone-Alpes, 2022; Agence Régionale de Santé Bourgogne Franche-Compté, 2023; Agence Régionale de Santé Bretagne, 2022; Agence Régionale De Santé Ile-de-France, 2022*).

Another suggestion to increase PPC uptake would be to create a dedicated unit for health prevention and education in public hospitals. Before patients are discharged, nurses and midwives from this unit could visit women after their delivery to raise awareness about PPC and PPM and arrange appointments for LPPC check-ups in the health prevention or outpatient consultation wards. This strategy needs to be piloted to evaluate its feasibility and effectiveness.

Furthermore, the coordination of care could be reinforced by creating a referral system among public health facilities (hospitals, maternity wards, delivery centres, health centres) so as not to lose sight of women after their discharge from the hospital until their sixth week postpartum.

Another relevant approach would be to address the lack of protocols and checklists for different components of maternal care. The benefit of such protocols and checklists is to standardise care, avoid oversights and decrease the risk of medical errors (Arora et al., 2016; Bernstein et al., 2017). For instance, checklists could remind HPs to promote PPC during ANC visits. The checklists should be concise and precise, and their use should be uniform across all health facilities (public or private). Moreover, the design of protocols for EPPC and LPPC provision should allow for flexibility of implementation by proposing different strategies to regional health directions according to the geographic and healthcare settings. The adherence of HPs to these tools would be better if these took into account their working conditions (Bernstein et al., 2017; Seyoum et al., 2021).

To summarise, in addition to health centres, the diversification of locations (hospitals, at home, or near women's dwellings) and the ways to provide PPC would offer more options to overcome current barriers. Nevertheless, existing facilities and modalities of access LPPC need to be brought to the attention of the population.

C. Financial measures

Free access to maternal health care is already implemented in the national maternal and infant health programme in Morocco. However, some women (even the poorest covered by the national insurance scheme) still have to pay for examinations related to maternal health (blood tests, ultrasound) received in the private sector because of the difficulty of getting prompt appointments for free examinations in public settings.

The reform of the social security announced in 2021 by the government (*Royaume du Maroc Ministère de la Solidarité, de l'Insertion Sociale et de la Famille*, 2021) and currently in the implementation phase includes the expansion of medical insurance to the whole Moroccan population, including since December 2022 the four millions of poor families insured by the national insurance coverage. This reform, supported financially by the World Bank (New Program in Morocco Supports Improved Access to Quality Healthcare for All, 2023), will enable full or partial coverage of healthcare

costs received in public and private establishments. Consequently, it might contribute to the reduction of health inequalities by facilitating access to LPPC in the private sector free of charge.

In summary, the practical recommendations of the research points to behaviour change and a holistic approach involving the participation of women, HPs and stakeholders. Further methodological suggestions are presented in the next section to enhance the monitoring and understanding of PPC uptake and PPM onset in the future.

9.3.2 Methodological recommendations

The research also has some methodological implications. All the recommended initiatives suggested earlier in this chapter should be part of a well-defined policy framework implemented in a consistent manner throughout Moroccan health institutions. Importantly, the efficiency of these initiatives to boost PPC uptake and improve maternal health should be measured. The evaluation of public health interventions is a multidisciplinary approach that aims to improve a health programme by developing a critical analysis of its elaboration and execution (Rootman et al., 2001). The evaluation involves the investigation of the cost-effectiveness of the intervention, its acceptability by the targeted population and implementers (women, HPs, stakeholders), its effectiveness to achieve the expected outcomes- here inspiring behaviour change to increase PPC uptake and decrease the onset of common and serious PPM (World Health Organisation, 1981, p.11). To do so, the method of evaluation should be planned at an early stage, that is to say during the conception of the interventions to define the parameters of evaluation that should be measured throughout the implementation of the programme (Moore et al., 2015).

Furthermore, the next iteration of the maternal health questionnaires of the national survey analysed in the quantitative study (*Enquête Nationale sur la Population et la Santé Familiale- [National Survey on Population and Family Health]*) could address the missing factors identified in this research as influencing PPC and PPM. It would be beneficial to include new questions relating to postpartum mental health, postpartum anaemia and other nutritional deficiencies, the use of traditional practices during the pregnancy and the postpartum period, as well as on women's autonomy in decision-making relating to healthcare services. This research has shown that these

factors are important to women's utilisation and experience of PPC. This is also supported by recent research in Morocco (Hababa and Assarag, 2023).

Overall, practical and methodological recommendations mentioned above may be conceived and implemented gradually because, based on health psychology concepts, a 'gradual change is better than sudden change as it is more lasting' (Bruchon-Schweitzer et al., 2014, p. 400). Some suggestions could focus on specific areas such as medical caravans depending on the local situation under the supervision of regional health delegations. Others or more general ones could be implemented under the management of the Ministry of Health and spread throughout the country to standardise PPC.

9.4. Limitations of the research

The present study has several methodological limitations that need to be considered when interpretating the findings. Many of the limitations have been discussed in previous discussion chapters (see sections 2.4. Discussion, p.82, 3.4. Discussion, p.108, 5.4. Discussion, p.152, 6.4. Discussion, p.171, 7.4. Discussion, p.201, 8.4. Discussion, p.230). The data analysed in the three studies were self-reported without verification of medical records, which could entail bias such as social desirability bias. PPM might be under-reported, particularly from the HPs' perspective. Data from the systematic review, meta-analysis and the Moroccan database lacked clarity regarding the frequency of PPC consultations, which hindered any comparison with the WHO guidelines (i.e. four PPC check-ups within six weeks postpartum). Other selection bias could occur in the qualitative study due to the method of recruitment of some participants (intermediaries, snowballing).

Furthermore, the interpretation of results is limited by the lack of causal relationships due to the cross-sectional design of the studies included in the systematic review, meta-analysis and the quantitative study. Therefore, it is not possible to define a direct causal relationship between exposure to the factors studied and the use of PPC or the occurrence of PPM. Moreover, the qualitative findings may not be transferrable to other settings. Women participants were mostly city-dwellers, and these rural women's testimonies are under-represented. The refusal rates among the HPs indicate that

practitioners may be reluctant to discuss issues relating to postpartum maternal health openly. This is discussed in the next section in more depth.

9.5. Reflections on conducting this research

During the analysis of the quantitative study, the process of selecting independent variables to input into the logistic regression models was challenging, because among the large number of eligible factors, the high collinearity between variables prevented the inclusion of independent variables that may be particularly relevant (e.g. reasons for not using LPPC) to the research topic. It was frustrating not to be able to make use of available data to obtain valid results. However, the qualitative method was useful for partly overcoming this constraint by providing additional insights.

The data collection in Morocco was a very formative human and professional experience. I had to adapt to recruit and interview very different types of participants. Indeed, I met women from all social classes; I observed their environments, which enabled a better understanding of the context in which they were experiencing the postpartum period. I also visited all types of health facilities providing maternal health care, from overwhelmed university hospitals to small birthing centres, by way of private clinics and surgeries, which gave me a sense of the different working conditions of HPs and the reception of patients.

Power dynamic:

I sometimes encountered difficulties in interviewing participants. There was a level of reluctance from HPs to open their practice. In one particular instance, I witnessed a power struggle between HPs in the organisation of maternal and infant care provision in a health facility, making difficult to collect. My venue led to a temporary change of practice in the organisation of care in this particular public health facility. Moreover, in this context, some interviews were supervised by HPs who sometimes responded instead of the women. Consequently, the presence of HPs silenced women's voice. I could not probe women further, especially with regards to PPM or women's delivery experience, particularly because some HPs tended to minimise the difficult experience reported by the women. For these reasons, after some hesitation, I regretfully decided to stop collecting data from women participants at this health facility because interviews could not generate reliable data. I therefore chose to exclude these

interviews (n=8) from the analysis. Instead, I observed PPC consultations and interviewed one HP. It was interesting to compare their account with my observation; the support they declared to be providing to women seemed overstated compared to my observation. This raises interesting methodological questions for further research in this area.

In another facility, a midwife helped recruit women in the waiting room. Although at first this did not seem to be an issue, on the second day I realised that she was priming women to refuse the interview being recorded. She herself admitted that she disapproved of recording interviews. Initially, four women refused to have their interview recorded. However, after explaining to them the reasons for recording interviews and after reminded them of their rights as participants (i.e., skip questions, withdraw from the study at any time), several women changed their mind and accepted the recording. It appeared that this particular midwife had somehow created some misunderstanding and I subsequently chose to stop recruiting participants through this establishment.

Uncomfortable questions:

The question about the cost of PPC consultations seemed to make self-employed HPs uncomfortable. They were evasive in their answers and appear genuinely keen to move to the next question. Therefore, I stopped asking that question. Their reaction discouraged me from asking about the illegal bribery practice of HPs, mentioned by the women. If HPs did not bring up the subject of bribery themselves, I hesitated to ask a question on the subject because it is an illegal practice and a taboo subject among HPs. However, I realised that this discomfort was not shared by women. In fact, on seeing my hesitation, one of them said to me, 'Ask me all the questions you want, I will answer you'. She put me at ease so that, later on, I felt more able to discuss bribery with the other women.

More generally, women seemed to be comfortable during the interviews, enough for some to open up to me about their postpartum psychological issues and distress. They gave me the impression that they needed to talk about it and their interview was an opportunity to express their feelings in a safe environment. It is well documented that sharing experiences with others can have a therapeutic effect. As the interviews progressed, I learned to put boundaries between my position as a researcher and my

emotions because, at times I felt very strong empathy for the women and HPs who shared their difficult experiences with me. In these cases, I felt the need to discuss these conversations with my supervisor to establish some distance between myself and the participants' situations or experiences.

Finally, I was lucky enough to be put in touch with national health policymakers, and to talk with them, which allowed me to be aware of the national priorities in terms of maternal health.

To have had the chance to collect qualitative data on-site rather than remotely was extremely constructive in considering different living and working contexts, adapting questions according to the interviewee's situations, and in the interpretation of findings. Thus, all these meetings, observations, and even difficulties encountered have enriched the contribution to the knowledge of this research.

9.6. Future research directions

To overcome the research limitations cited previously and to further the understanding of PPC uptake in Morocco, longitudinal studies to determine the causality relationships between socioeconomic, obstetric and environmental factors and PPC uptake as well as PPM are warranted. More research focusing on psychological PPM and postpartum anaemia is also needed to measure their extent at national level.

Moreover, the importance of families' role during the delivery and postpartum period was highlighted in this research by women's and HPs' accounts, and thus, this would need to be explored further. In particular, a study investigating the place of fathers in Morocco would contribute to understanding their perceptions of their role in maternal health and inform interventions to promote awareness of women's situations and needs.

Finally, this research showed that a poor quality of care during delivery deter women from using LPPC. This also might hinder EPPC provision as some women did not receive it during their hospitalisation. Thus, an in-depth investigation into the quality of care and working conditions in Moroccan public health centres, delivery centres, maternity and gynaecology-obstetrics wards would be beneficial. This could be conducted via several methods. Firstly, an assessment of health indicators through the national maternal health programme could provide information on the sites most

in need of interventions (e.g. increase of resources, reorganisation of care). Audits could be used on these particular sites to assess and compare the quality of care received by measuring HPs productivity (e.g. number of patients admit, number of HPs per patient, length of hospitalisation), the quality of care perceived by women regarding the care, support, hospitality services, as well as the maternal mortality and morbidity rates and compare them with the records. Working conditions in public health facilities could be examined through qualitative and ethnographic studies in order to explore whether there has been any evolution in the psychosocial stress experienced by HP since the study by Giurgiu *et al.* (2015), which described psychosocial and occupational risk perceptions among Moroccan HPs.

9.7. Conclusion

The studies presented in this thesis investigated, holistically, factors implicated in the low and stagnating utilisation of PPC in Morocco as well as the onset of PPM.

Between 2013 and 2017 the extent of PPC utilisation reached 62.6% before discharge from delivery-led hospitalisation (Early PPC) and 21.3% within six weeks of delivery (Later PPC). Thus, the uptake of PPC post-discharge did not evolve since 2011 (21% in 2011 (Moroccan Ministry of Health, 2011b)). Moreover, 28.3% of women experienced at least one PPM. Two relationships between PPC and PPM were highlighted in this research, and their complexity relates to the timing of PPC utilisation and a divergent perception of care between HPs and women. The provision of EPPC during hospitalisation was associated with lower risk of developing PPM within six weeks after delivery, whereas the utilisation of LPPC post-discharge was associated with PPM occurrence. Women viewed PPC consultations as curative approach, whereas HPs considered them as preventive. Common and serious PPM were identified, including psychological PPM that seem to be under-reported by women and neglected by HPs and sometimes, by the women's family. Psychological PPM should be recognised without stigmatisation. This would encourage women to talk about PPM and receive suitable support in return.

Moreover, both sociodemographic factors (i.e. social gradient) and the differences in quality of care between public and private structures contributed to postpartum health inequalities. Hence, in the current situation, the four PPC check-ups recommended by

the WHO seems to be an ambitious goal for public institutions which is more easily achievable in the private sector.

The research has shown that a set of factors health, environmental, demographic, economic and cultural may influence women's health and uptake of health services during the postpartum period.

The Moroccan national priority in terms of maternal health is to sustain efforts to reduce maternal mortality rate, which is currently at 72.6 deaths per 100,000 live births, to get to 20 deaths per 100,000 live births per year thanks to the extension of the medical coverage and the strengthening of the maternal health programme in rural areas that are currently implemented (Anonymous 2022, personal communication, 30 March). Additionally, the project of modernising public health structures such as the creation of new level 3 hospitals (able to care high risk pregnancy and delivery) and the renovation of health and delivery centres throughout the country along with the new health policies currently in process should contribute to achieving this goal (Framework law n° 06-22 relating to the national health system, 2023). Maternal mortality remains mostly preventable, which is why it is important that in the long term, policymakers ensure that the socio-economic development of the country results in a greater decline in the maternal mortality rate.

Pregnancy and childbirth are not diseases but can be risky for women's health and well-being, and thus this requires preventive actions as well as curative care if/when needed. In Morocco, maternal health prevention and promotion would benefit from more public funding, widespread communication, and a greater awareness of their benefits in all levels of society. It is hoped that the dissemination of this body of research to stakeholders will raise their awareness of the prevalence and patterns of PPC uptake and PPM in Morocco so this becomes a priority for policy making.

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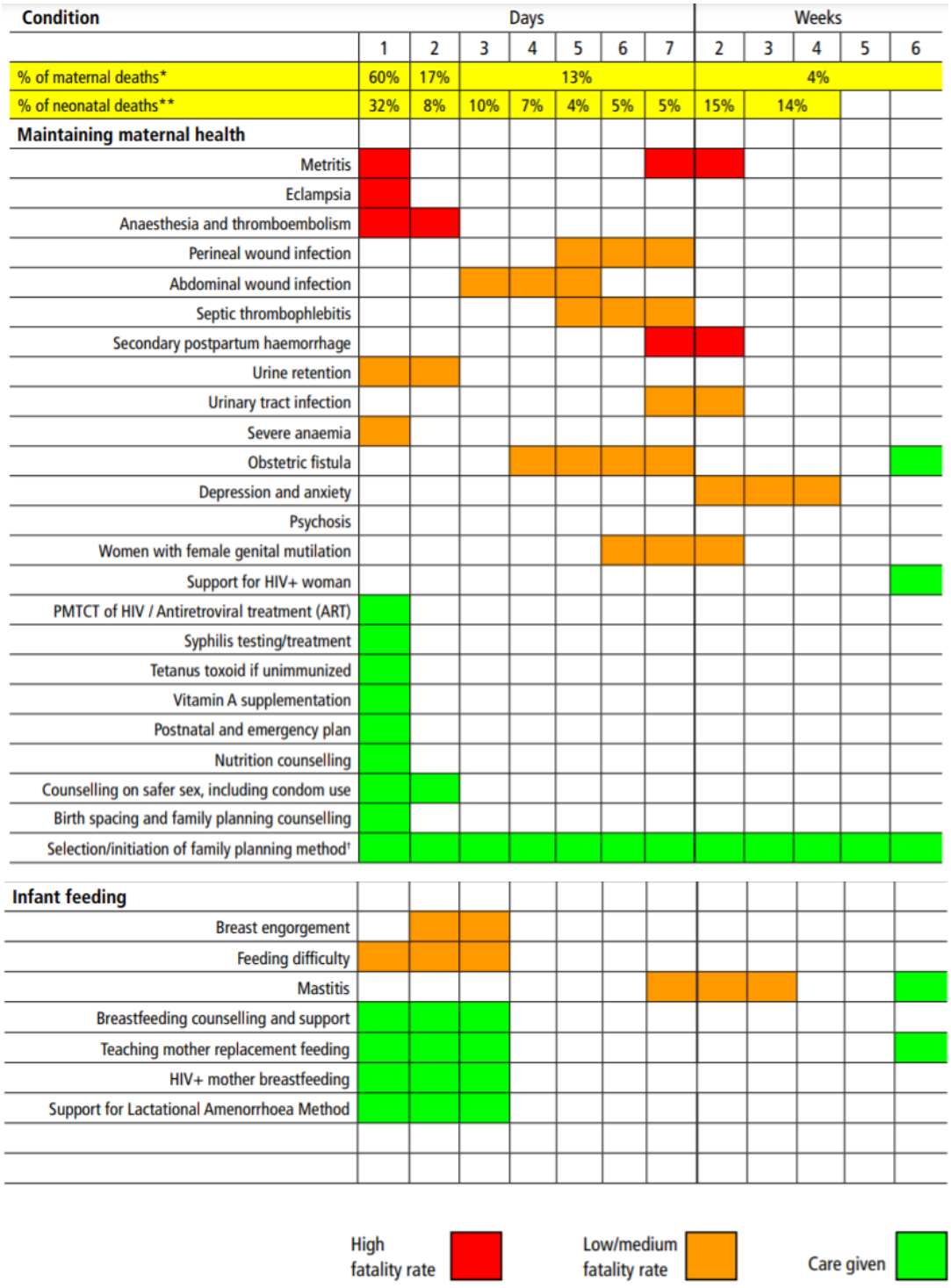
Appendices

Appendix 1.1: Obstetric epidemiology: timing of onset of conditions or provision of care



(World Health Organisation, 2008, pp. 19-20)

Appendix 2.1. Data extraction form of studies included in the systematic review

Author, year of publication, setting, study label	Study design, data source, study objective and population of study	Variables of interest	Main findings and characteristics of participants	Barriers	Facilitators	Limitations
Mohan, 2015, rural Tanzania 9	- cross-sectional study, household survey adapted from DHS program, - To examine factors that are associated with the use of PPC services in rural Morogoro, Tanzania. - Inclusion criteria: rural women who had a childbirth in the preceding 2–14 months and referred to as "recently delivered women". If multiple births were encountered, then it was considered as a single pregnancy event. - Exclusion criteria: pregnancy resulted in a miscarriage and no reason to access PPC	Dependent variable: PPC uptake, which was defined as attending PPC for the mother's care at a health facility within 6 weeks of delivery; regardless of the reason for seeking care (routine care vs. care seeking for complications). Independent variables: Sociodemographic (predisposing) characteristics: age, marital status, education, SES, community poverty and peer usage of services, religion. Environmental (enabling) characteristics: distance to facilities, cost of services, trust in health system and community outreach	1931 participants: 23.2 % (95 %CI: 18.7–28.3) of the respondents reported visiting a health facility to receive PPC with 2.4 % (1.6–3.4) receiving care from a hospital, 9.3 % (5.5–15.2) from a health centre and 10.8 % (8.2–14.2) from a dispensary. Almost two thirds of the population were Christian, 81% reported living within a marriage or a union. About 98 % had attended 1 or more ANC visits and 34 % reported having delivered at home. 31% reported having experienced a complication during pregnancy and 14 % and 11 % reported having complications during delivery and in the postpartum period respectively, with 6 % reporting a complicated mode of delivery (caesarean section or	Women delivering at a health facility, including at a hospital (AOR=0.50, 95% CI: 0.33–0.76), health centre (AOR=0.57, 95% CI:0.38–0.85), or dispensary (AOR=0.48, 95% CI:0.33–0.69), were less likely to use PPC respectively as compared to those delivering at home.	1) Education (primary or higher level) (AOR=1.37, 95% CI:1.04, 1.81), 2) Women who had a complicated mode of delivery (Cesarean section/ vaginal with instrument delivery) were three times (AOR=2.95, 95% CI:1.8–4.81) more likely to report receiving PPC services from facilities. 3) Women counseled by a Community Health Worker on PPC were 2.3 times more likely to use a facility for PPC (AOR=2.3, 95% CI:1.36–3.89). 4) Community-level effect: Women from communities that had high postpartum contraceptive use prevalence were more likely to access PPC (AOR=2.48, 95% CI:1.15–5.37) but not those with high levels of 4 or more ANC visits coverage. Communities with high level of trust were more likely to	Lack of accuracy in the measurement of geographic and economic access. Traditional beliefs about the postpartum period play an important part in the use of care and were not adequately captured. Causality could not be drawn.

		activities. Obstetric characteristics: parity, seriousness of complications during pregnancy, delivery and postpartum period, mode of delivery.	vaginal delivery using instrument (forceps)).		use PPC than communities with lower levels of trust in the health system on issues related to maternal health (AOR=1.77, 95% CI:1.12–2.79).	
Laisser, 2019, Northern Tanzania 10	- Cross-sectional study, checklist - To determine health facility factors that contribute to the low uptake of PPC in 43 primary care facilities of Misungwi District. - Inclusion criteria: all women of reproductive age (15-49 years) who gave birth in one of the 43 healthcare facilities. -Exclusion criteria: not reported	- Dependent variable: proportion of women who returned for PPC services. - Independent variables: Obstetric factors: number of births, number of women who attended PPC services, number of nurse-midwives and other HPs, and availability of laboratory services and treatment.	2648 participants: across all health facilities, 40.6% of women returned for PPC. In the setting area, there were 93% of health facilities owned by the government and 7% by faith-based organisations. 84.7% of participants delivered in government health facilities, from them 40% returned for PPC. 15.3% of participants delivered in faith-based facilities and 46% of them returned for PPC.	Not reported	Place of delivery: Women who delivered in dispensary (AOR=8.78, 95% CI:6.43–11.14) and health centre (AOR=8.82, 95% CI:6.64–11.00) were 8.8 times more likely to uptake PPC, compared to women who delivered in hospital.	This study used secondary data and there was no opportunity for validation of information. The study was also limited to rural areas in a low-income and low-resource country. Generalisation in urban areas was not possible.

Khaki, 2019, Malawi 11	Cross-sectional study, DHS 2015-2016 To identify factors associated with PPC uptake among Malawian women by using nationally representative data. - Inclusion criteria: women aged 15-49 who had a live birth in the 24 months prior to the survey. - Exclusion criteria: miscarriage	- Dependent variable: whether or not a woman was checked by a skilled HP during the first 42 days after delivery - Independent variables: Sociodemographic factors: age of mother, maternal education level and occupation, region, SES. Obstetric factors: delivery through caesarean, birth order, child wanted, place of birth, health care decision, number of ANC visits. Environmental factor: place of residence	6693 participants: 48.4% women had a PPC within 6 weeks after birth. Overall, 66.85% of women have not gone beyond primary level education. Concerning health care decision: 47.70% of all women have taken their health care decision jointly with their partners, for 32.24% of women their health care decision has been taken by their partner/husband or other people, and only 18.08% of women took their health decision alone. A caesarean delivery was done for 9.8% of participants.	Mothers living in the richest wealth quintile were 28% [AOR= 0.71; 95% CI: 0.53, 0.98] less likely to use PPC services unlike the women in the poorest wealth quintile. The odds of PPC uptake were 45% [AOR=0.55; 95% CI: 0.40, 0.76] less among women living in rural areas than those in the urban areas.	1) older age (30-35 (AOR=1.75, 95% CI:1.22-2.51) and above 36 years old (AOR=1.86, 95% CI:1.19-2.92) compared to under 20, 2) Delivery through caesarean section (AOR=1.93, 95% CI:1.38-2.69), 3) Uptake of recommended number of ANC visits (AOR= 1.20, 95% CI:1.02, 1.40). 4) Delivery in health facilities (AOR=1.91, 95% CI:1.03, 3.55) compared to home delivery 5) Employed mothers were 44% (AOR=1.44, 95% CI:1.22-1.70)	Determination of causality relationships not possible
Machira, 2017, Malawi 12	- Cross-sectional study, DHS 2010 - To examine the factors associated with women's use of postpartum care services in urban areas as compared with the rural areas in Malawi. - Inclusion criteria:	Dependent variable: use of postpartum care in rural and urban settings in Malawi. Independent variables: ANC frequency, mode of delivery, distance to health facility, availability of	13 776 participants: 50.9% of women reported to have utilised PPC services at that time. Of these women, 62.3% received PPC within 24h, 24% between 1 and 6 days and 13.6% a week or more after childbirth. This represented a total of 14.1% rural women and 85.9% urban women. 89.4% of the sample lived	In rural areas, factors that decreased significantly PPC uptake were perception of distance from health facility as a problem (OR=0.78, 95% CI:0.70-0.86) and health care service availability (OR=0.87, 95% CI:0.80-0.93) as well, women primary	In rural areas, factors that increased significantly the use of PPC were at least 4 ANC visits (OR=1.20, 95% CI:1.11-1.28), caesarean delivery (OR=3.56, 95% CI:2.91-4.36), pregnancy complications (OR=1.66, 95% CI:1.53-1.80), secondary or higher level of education (OR=1.31, 95% CI:1.14-1.50).	No limitations reported

	women who had at least one birth in the last 3 years preceding the survey. - Exclusion criteria: not reported	transport, knowledge about pregnancy complications, age at first birth, maternal education and employment, number of living children, availability of healthcare services, exposure to media and women autonomy to seek their own healthcare.	in rural areas. Among women living in rural areas and who did not use PPC (51%), 64.6% had no pregnancy issues, 54.2% had less than 3 ANC, 49.2% considered having problem for health care service availability, 53.2% considered distance from health facility and transport availability as a problem, 50.8% had no autonomy to make decisions, 52.6% were farmers, 57.4% were illiterate and 53% had neither radio or TV. Among women living in rural areas and having used PPC (49%), 53% had at least 4 ANC, 77% had caesarean delivery and 47.5% vaginal delivery, 53% considered distance from health facility and availability of transport as not a problem, and 51% perceived availability of health care facility as a problem, 53% had pregnancy complications, 61.4% had secondary or higher level of education,	educational level (OR=0.91, 95% CI:0.83-0.99), In urban areas, the factor that refrained PPC uptake was health care service availability (OR=0.75 (0.59-0.97)).	In urban areas, caesarean delivery (OR=3.98, 95% CI:2.27-6.98), pregnancy complications (OR=1.58, 95% CI:1.21- 2.08), exposure to media (radio or television) (OR=1.38, 95% CI:1.04-1.77).	

			50% had access to radio and television.			
Chungu, 2018, Zambia 13	Cross-sectional study, DHS 2013/2014 To determine if place of delivery was associated with maternal PPC service uptake within the first 48 h after birth in Zambia. Inclusion criteria= women (resident of the household or visitors) who gave birth during the last 2 years prior the survey and utilised PPC Exclusion criteria= All women who had a child within 2 years preceding the survey but did not attend PPC	Dependent variable: EPPC uptake (either in the first 48h or after 48h following the delivery of the baby). Independent variables: <u>Sociodemographic factors:</u> Mother's age at birth (in years, ordered), maternal education and wealth status, women and women's partner occupation, marital status. <u>Obstetrical factors:</u> birth order, place of delivery, skilled birth attendant, ANC timing, being told about pregnancy complications. <u>Environmental factors</u>: place of residence, distance to a health facility.	5074 participants: 63% (95% CI 61.9–64.6) of women used EPPC among them, 66% were within the age group 20–24 years while women 35 years or older only (57%) utilised EPPC ($p < 0.001$). From those who delivered in health facilities, nearly 84% of those that had their delivery in government hospitals utilised EPPC and 88% of those who delivered in private hospital/clinic had EPPC. For women who had a SBA, 82% used EPPC. 65.5% of women who had autonomy to make decision on their health matters were able to use EPPC. Among those who indicated that distance to the health facility was not an issue, about 73% of them used EPPC. Only 47% of poor women were able to use EPPC. Most women (89%) with higher education were able to use EPPC and those who	Living in rural area is a barrier for women to get access to PPC (AOR=0.70, 95% CI:0.53–0.93).	1) Women who delivered at health facilities, either government hospital (AOR=7.24 95% CI 4.92–11.84), government health centre/post (AOR=7.15 95% CI 4.79–10.66), or private hospital/clinic (AOR=10.08 95% CI 3.35–30.35), were far more likely to utilise PPC in the first 48 hours than those who did not deliver at the health facility. 2) Skilled birth attendant (AOR=2.30, 95% CI:1.56–3.40). 3) knowledge about PPC complications was associated with EPPC (AOR=1.39, 95% CI:1.04–1.85) 4) Compared to the poor index, rich women were 47% more likely to use PPC (AOR=1.47, 95% CI:1.17–1.83).	Cross-sectional studies like this one, limit the capacity to establish causal inferences. The information that was used was obtained retrospectively, raising the possibility of recall bias.

			were working (72%) as well. Among women in urban areas, 82% of them used EPPC compared to women in rural areas (54%) (p< 0.001).			
Izudi, 2017, South Sudan 14	Community-based cross-sectional study, survey To assess the level and factors associated with early Postpartum care in South Sudan (Mindri East County) Inclusion criteria: women aged between 15 to 49 years old with a live birth, 8 to 14 days after delivery , and attending PPC clinics Exclusion criteria: not reported	Dependent variable: EPPC (postpartum visits between 2 and 7 days after birth) Independent variables: <u>Sociodemographic characteristics:</u> age, educational status, occupational status, household income ; marital status; autonomy /household decision making <u>Environmental factors:</u> type of health facilities, health facilities ownership (government vs private) , distance from nearby health facilities, availability of health care professionals at facilities	Participants: 385 women: 11.4% used EPPC. Of those, half (n=22) were from primary health care units and half (n=22) were from primary healthcare centres and hospitals. Mean age=27.9, SD 6.7 years and 71.9% below 30; 88.3% were not married; 95% had no employment; 57.4% had delivered their first child.	1) Government health facilities: participants who went to government health facilities were less likely to use EPPC compared to those from Private not for profit (PNFP) health facilities (AOR = 0.18; 95% CI: 0.05–0.61; P = 0.006) 2) Home delivery was associated with reduced EPPC use compared to health facility delivery (AOR = 0.30; 95% CI:0.04–2.28; P=0.245). 3) Distance > 1hour to nearest health facility reduced EPPC use (AOR = 0.27; 95% CI: 0.09–0.78; P = 0.015).	1) primary (AOR = 2.57, 95% CI:0.78–8.48) and secondary education or beyond (AOR = 5.73, 95CI: 1.14–28.74) increased EPPC uptake 2) ANC visits - increased significantly the EPPC use (UOR = 4.69; 95% CI: 1.93–11.38). 3) Having a health education on PPC increased EPPC use (UOR = 2.59, 95%CI:1.08–6.20). 4) Compared to Skilled vaginal Delivery, caesarean section (AOR = 8.12; 95% CI:3.24–20.31) and assisted vaginal delivery (UOR = 1.08; 95% CI: 0.31–3.77) 5) SBA - Compared to non-SBA, (UOR = 6.74;95% CI:3.28–13.85). 6) Participants that had been informed of PPC were more likely use EPPC (UOR=13.74; 95%CI:6.78–27.85). 7) Knowledge of PPC complications (UOR =	- Possible social desirability bias because of self-reporting. - Recall bias was another possibility as the ability to remember past events may depend on various factors. - impact of weather and payment schemes were not studied.

		Behavioural/clinical factors: knowledge about PP complications and newborn complications, ANC frequency, mode of delivery, health education on PPC , place of delivery, knowledge of PPC visits			4.71;95% CI: 2.25–9.84). 8) Presence of HPs and friendliness increased EPPC provision in contrast to when they are reportedly unfriendly (UOR=5.61; 95%CI:2.53–12.43). 9) presence of HPs at health facilities was associated with EPPC use compared to their absence (UOR= 4.86;95%CI:2.51–9.40).	
Ononokpono, 2013, Nigeria 15	Nationally representative cross-sectional data, DHS 2008 To examine community factors associated with the receipt of PPC in Nigeria and the moderating effects of community factors on the association between individual factors and postpartum care. Inclusion criteria: Nigerian women in reproductive age, aged 15–49 years whose recent	Dependent variable: PPC means here receiving postpartum check from trained medical personnel (doctor, nurse/midwife) within 41 days after childbirth. PPC is a binary variable, coded as 1 if postpartum care was received and 0 if not. Independent variables: maternal age at last delivery, education, religion, occupation, women's autonomy, household wealth index.	17846 participants: 33.2% received PPC and about 66.8 did not receive PPC. 45% of participants were aged 25-34, 45% had no education, 41% had formal employment, 54% were Muslims, 58% had no autonomy to take their health decisions which were taken by their husband or others people, 23% and 22% belonged, respectively, to the poorest and poorer household. Among women who used PPC, 38% were aged between 25-34, 81% achieved higher education level (above secondary), 43% had formal employment, 48% were	Religion: compared to Muslim women ,Christian women used significantly less PPC services (AOR=0.55, 95% CI:0.41–0.74) as well as women who have traditional and others belief (AOR=0.28, 95% CI:0.13–0.58).	1) Women's education: compared to no formal education, primary level and secondary or higher level of education increased, respectively, by 2 (AOR=2.16, 95% CI:1.62–2.87) and 5 (AOR=5.03, 95% CI:3.18–7.94) times the uptake of PPC. 2) Women's occupation: compared to unemployed women, those who had a formal employment used more PPC (AOR=1.25, 95% CI:1.01–1.56). 3)SES : compared to poorest household, women from the poorer (AOR=2.93, 95% CI:2.03–4.23), middle (AOR=8.33, 95% CI:4.85–14.29), richer (AOR=20.65,	Primary sampling unit (PSI) was used here as the community which may result biased towards a functioning population as a result of endogeneity and selection effects. Multicollinearity was another problem as the same variables were used at both individual and the community levels.

	delivery had occurred in the 5 years preceding the survey. Exclusion criteria: women who had delivery more than 5 years.		Christians, 52% were autonomous to take alone their health decisions, 51% and 75% belong to the richer and richest household, respectively. Among women who had no education, 90% did not used PPC. Among Muslims women , 78% did not used PPC. Among those who had no autonomy, 77% did not used PPC. The majority of poorest and poorer women did not used PPC, respectively 93% and 85%.		95% CI:9.97–42.74) and richest (AOR=74.75, 95% CI:27.29–204.71). 4) Living in communities with a high proportion of educated women (OR = 2.04; 95% CI:1.32–3.16), and communities with a high proportion of health facility delivery (AOR =17.86, 95% CI:8.34–38.24) was significantly associated with an increased likelihood of receiving PPC.	
Sakeah et al. 2018, Ghana (rural areas) 16	Cross-sectional household study, survey This study examined determinants of at least three PPC visits in rural Ghana Inclusion criteria: Women who delivered within 5 years preceding the survey. Exclusion criteria: Women gave birth more than 5 years preceding the survey	Dependent variables: PPC visits. Independent variables: Sociodemographic factors: age, religion, marital status, women and their partners' education level, SES, religion, Obstetric factors: ANC attendance during previous pregnancy, SBA	650 participants: 62% of women had at least 3 PPC follow-ups. About 87% of the women reported having had at least four ANC attendance, and 66% of them were supervised by a SBA.	unavailability of home-based PPC which may affect the PPC uptake in the two districts.	Increased PPC visits are found to be for women who attended ANC at least four times (AOR=5.23; 95%CI: 2.49–11.0) and for those who's partners have secondary education level (AOR=3.31, 95% CI: 1.17-9.39).	The significant difference in the PPC attendance rate between the two districts indicates the need for a stratified analysis and presentation of the data.

Ndugga, 2020, Uganda 17	Cross-sectional study, DHS 2016 To determine the determinants of EPPC attendance Inclusion criteria: women who delivered in the 2 years preceding the 2016 UDHS and who never had a caesarean birth. Exclusion criteria: women with caesarean births were excluded from the analysis sample because these births were likely to have received postnatal care regardless of the mother's characteristics.	Dependent variable: Early PPC= having received a PPC from a skilled health provider within 2 days after childbirth. Independent variables: mother's age, residence, education, religion, wealth status, marital status, occupation, antenatal care attendance, place of delivery, perceived size of the child at birth, birth order, women's perception of whether or not distance to the health facility hinders her access to medical care, and exposure to mass media.	5471 participants: 50% received EPPC in the first 2 days after childbirth. Two-thirds of the women (67%) had been exposed to family planning messages via radio, television, or newspapers. The mean age was 27 years. The majority of women were rural (80%), had attained primary education (62%), and were married (84%).	Women in households in the poorer (AOR=0.76, 95% CI:0.59–0.97), middle (AOR=0.69, 95% CI:0.53–0.91), and richer (AOR=0.66, CI:0.50–0.86) wealth quintiles were less likely to attend EPPC compared to poorest women - women's unemployment (AOR=0.72, 95% CI:0.58–0.91) compared with women employed in the agricultural sector.	1) no formal education (AOR=1.33, 95% CI 1.04–1.69) and secondary or higher education (AOR=1.45, 95% CI:1.22–1.74) compared to primary education. 2) attending at least four ANC visits (AOR=1.20, 95% CI:1.04–1.39) compared to attending less than 4 ANC visits. 3) delivery at a health facility—either a public hospital (AOR=15.28, CI:11.92–19.58) or a private facility (AOR = 15.68, CI:11.89–20.67) compared with those who delivered at home. 4) Women who perceived that distance to the health facility did not hinder their access to health care were more likely (AOR=1.20, CI:1.03–1.39) compared to distance perceived as a problem 5) exposition to mass media messages (AOR = 1.31, CI 1.13–1.52) compared to never accessed mass media.	- DHS data does not address any elements related to the quality of care received and clinical screenings that were performed or assessments. - Causality cannot be established. - The study was based on retrospective information provided by the survey respondents, which may be subject to recall bias.
Rwabufigiri 2016, Rwanda 18	Cross-sectional study, DHS 2010	Dependent variable: use of PPC Independent	2748 participants: 12.8 % returned for PPC within seven days of birth. Among them, 52.8% were aged	Mother's older age at delivery: compared to women under 20, women between 20–	1) Delivering at a health facility (AOR=2.97, 95% CI:2.28–3.87)	As a cross-sectional survey, causal conclusions could

	To identify key socio-economic and demographic factors associated with PPC uptake in Rwanda to inform improved PPC policies and programs. Inclusion criteria: women who had a live birth in the last two years preceding the survey. Exclusion criteria: not reported	variables: <u>sociodemographic factors</u>: mother's age at delivery, household wealth index, marital status, mother's education and employment, decision autonomy in healthcare, getting money needed for treatment. <u>Obstetric factors</u>: wanted last child, number of ANC visit, assisted delivery, place of delivery (health facility or not), delivery by caesarean section, birth order, distance to health facility. <u>Environmental factors:</u> place of residence	between 29-29, 83.5% lived in rural areas, 59.1% were married and involved in decisions, 71.3% had achieved primary school, 89.2% were employed, 22.6% were in a richest household, 59.3% wanted their child, 41.2% had at least 4 ANC visits, 59.9% were assisted for their delivery, 66.1% delivered in a health facility, 69.4% considered that distance to health facility was not a big problem to get medical help, but 55.5% considered that getting money for treatment was a big problem. Women who did not get PPC have a similar epidemiological profile than those who get PPC. The difference between both groups is from women who did not used PPC, only 28.9% had at least 4 ANC visits, 68.1% had no assistance for delivery, 64.4% had delivered outside a health facility, 12.4% were in a richest household.	29 (AOR=0.51, 95% CI:0.29–0. 87), 30–39 (AOR=0.47, 95% CI:0.27–0.83), and 40–49 (AOR=0.32, 95% CI:0.16–0.64) used significantly less PPC services.	2) Marital status/women's autonomy: compared to never married/widowed/divorced/ separated women, married and partnered women who are not involved in their own health care decision-making were more likely to use PPC (AOR=1.69, 95% CI: 1.17-2.44). 3) SES: compared to the poorest category, poorer (AOR=1.46, 95% CI:1.01–2.09) and richest households (OR: 2.04, 95% CI:1.27–3.29)	not be drawn. some important variables were not available for analysis such as cultural beliefs about when women are allowed to leave the house in the postpartum period, roles of husbands in maternal health decision-making, and perceptions about whether pregnancy was a medical issue warranting clinical visits.

Solanke, 2017, Cote-d'Ivoire 19	Cross-sectional study, DHS 2012 To examine the multilevel factors related to PPC for mothers with home deliveries Inclusion criteria: women aged 15–49 years who were either permanent residents or visitors to the household the night preceding the survey. Exclusion criteria: Women who did not have a child in the last 5 years preceding the survey and women whose last live birth occurred in a health facility were not included because they probably received PPC checkups after delivery in the health facility.	Dependent variable: PPC for women Independent variables: divided in two sets: <u>- The community variables</u>= community education level of women, community poverty level, community median size of households, community type (rural or urban), and community perception of distance to health facility. - <u>Individual characteristics</u>=women's education level and employment status, women's age, access to mass media (reading the newspaper, listening to radio, and watching television), women's autonomy, partner's education level, SES, number of ANC visits.	2125 participants: 59.2% of women used PPC Among them, the first PPC occurred within 2 days for 51.5% of women and after more than 2 days for 48.5% of them. 72% of this first PPC was provided by unskilled providers 28% by a skilled provider. 82% of women lived in rural areas, 74% of women and 67.5% of women's partner did not went to school, 71.5% of the respondents were employed, 68% of women were aged 25 and above, 50% had no access to mass media, 56.7% of women had low autonomy, 36.6% of women belong to a poorest household, 10.8% to a rich household and 4.4% to a richest household. 23.6% of women had at least 4 ANC visits. 51.1% of women lived in communities with a high proportion of women who perceived that distance to health facility was not a big	Living in communities with high concentration of women in poor household decreased the use of PPC (OR=0.31, 95% CI:0.10–0.96).	1) primary (OR=1.34, 95% CI:1.09–1.65) and secondary (AOR=2.36, 95% CI:1.86–3.00) level of education compared to no formal education. 2) Women aged 25 and above compared to young women (15-19) (OR=1.74, 95% CI:1.26–2.40). 3) Low (OR=2.39, 95% CI:2.01–2.76) and moderate (OR=1.37, 95% CI:51.05–1.80) access to mass media compared to no access to mass media. 3) Compared to poorest household, women in poorer (OR=1.48, 95% CI:1.07–2.04) , richer (OR=1.80, 95% CI:1.22–2.64) and richest (OR=2.35, 95% CI:1.42–3.87) households were more likely to use PPC. 4) Attending to at least 4 ANC visit (OR=8.46, 95% CI:5.73–12.50). 5) Living in communities with high proportion of women with secondary level of education increased the use of PPC (OR=1.60, 95% CI:1.04–2.47) by 60%, compared to low proportion of women with secondary	Causality relationships between the research variables could not be drawn. The data analysed were self-reported. However, authors assumed that socially desirable responses and other inappropriate responses were greatly reduced by the DHS standard survey methodology.

			problem in using health care. 34.5% of women lived in communities with high poverty level.		education. 6) Living in communities with a high proportion of women who did not perceived the distance to health facility as a big problem for health care facilitate PPC uptake (OR=1.83, 95% CI:1.25–2.69).	
Solanke, 2017, Guinea 20	Cross-sectional study, DHS 2012 To examine the multilevel factors related to PPC for women with home deliveries Inclusion criteria: women aged 15–49 years who were either permanent residents or visitors to the household the night preceding the survey. Exclusion criteria: Women who did not have a child in the last 5 years preceding the survey and women whose last live birth occurred in a health	Dependent variable: PPC Independent variables: <u>- The community variables</u>= community education level of women, community poverty level, community median size of households, community type (rural or urban), and community perception of distance to health facility. - <u>Individual characteristics</u>= women's education level, women's employment status, women's age, access to mass media, women's autonomy, partner's education	2908 participants: 22.1% of women had a PPC visit, but 77.9% did not use PPC. The first PPC occurred within 2 days (EPPC) for 18.7% of women and 81.3% after 2 days. The first PPC visit was provided by unskilled provider in 89% of cases and 11% by skilled provider. Overall, 86.3% of women and 78.9% of women's partner did not went to school, 83.2% of the respondents were employed, 67.2% of women were aged 25 and more. Access to mass media was inexistant (36.9%), low (26.9%) and moderate (36.2%). Women's autonomy was high for 54% of them. The wealth index of women was poorest for	Living in rural areas restrained significantly PPC uptake (OR=0.64, 95% CI:0.44–0.93).	- secondary education (OR=2.01, 95% CI:1.44–2.80). - Women aged 25 and older (OR=1.41, 95% CI:1.03–1.93) compared to young women (15-19). - A moderate access to mass media (OR=1.55, 95% CI:1.21–1.98) compared to not having access to mass media. - high autonomy (OR=1.38, 95% CI:1.14–1.66) compared to low autonomy. - Compared to poorest household, women who lived in poorer (OR=1.46, 95% CI:1.08–1.99) middle (AOR=1.43, 95% CI:1.05–1.95)), richer (OR=2.43, 95% CI:1.71–3.46) and richest (OR=5.05, 95% CI:3.12–8.17) households were more likely to use PPC. - At least 4 ANC visits (OR=6.35, 95% CI:4.40–9.15) compared to no ANC	Causality relationships between the research variables could not be drawn. The data analysed were self-reported. However, authors assumed that socially desirable responses and other inappropriate responses were greatly reduced by the DHS standard survey methodology. One of the community variables (community perception of

	facility were not included because they probably received PPC checkups after delivery in the health facility.	level, SES, number of ANC visits.	30.3% of them, poor for 27%, middle for 22%, rich for 15.5% and richest for 5.2% of them. 43.4% of women had at least 4 ANC visits. 59% of the respondents lived in communities with low proportion of women with secondary level education. 86.2% of women lived in rural areas. 34.4% of women lived in communities with a high proportion of women belonging to poorest and poor households.		- living in communities with moderate (OR=1.51, 95% CI:1.05–2.17) and high (OR=2.39, 95% CI:1.63–3.51)) proportion of women with secondary level education were more likely to use PPC.	distance to a health facility) was not available in the Guinea DHS. This may have reduced the extent of variation in PPC associated with community factors in the multilevel analysis for Guinea.
Solanke, 2017, Liberia 21	Cross-sectional study, DHS 2013 To examine the multilevel factors related to postpartum care for mothers with home deliveries Inclusion criteria: women aged 15–49 years who were either permanent residents or visitors	Dependent variable: PPC Independent variables: - The community variables= community education level of women, community poverty level, community median size of households, community type (rural or urban), and community perception of distance to health	1905 participants: 50% of women had a PPC visit. The first PPC occurred within 2 days for 46% of women and after 2 days for 54%. The first PPC was provided by unskilled provider in 84% of cases and by skilled provider for 16% of women. 67.1% of the respondents received at least 4 ANC visits. 49.6% of women and 39.9% of women's partner did not went to school. But 36.9% of women's partner	Living in communities with a high proportion of women living in poor households (AOR=0.28, 95% CI:0.15–0.53). Living in rural areas (AOR=0.73, 95% CI:0.55–0.98), compared to living in urban areas.	1) primary (AOR=1.35, 95% CI:1.01–1.66) and secondary (AOR=1.33, 95% CI:1.04–1.71) education compared to no formal education. 2) Employed women (AOR=1.32, 95% CI:1.06–1.64) compared unemployed women. 3) A moderate access to mass media compared to no access to media (AOR=1.32, 95% CI:1.07–1.64). 4) Women's partner with a high level of education compared to women's	Causality relationships between the research variables could not be drawn. The data analysed were self-reported. However, authors assumed that socially desirable responses and other inappropriate

	to the household the night preceding the survey. Exclusion criteria: Women who did not have a child in the last 5 years preceding the survey and women whose last live birth occurred in a health facility were not included because they probably received PPC checkups after delivery in the health facility.	facility. - Individual and household characteristics= women's education level, women's employment status, women's age, access to mass media), women's autonomy, partner's education level, SES, number of ANC visits.	get secondary level education. 58.2% of women were employed. 66.3% of them are aged 25 and older. Access to mass media is inexistant for 34% of women, low (30.2%), and moderate (35.8%). Most of the respondents had a high autonomy (70%). The house wealth index was poorest for 31.6% of women, poor for 25.6%, middle for 21.7%, rich for 14.1%, and richest for 7% of them. 41.7% of the respondents lived in communities were women get secondary education level. 59.9% of women lived in rural areas. 39.2% of women lived in communities where women belong to poorest and poor households. 58.9% of women lived in communities with a high proportion of women who perceived the distance to health facility as not a big problem in using health care.		partner without formal education (AOR=1.94, 95% CI:1.14–3.28). 5) Compared to the poorest household, living in middle (AOR=1.74 (1.31–2.33)), richer (AOR=1.72, 95% CI:1.14–2.59), richest (AOR=2.68, 95% CI:1.53–4.70) households used PPC more. 6) attending at least 4 ANC visits 7) Women who lived in communities with moderate (AOR=1.53, 95% CI:1.12–2.115) and high (AOR=1.69, 95% CI:1.14–2.51) proportion of women with secondary education level were more likely to use PPC. 8) Living in communities with a high proportion of women who did not perceived the distance to health facility as a big problem encourage PPC uptake (AOR=1.50, 95% CI:1.16–1.95).	responses were greatly reduced by the DHS standard survey methodology.

Solanke, 2017, Niger 22	Cross-sectional study, DHS 2012 To examine the multilevel factors related to PPC for mothers with home deliveries. Inclusion criteria: women aged 15–49 years who were either permanent residents or visitors to the household the night preceding the survey. Exclusion criteria: Women who did not have a child in the last 5 years preceding the survey and women whose last live birth occurred in a health facility were not included because they probably received PPC checkups after delivery in the health facility.	Dependent variable: PPC Independent variables: - The community variables= community education level of women, community poverty level, community median size of households, community type (rural or urban), and community perception of distance to health facility. - Individual and household characteristics= women's education level, women's employment status, women's age, access to mass media, women's autonomy, partner's education level, SES, number of ANC visits.	5660 participants: 24.4% of women had a PPC visit. Among them, the first PPC was provided within 2 days for 20.2% of women and more than 2 days after delivery for 79.8% of women. This first PPC was provided by unskilled providers (86.5%) and skilled providers (13.5%). At least 4 ANC was provided to 27.9% of women. Education was not provided to a large majority of women (89.8%) as well as 87.5% of women's partner. 78.8% of women were unemployed and 21.2 employed. 75.6% of women were aged 25 or older. Access to media was inexistant for 37.7% of women, low (29.3%) and moderate (33%). Women's autonomy was low for most of them (58%) and high for (42%) of women. The distribution of women SES was poorest for 23.5% of them, poor for 22.2%, middle for 22.2%, rich for	Living in communities with high proportion of women living in poor household were compared to women who lived in communities with low level of poverty (OR=0.57, 95% CI:0.33–0.97). Living in rural areas compared to living in urban areas (OR=0.52, 95% CI:0.30–0.91).	1) primary (OR=1.56, 95% CI:1.26–1.92) and secondary (OR=1.65, 95% CI:1.21–2.26) level of education compared to no formal education. 2) Employed women (OR=1.48, 95% CI:1.24–1.76) compared to unemployed women. 3) Women aged 25 and above (OR=1.35, 95% CI:1.01–1.81) compared to young women (15-19). 4) living in communities with high proportion of women with a secondary level of education (OR=1.82, 95% CI:1.22–2.71)) compared to living in communities with low proportion of women with secondary level of education. 5) Living in communities with a high proportion of women who did not perceived the distance to health facility as a big problem to health care is associated to PPC uptake (OR=1.24, 95% CI:1.04–1.48) compared to living in communities with low proportion of women who did not perceived the	Causality relationships between the research variables could not be drawn. The data analysed were self-reported. However, authors assumed that socially desirable responses and other inappropriate responses were greatly reduced by the DHS standard survey methodology.

			20.9% and richest for 11.2%. 57.3% of women lived in communities where a low proportion of women had achieved secondary level of education. 92.6% of women lived in rural areas. 35.3% of women lived in communities with a high proportion of women in a poor or poorest households. 51.6% of women lived in communities with a low proportion of women who perceived that distance to a health facility was not a big problem in using healthcare.		distance to health facility as a big problem for health care.	

Solanke, 2017, Sierra Leone 23	Cross-sectional study, DHS 2013 To examine the multilevel factors related to PPC for mothers with home deliveries Inclusion criteria: women aged 15–49 years who were either permanent residents or visitors to the household the night preceding the survey. Exclusion criteria: Women who did not have a child in the last 5 years preceding the survey and women whose last live birth occurred in a health facility were not included because they probably received PPC checkups after delivery in the health facility.	Dependent variable: PPC Independent variables: - The community variables= community education level of women, community poverty level, community median size of households, community type (rural or urban), and community perception of distance to health facility. - Individual and household characteristics= women's education level, women's employment status, women's age, access to mass media, women's autonomy, partner's education level, SES, number of ANC visits.	3754 participants: 59.9% of women used PPC services. Among them, the first PPC occurred within 2 days for 59.9%, and more than 2 days after delivery for 40.1%. Unskilled providers provided first PPC for 81.3% of women and skilled providers for 18.7%. At least 4 ANC visits were provided to 71.5% of women. 80.4% of women lived in rural areas. 74.9% of women and 77.4% of women's partner did not get education. 80.3% of women are employed. 71.8% of women are aged 25 or older. Access to mass media was not possible for 50% of women, low for 18% of them and moderate for 32% of them. Women's autonomy was high for 60.6% of them and low for 39.4%. The SES was poorest for 25.3% of women, poor for 23.4%, middle for 23.2%, rich for 16.8% and richest for 11.3%.	Employed women had less probability (OR=0.73, 95% CI:0.61–0.86) to use PPC than unemployed women. Women who lived in communities with a medium (OR=0.40, 95% CI:0.32–0.52) and high (OR=0.44, 95% CI:0.34–0.56) proportion of poverty were less likely to use PPC. Living in rural areas (OR=0.82, 95% CI:0.71–0.95).	1) women's secondary education level (OR=1.44, 95% CI: 95% 1.21–1.71) compared to no formal education. 2) Low (OR=1.39, 95% CI:1.13–1.70) and moderate (OR=2.02 (1.64–2.48) access to mass media. 3) A high level of autonomy (OR=1.28, 95% CI:1.09–1.52). 4) Secondary level education of women's partner (OR=1.69, 95% CI:1.23–2.34) compared to no formal education. 5) Compared to the poorest household, living in richer (OR=1.33, 95% CI:1.01–1.75) and richest (OR=1.37, 95% CI:1.01–1.86) households 6) attending at least 4 ANC (OR=2.19, 95% CI: 1.75–2.74). Women who lived in communities with a high proportion of women with a secondary level education were twice more likely to use PPC (OR=1.96, 95% CI:1.13–3.41). Living in communities with high proportion of women	Causality relationships between the research variables could not be drawn. The data analysed were self-reported. However, authors assumed that socially desirable responses and other inappropriate responses were greatly reduced by the DHS standard survey methodology.

			The proportion of women who lived in communities with a low (32.7%), moderate (35.9%), high (31.4%) proportion of women with a secondary level education. A similar distribution was found for women who lived in communities with a low (33.3%), moderate (35.3%) and high (31.4%) level of poverty (poor and poorest household). 51.1% of women lived in communities with a high proportion of women who perceived that distance to health facility was not a big problem in using PPC.		who did not perceived distance to health facility as a big problem(OR=1.49, 95% CI:1.07–2.07)	
Benova, 2019, 33 Sub-Saharan African countries 24	Cross-sectional study, DHS 2016 To examine the proportion of women receiving a PPC by a HPs before discharge from a health facility following childbirth Inclusion criteria= all women aged 15–49 with a live birth in	Outcome= PPC visit by HP during hospitalisation post-delivery Independent variables= women's sociodemographic characteristics: age at birth, level of education, marital status, SES. Environmental factors: length of facility stay,	137,218 women: 66.6% (95% CI: 66.2–67.1) of women receiving a EPPC across all countries. - Women who gave birth by a cesarean section (8.3% of the pooled sample) were more likely to have received a pre-discharge check (85.5%) compared to those with a vaginal birth (65.2%). - Age 25 to 44 years old was associated with 8%–21% increase in the odds of	Mistimed pregnancy (AOR=0.87 (0.84–0.91)) and unwanted (AOR=0.79 (0.74–0.85)) compared to wanted pregnancy. giving birth in public lower-level facility is not associated with the uptake of PPC (AOR=0.94 (0.90–0.98) compared to public hospital.	ANC visits PPC (AOR=1.04 (1.03-1.05)) . - living in poorer (AOR=1.07 (1.01–1.13)), richer (AOR=1.14 (1.07–1.20)) and richest (AOR=1.32 (1.23–1.41)) households compared to poorest households. - Living in urban areas (AOR=1.08 (1.04–1.13). - caesarean delivery (AOR=1.88 (1.72–2.05))	PPC was measured using slightly different questions across the 33 included countries. In the majority of included surveys, women were asked questions according to pattern A, which does not define what constitutes a "check,"

	the survey recall period (5 years) were included in the analysis. Exclusion criteria= Not reported	delivery attendant, delivery facility type), place of residence. Obstetric factors: number of ANC visits, mode of delivery (vaginal or caesarean), multiple birth (singleton or not) and parity (first birth, 2–3, 4–6, and 7).	being checked compared to the 20- to 24-year–old reference group. - Women in the wealthier four quintiles and those with secondary and higher education were more likely to receive a PPC before discharge compared to the poorest fifth and those with less education. - Urban residents were 8% more likely to be checked compared to rural dwellers. - Every additional ANC visit during pregnancy increased the likelihood of EPPC by 4% and additional day in the childbirth facility by 6%. - Women giving birth in public lower-level facilities (the most common category of childbirth location with 46.9% of the pooled sample) had the lowest level of pre-discharge check at 60.6% compared to those giving birth in private facilities (67.3%) and public hospitals (74.5%).	giving birth with others SBA (nurses/midwives) (AOR=0.74 (0.69–0.78)) and non-SBA (AOR=0.14 (0.12–0.15)) compared to doctors	- secondary or higher education services (AOR=1.11 (1.04–1.17)) Compare to no formal education. - Women aged between 25 to 44 years old [25-29 (AOR=1.08 (1.02–1.13)), 30-34 (AOR=1.12 (1.05–1.19)), 35-39 years old (AOR=1.21 (1.12– 1.31)), 40-44 (AOR=1.13 (1.02–1.25)) compared to younger women	compared to pattern B, which specifically asks about a “physical examination” before discharge. Women in different countries might have understood the term “check” variably. Women’s interpretations of the differing questions could have biased our results. DHSs do not consistently ask women across all country surveys how long after childbirth or how long before discharge they were checked, how many times, or what actions constituted this check.

Khanal, 2014, Nepal 25	Cross-sectional study, DHS 2011 To determine the factors associated with PPC uptake within 42 days and 24h after birth Inclusion criteria: women who gave birth (last born child) during the 5 years preceding the survey. Exclusion criteria: not reported	Dependent variables: PPC uptake= at least one PPC visit provided to the women within the first 42 days of birth and immediate PPC (EPPC)within 24h after birth. Independent variables: <u>Sociodemographic factors:</u> age, socioeconomic status, religion, maternal and paternal education and employment, <u>Obstetric factors:</u> use of ANC, place of delivery, birth attendance, birth order, child sex, maternal final say on their own health. <u>Environmental factors:</u> place of residence, development and ecological region.	4079 participants: PPC LPPC attendance 43.2% and EPPC attendance =40.9% 64% of mothers were aged between 20-29 years old, 1/3 of women were primiparous, 52.7% attended at least 4 ANC, 39.6% of women delivered in a health facility and 60.4% at home, 45.2% of women had a SBA.	Non-significant findings	1) Place of delivery (AOR=31.08; 95% CI:22.42-43.11) compared to home delivery. 2) Attendance to at least 4 ANC visit (AOR 3.62; 95% CI:2.343-5.60), compared to not attending any ANC visit. 3)SES: compared to the poor women, those from the middle (AOR=1.45, 95% CI:1.09-1.93) and rich (AOR=1.79, 95% CI:1.10-2.92) households were more likely to use PPC. 4) compared to no education, women with a higher education level were more likely to use PPC (AOR=2.26, 95% CI:1.19-4.27).	Cross-sectional nature of DHS limits the capacity to draw any causal inferences

Neupane, 2013, Nepal 26	Cross-sectional study, DHS 2006 To analyse the risk factors associated with type of birth attendants and timing of PPC Inclusion criteria: women who had given birth within 3 years preceding the survey. Exclusion criteria: women whose last birth was delivered in a health facility were assumed to have received a EPPC soon after delivery and therefore were excluded from the logistic regression analyses (model 3).	Dependent variable: PPC within 6 weeks after delivery Independent variables: Sociodemographic factors: age, educational level, partner's educational level, employment, religion, SES. Obstetrical factors: place of delivery, parity Environmental factors: place of residence.	4136 participants: 26.5% of women used PPC. The mean age of mother was 27.10 years (SD = 6.35), 56.5% had 1 or 2 children and did not get access to education, 76.1% lived in rural areas. 79.5% delivered at home, 23 % of SBA. More than half of the women had traditional birth attendants during delivery, while 7 % had no birth attendants at all. In this study, 5 % of women who had a SBA used PPC while 10 % of those whose deliveries were assisted by other personnel including those who had no attendants had PPC.		1) at least primary education level (AOR = 1.46, 95 % CI:1.11–1.92) compared to no formal education 2) compared to the poorest household, women from the poorer, middle, richer and richest households were respectively 58% (AOR=1.58, 95% CI:1.06-2.35), 69% (AOR=1.69, 95% CI:1.13-2.53) , 2.49 (AOR=2.49, 95% CI:1.68-3.71), 2.57 (AOR = 2.57, 95% CI:1.59–4.15) times more likely to use PPC. 3) Sufficiency of advice during pregnancy (OR=3.09, 95 % CI:2.16–4.41) compared with those who received no information)	The cross-sectional nature of this study with reporting of past behaviour might have recall bias. However a 3-year time period was chosen to minimise this recall bias.

Mon, 2019, Myanmar 27	Community based cross-sectional study, DHS This study aimed to explore the magnitude of rural women who received full PPC in addition to push and pull factors for full PPC uptake in Myanmar. Inclusion criteria: married women who had children aged under 2 years. Exclusion criteria: women who could not communicate properly due to physical or mental ill health	Dependent variable: full PPC uptake, which means receiving at least 4 PPC and the first visit within 24 hours after childbirth. Independent variables: age of respondents, education level, average monthly per-capita income, male involvement, accessibility to PPC services, knowledge of postpartum danger signs, perception on traditional birth attendants, birth order (i.e. the order that the child was born to his/her family), number of ANC visits, misconception regarding postpartum practices.	500 participants= 25.20% (95%CI, 21.58-29.21) used full PPC. Nearly half of them (48.2%) were in the young adult age group of 25 to 35 years. Participants aged between 17 and 47 years, with a mean age of 29.72±6.6 years. Majority of the respondents and their spouses were in primary or below level of education, accounting 72.2% and 63.8% respectively. More than half of the respondents (60.8%) had low incomes (less than 50,000 Myanmar kyats (MMK).	The presence of misconceptions regarding postpartum practice had a strong negative impact on the uptake of full PPC (AOR=0.12, 95% CI:0.04-0.36).	1) Secondary or higher education level of the mother (AOR=2.16, 95% CI:1.18-3.94). 2) The rural women earning higher incomes (≥50,000 MMK) were twice as likely to receive full PPC as their counterparts earning <50,000 MMK (AOR=2.02, 95% CI:1.11-3.68). 3) receiving support from partners (AOR=2.19, 95% CI:1.02-4.69) compared to male involvement 4) knowledge about PPM (AOR=2.10, CI:1.15-3.83) compared to low awareness. 5) Delivery of the first child (AOR=3.26, 95% CI:1.8-5.91) was identified as a conclusive determinant of full PPC usage.	Causality relationships between the potential predictors and full PPC uptake could not be drawn. Participants may have some recall bias since they were reporting past experience and practice although a 2-year period was selected to minimise this bias.
Siriwardhana, 2019, Sri Lanka 28	Cross-sectional study, DHS 2006/2007 To determine the overall and sector-wise socioeconomic	Dependent variable: Whether the public health midwives visited the home at least once to provide PPC within one month of the delivery after	4890 participants: Overall, 82.6% of women were visited by public health midwives at least once during the first month after delivery. The highest number of home visits was	Not reported	Pro-rich inequality in PPC visits made by public health midwives probably due to the majority of the Sri Lankan population being resident in the rural sector. This indicates that the rich	Recall bias. Exclusion of 5 districts due to the security situation during the time of

	inequality in PPC home visits made by public health midwives in Sri Lanka and to decompose the observed socioeconomic inequality into potential determinants. Inclusion criteria: ever-married women aged 15–49 years living who gave birth in 2001 or later (up to 2007). Exclusion criteria: not reported	giving birth to their last child. Independent variables: age at the last birth, education level of women, education level of husband, sector of residence (urban, rural, estate (plantations)), SES.	reported in the rural sector (84.5%) and the lowest was reported from the estate sector (72.4%). The mean (SD) age of the participants was 30.2 (6.2) years. 72.5% live in rural area. 85.6% of women and 81% of women's partner had achieved at least secondary school.		women received more home-based care than poor women. -results varied by the sector of residence (urban, rural, and estate) indicating differences within and between sectors. Poor women in the urban sector received home-based care more than those who were rich. Being a woman residing in the rural sector increased the probability of being visited by a public health midwife almost 6.6% compared with a woman residing in the estate sector. The main contributory factors for socioeconomic inequality were province of residence and education level of women.	survey. Hence, this dataset only represents eight Provinces of Sri Lanka

Caption: ANC: antenatal, AOR: adjusted odds ratio, UOR: univariate odds ratio, CI: confidence interval, HPs: healthcare professionals, DHS: demographic and Health Survey, PPC: postpartum care, EPPC: early postpartum care before discharge within 48 hours after delivery, SBA: skilled birth-attendant, SES: socioeconomic status.

Appendix 3.1. Forest plots of the association between the place of residence and PPC uptake

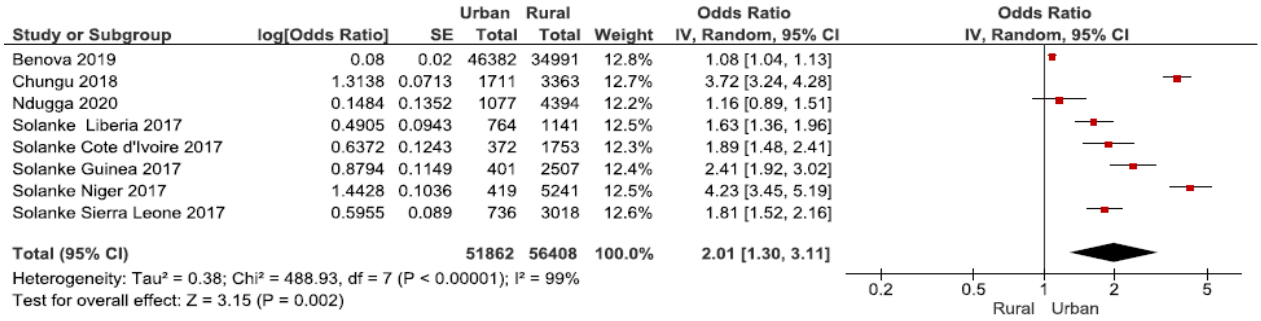


Figure 1. Subgroup analysis of EPPC group association between postpartum care uptake and place of residence: urban compared to rural (reference).

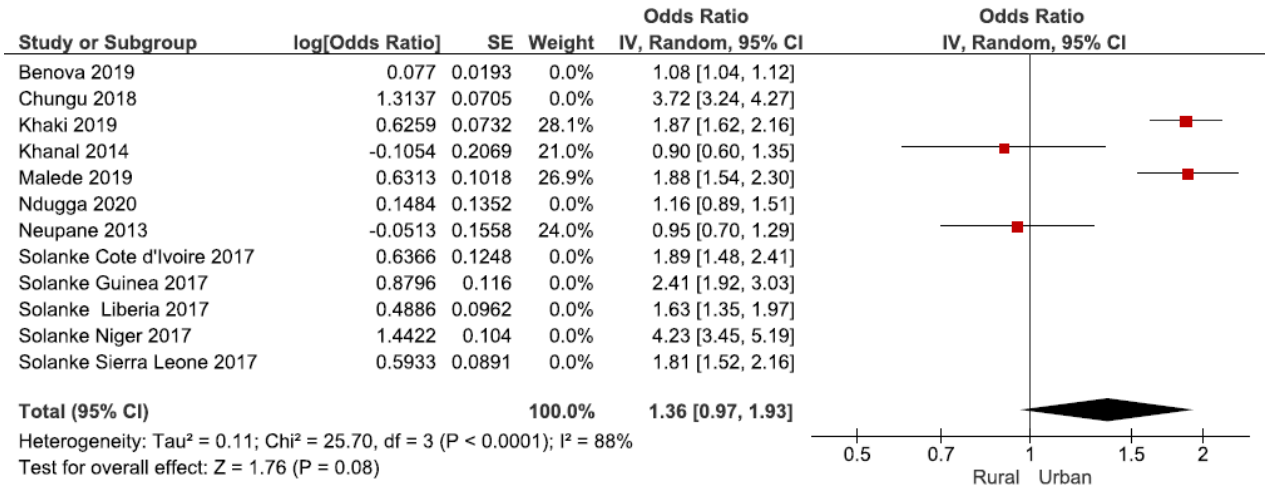


Figure 2. Subgroup analysis of PPC group association between postpartum care uptake and place of residence: urban compared to rural (reference).

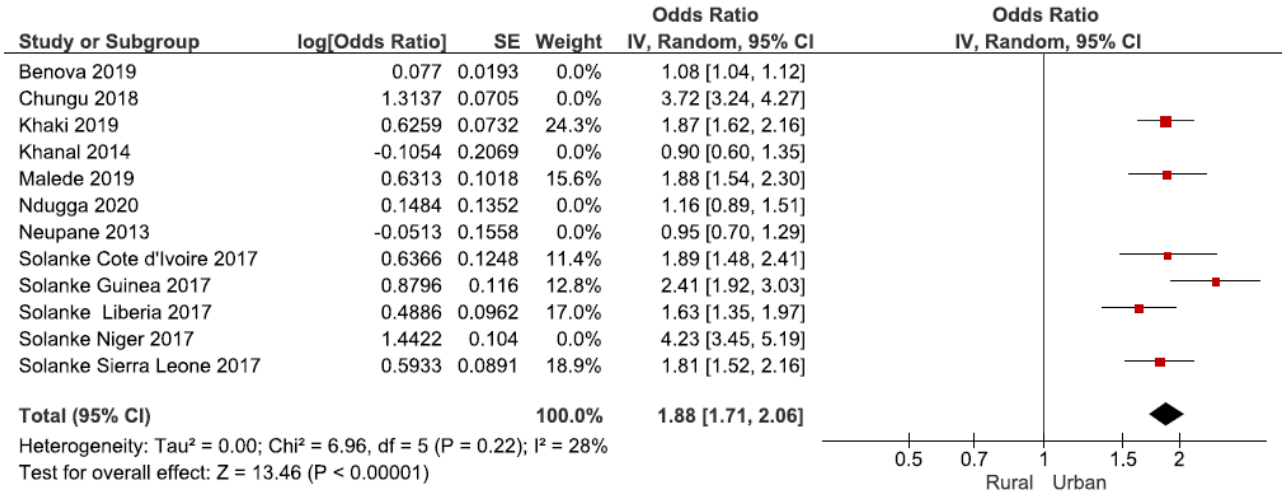


Figure 3. Sensitivity analysis of the meta-analysis estimating the association between use of postpartum care and place of residence: urban compared to rural (reference).

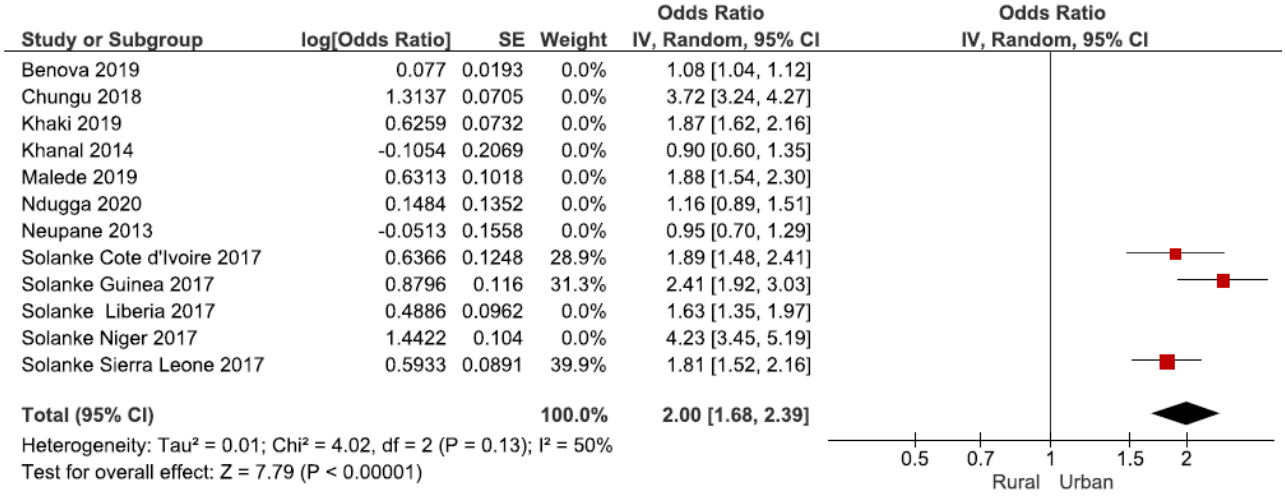


Figure 4. Sensitivity analysis of EPPC subgroup estimating the pooled association between use of postpartum care and place of residence: urban compared to rural (reference).

Appendix 3.2. Forest plots and funnel plots of the pooled association between the Richest socioeconomic status and PPC uptake

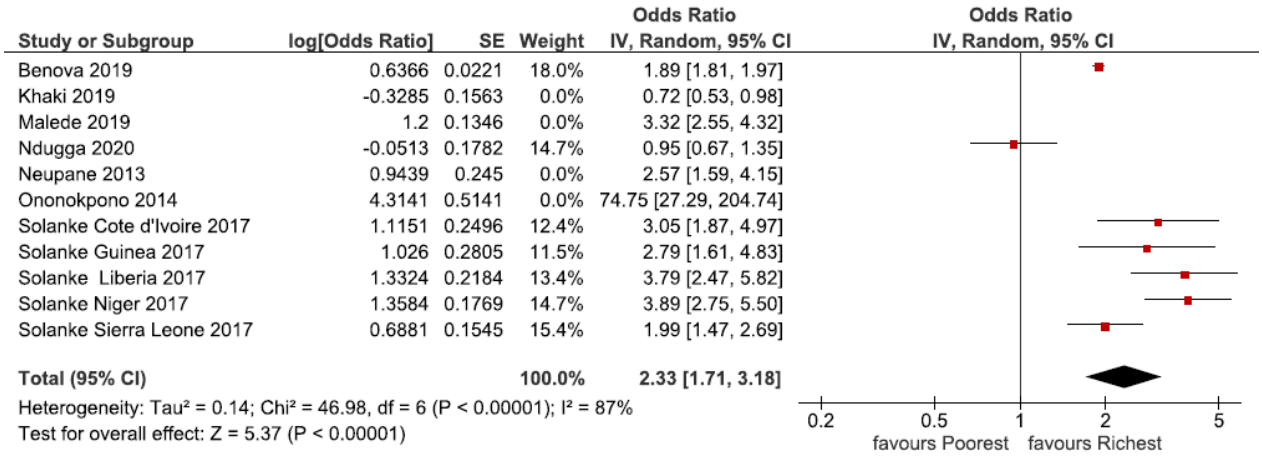


Figure 1. EPPC subgroup analysis assessing the association between richest socioeconomic status and uptake of postpartum care compared to poorest (reference).

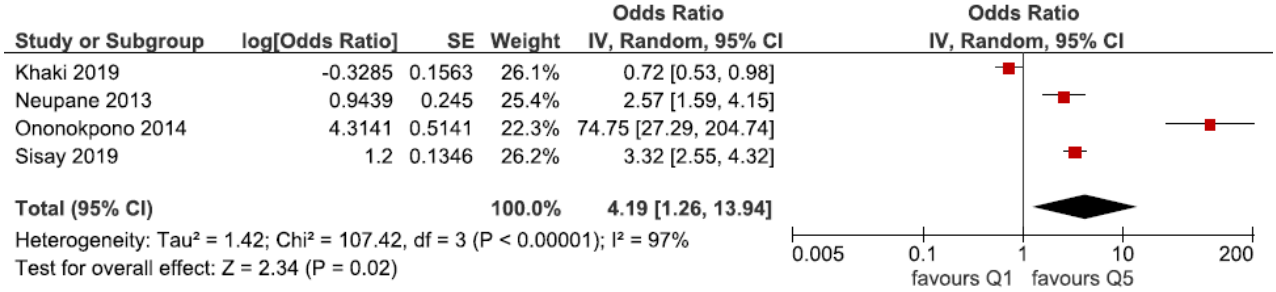


Figure 2. PPC subgroup analysis assessing the association between richest socioeconomic status and uptake of postpartum care, compared to poorest household (reference).

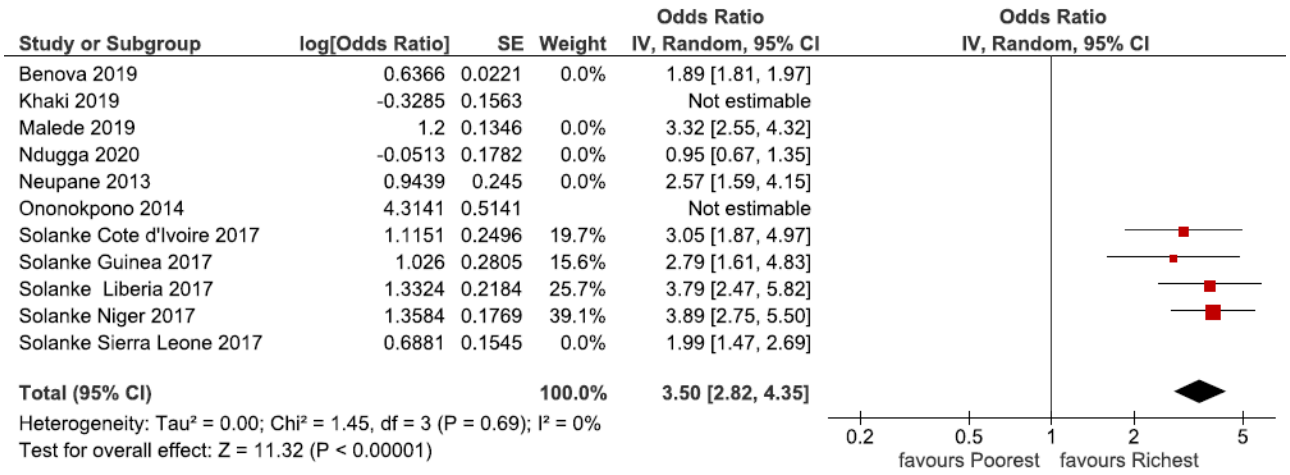


Figure 3. Sensitivity analysis of the EPPC subgroup meta-analysis assessing the association between richest socioeconomic status and uptake of postpartum care, compared to poorest category (reference).

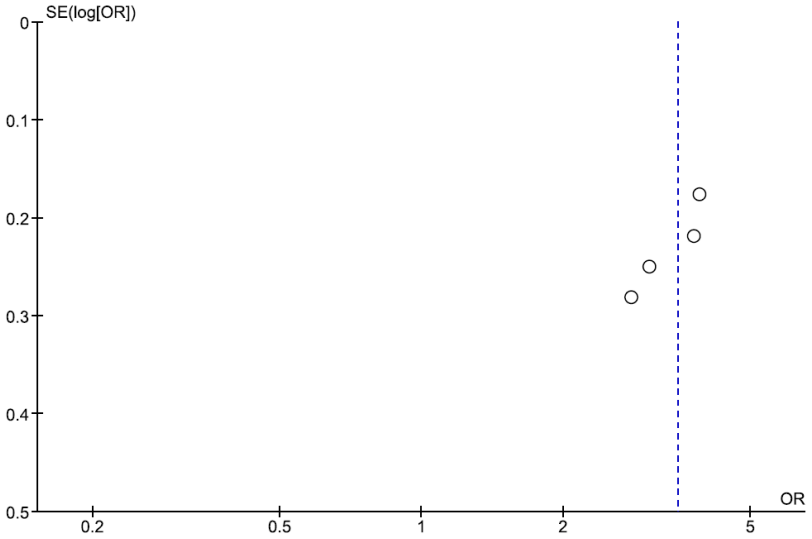


Figure 4. Funnel plot of studies included in the EPPC subgroup meta-analysis measuring the association between the richest socioeconomic status and postpartum care uptake.

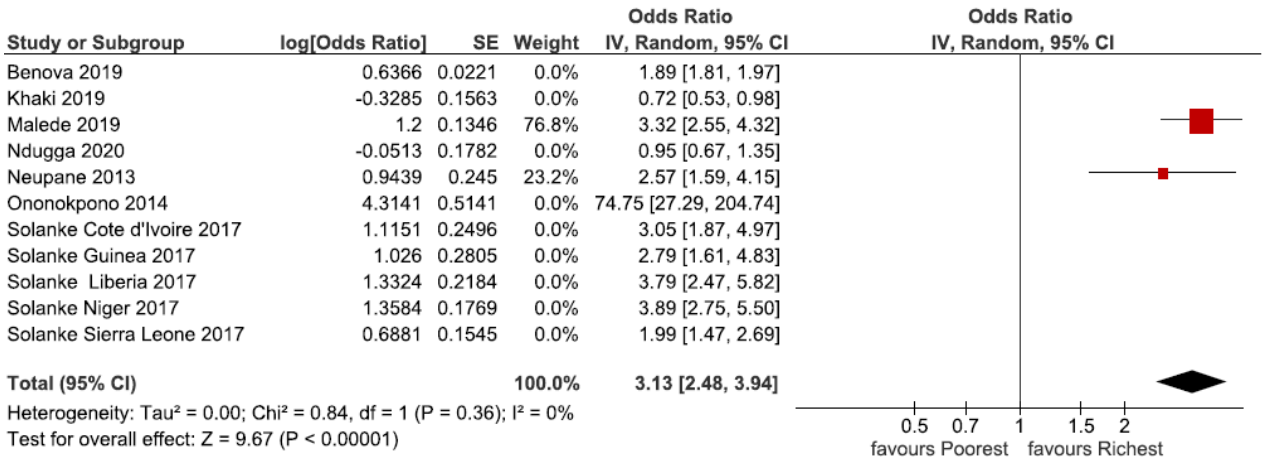


Figure 5. Sensitivity analysis of the PPC subgroup meta-analysis assessing the association between richest socioeconomic status and postpartum care, compared to poorest category (reference).

Appendix 3.3. Forest plots and funnel plots of the pooled association between the Richer socioeconomic status and PPC uptake

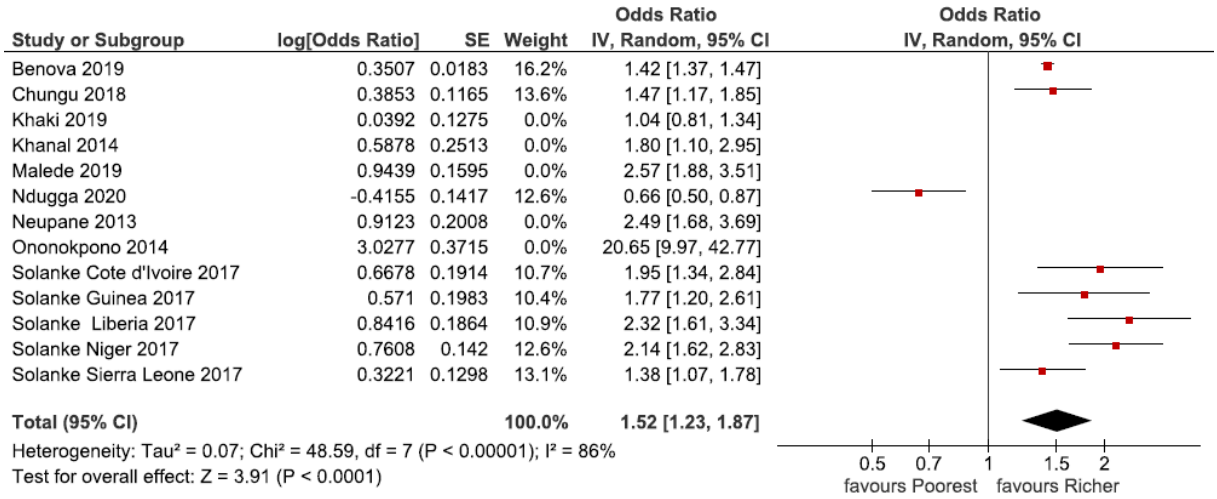


Figure 1. EPPC subgroup meta-analysis assessing the association between richer socioeconomic status and postpartum care, compared to the poorest category (reference).

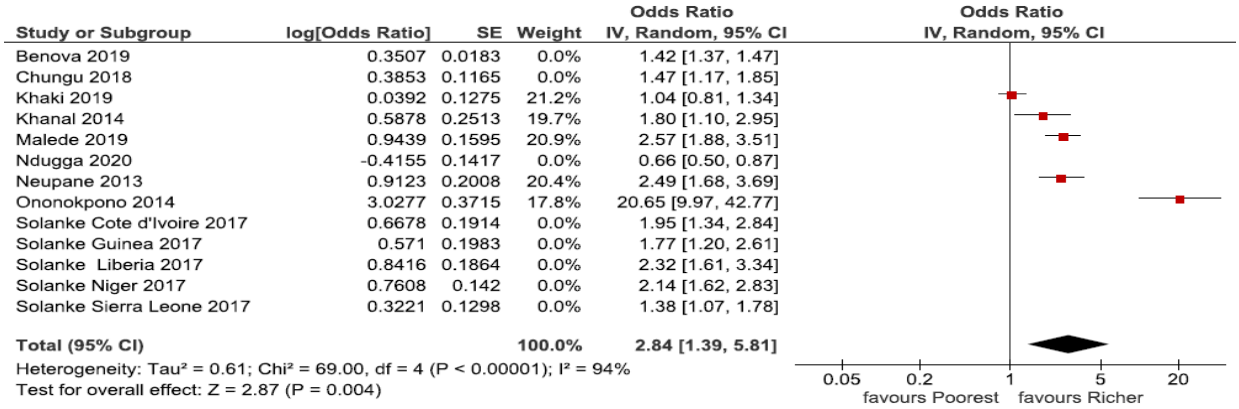


Figure 2. PPC subgroup meta-analysis assessing the association between richer socioeconomic status and postpartum care, compared to the poorest category (reference).

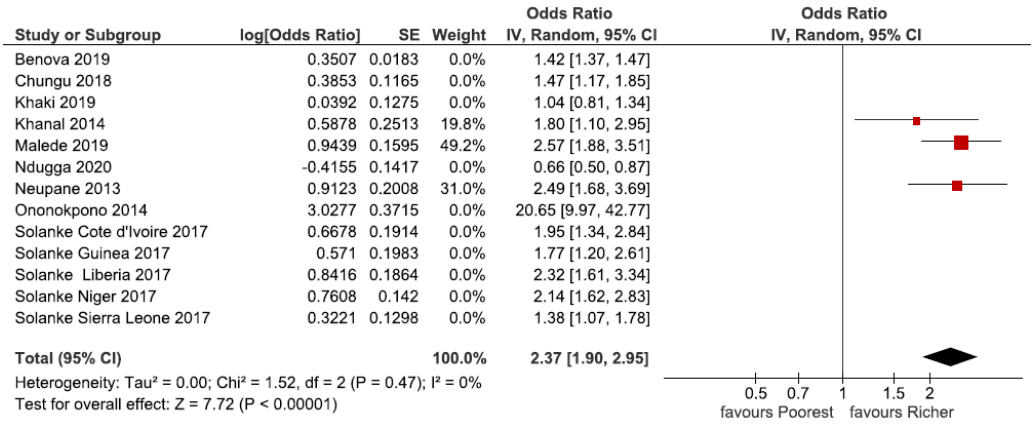


Figure 3. Sensitivity analysis of the PPC subgroup meta-analysis assessing the association between richer socioeconomic status and postpartum care, compared to the poorest category (reference).

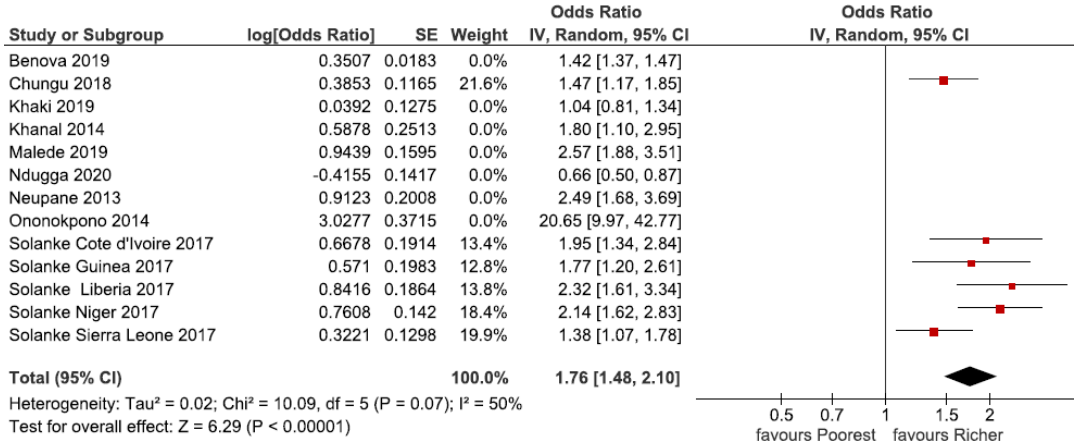


Figure 4. Sensitivity analysis of the EPPC subgroup meta-analysis assessing the association between richer socioeconomic status and postpartum care, compared to the poorest category (reference).

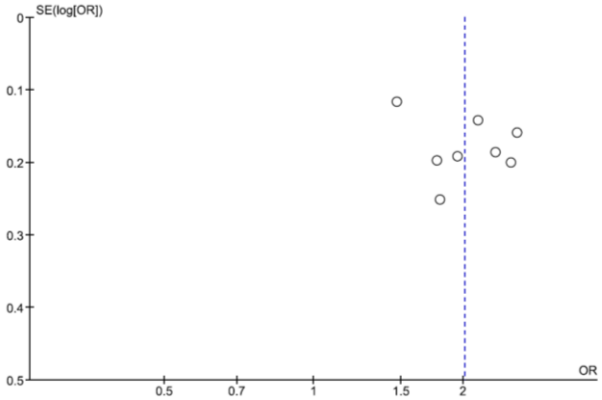


Figure 5. Funnel plot illustrating the absence of publication bias between studies included in the sensitivity analysis estimating the association between richer socioeconomic status and postpartum care uptake in LMIC.

Appendix 3.4. Forest plots and funnel plots of the pooled association between the Middle socioeconomic status and PPC uptake

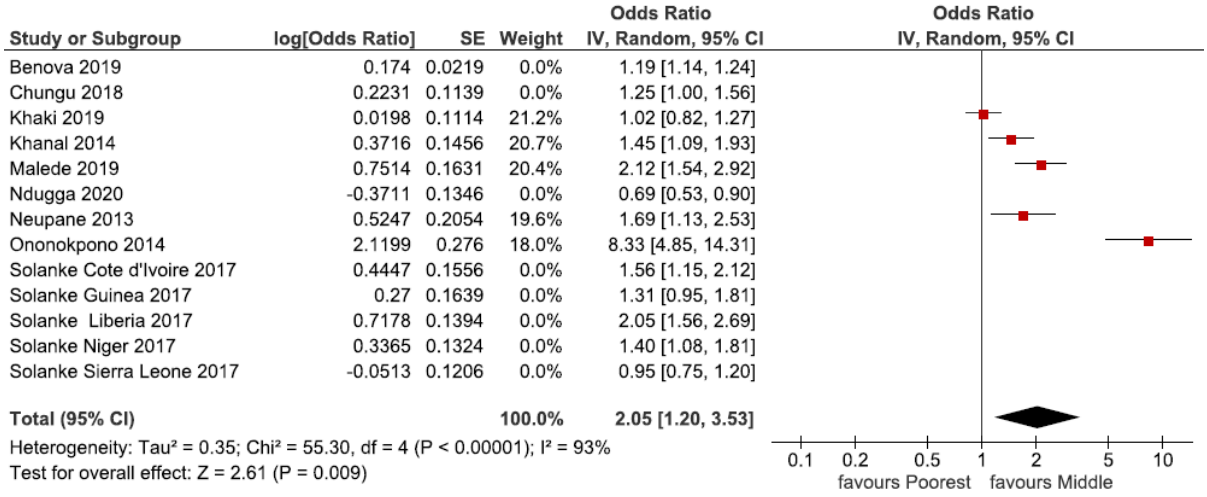


Figure 1. PPC subgroup meta-analysis assessing the association between middle socioeconomic status and postpartum care, compared to the poorest category (reference).

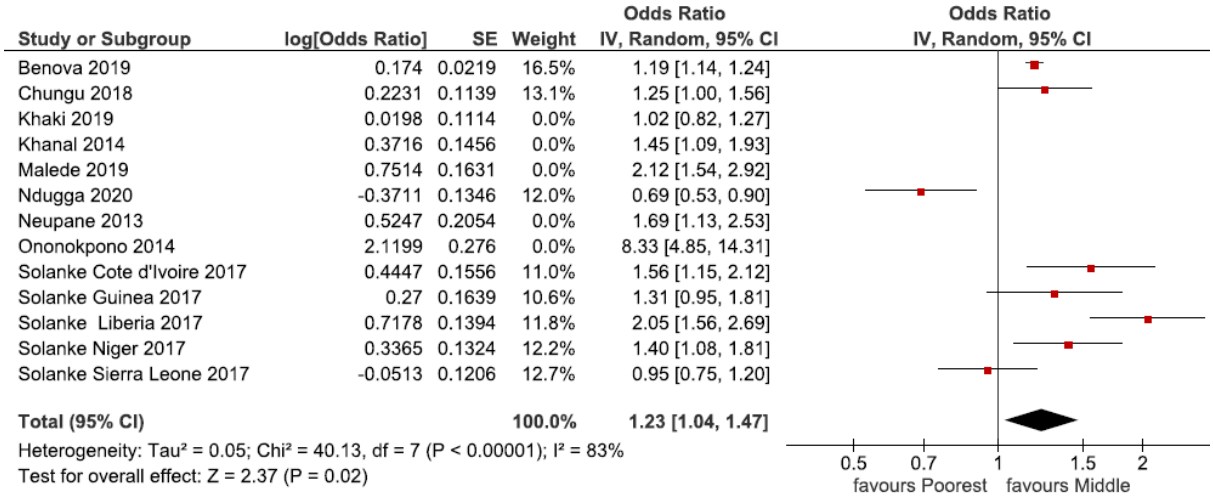


Figure 2. EPPC subgroup meta-analysis assessing the association between middle socioeconomic status and postpartum care, compared to the poorest category (reference).

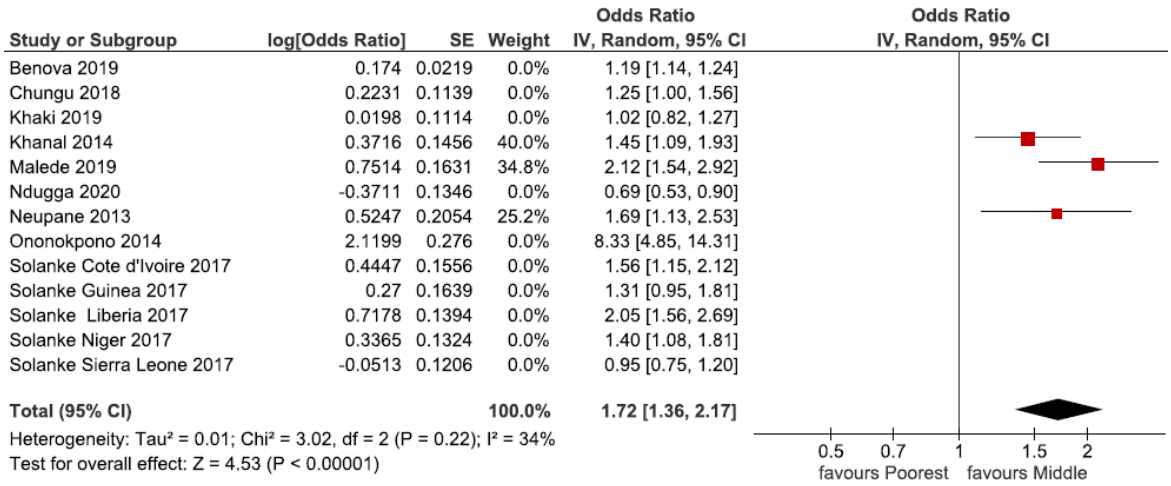


Figure 3. Sensitivity analysis of the PPC subgroup meta-analysis assessing the association between middle socioeconomic status and postpartum care, compared to the poorest category (reference).

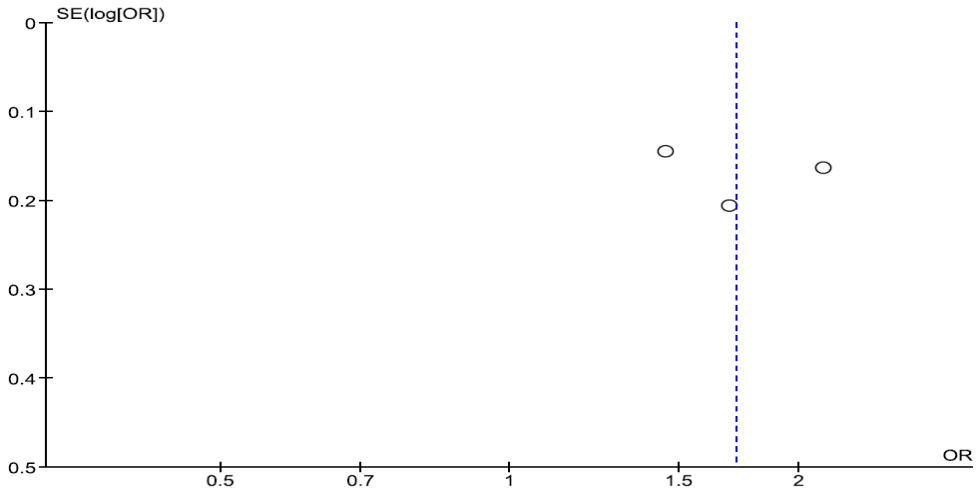


Figure 4. Symmetrical funnel plot illustrating the absence of publication bias between studies included in the sensitivity analysis estimating the association between middle socioeconomic status and LPPC subgroup.

Appendix 3.5. Forest plots of the pooled association between the Poorer socioeconomic status and PPC uptake

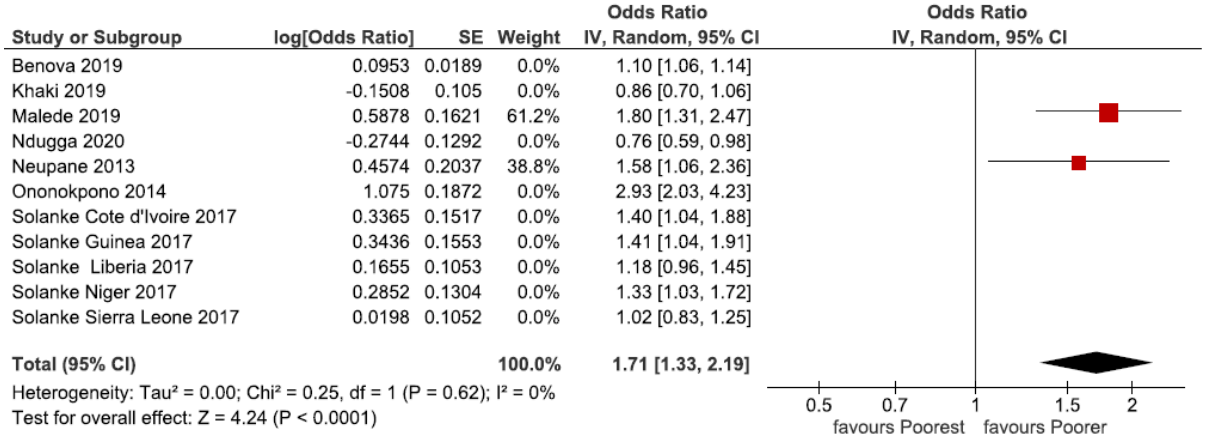


Figure 1. Sensitivity analysis of the PPC subgroup meta-analysis assessing the association between poorer socioeconomic status and postpartum care, compared to the poorest category (reference).

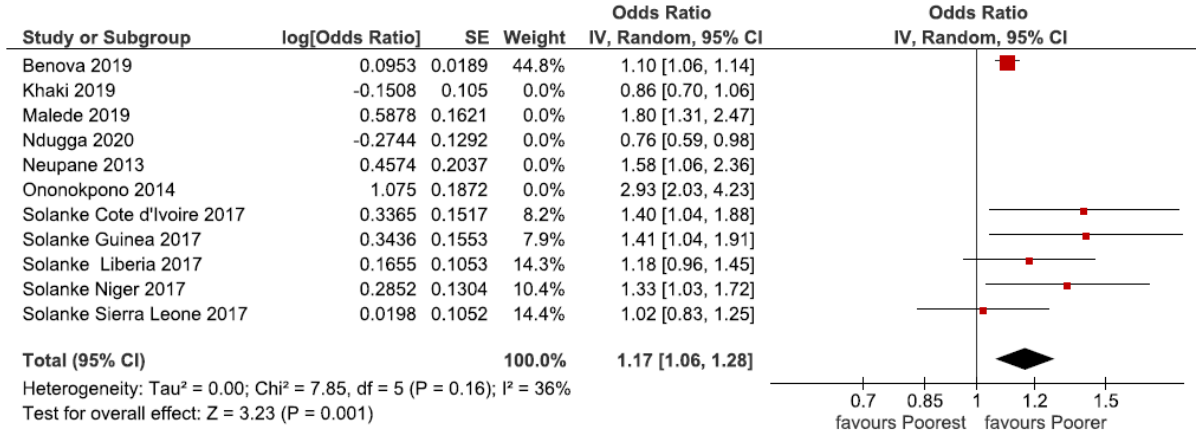


Figure 2. Sensitivity analysis of the EPPC subgroup meta-analysis assessing the association between poorer socioeconomic status and postpartum care, compared to the poorest category (reference).

Appendix 3.6. Forest plots and funnel plots of the pooled association between women's primary education level and PPC uptake

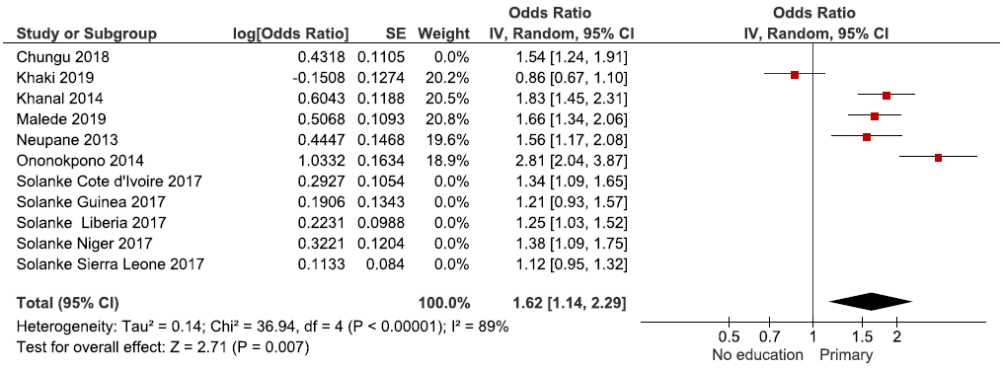


Figure 1. LPPC subgroup meta-analysis assessing the association between women's primary education level and postpartum care, compared to no formal education (reference).

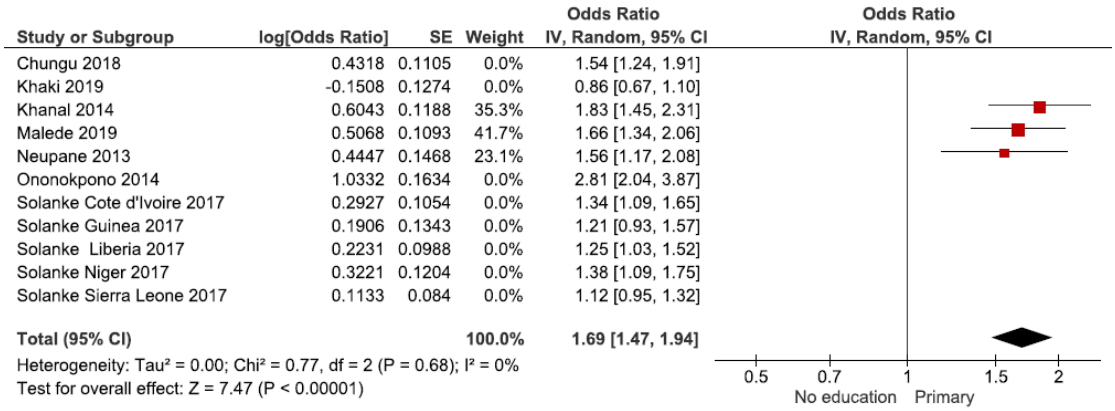


Figure 2. Sensitivity analysis of the LPPC subgroup analysis assessing the association between women's primary education level and postpartum care, compared to no formal education (reference).

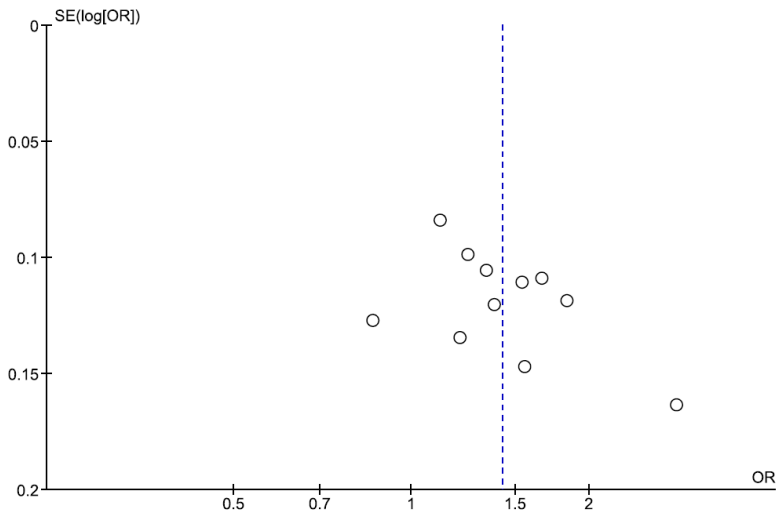


Figure 3. Funnel plot of the meta-analysis between women's primary education level and postpartum care uptake.

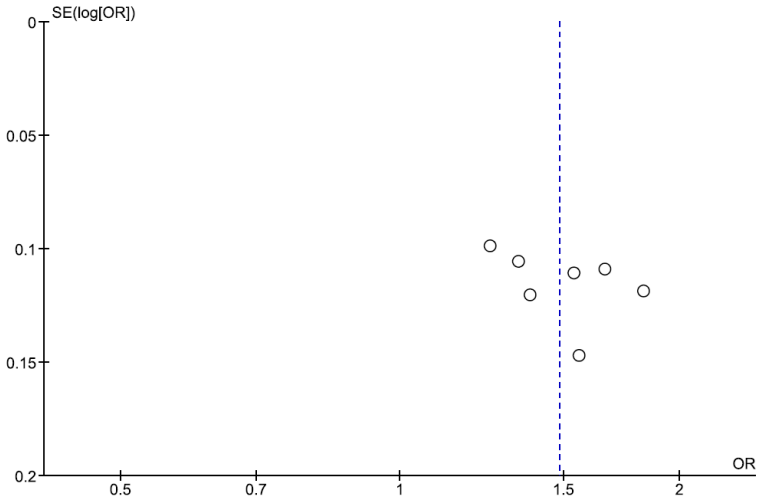


Figure 4. Funnel plot of the sensitivity-analysis (LPPC group) between women's primary education level and postpartum care uptake.

Appendix 3.7. Forest plots of the pooled association between women's secondary education level and PPC uptake

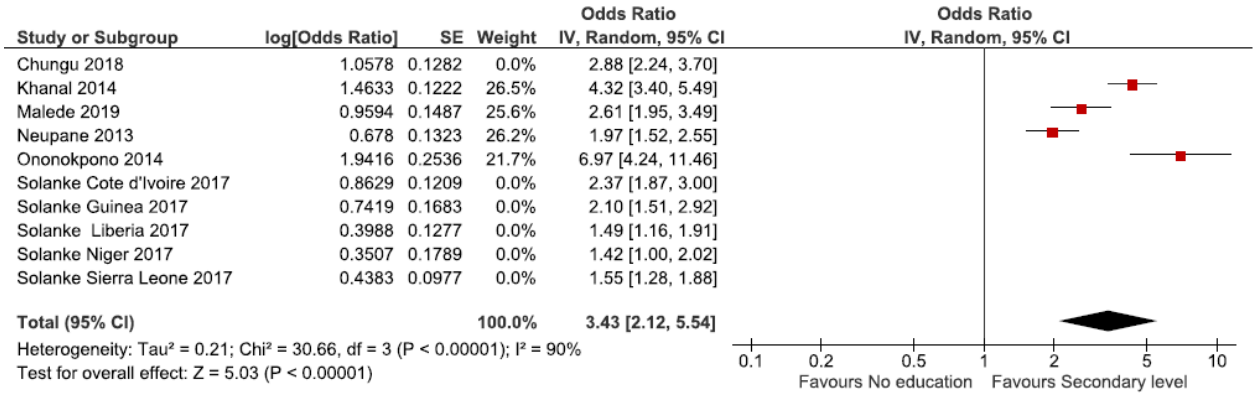


Figure 1. LPPC subgroup analysis of the pooled effect of women's secondary education level on PPC uptake, compared to no formal education (reference).

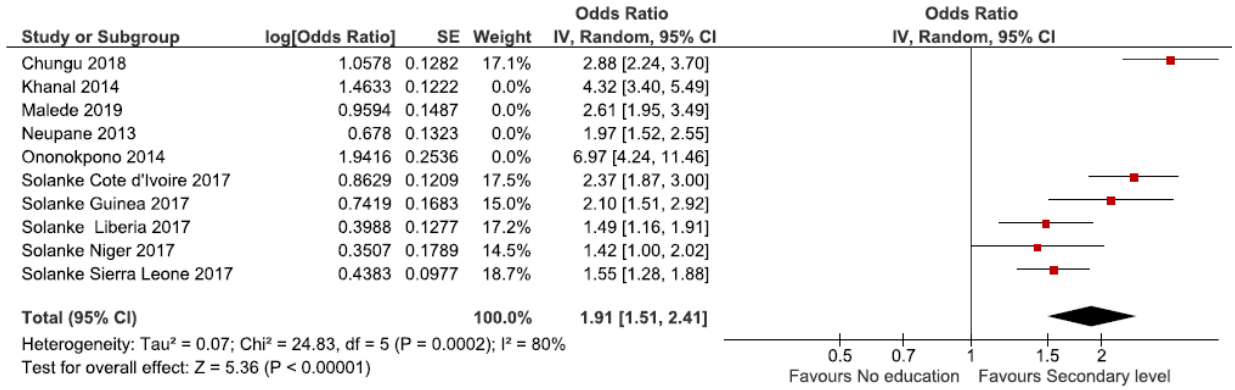


Figure 2. LPPC subgroup analysis of the pooled effect of women's secondary education level on PPC uptake, compared to no formal education (reference).

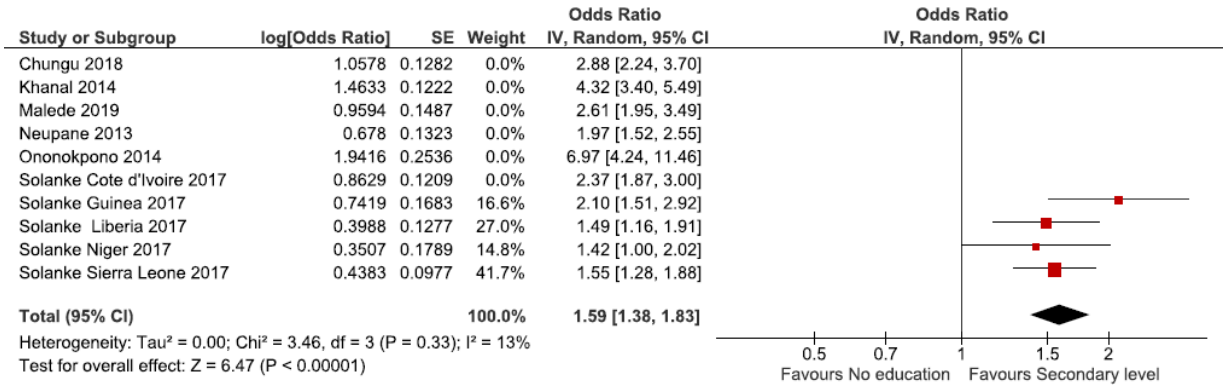


Figure 3. Sensitivity analysis of the EPPC subgroup analysis of the association between women's secondary education level and PPC uptake, compared to no formal education (reference).

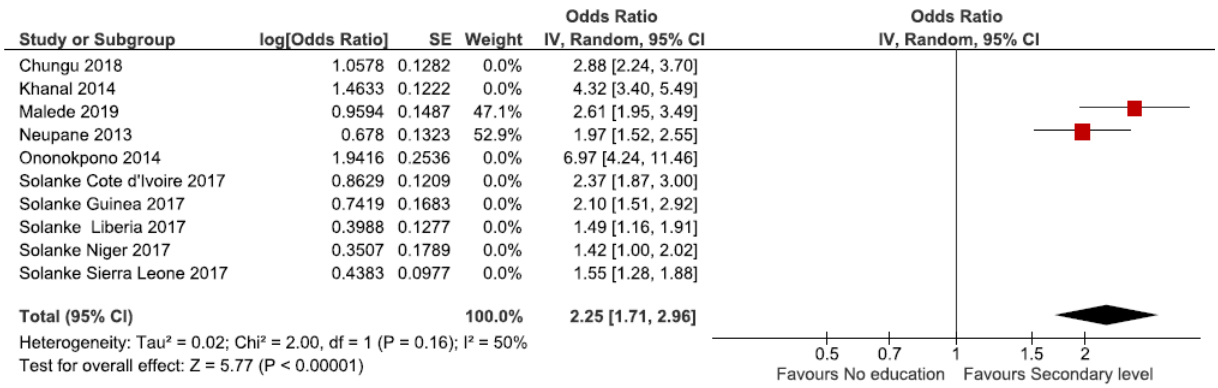


Figure 4. Sensitivity analysis of the PPC subgroup analysis of the association between women's secondary education level and PPC uptake, compared to no formal education (reference).

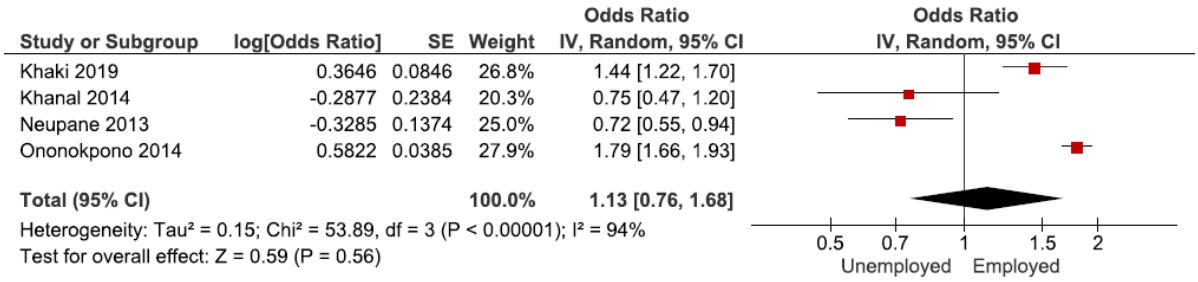


Figure 5. Meta-analysis of the pooled association between women's employment and LPPC , compared to unemployment (reference).

Appendix 3.8. Forest plot and funnel plot of the pooled association between place of delivery (health facilities versus other places) and PPC uptake

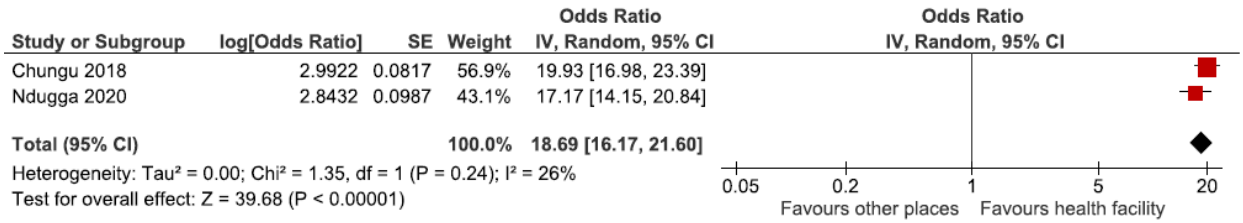


Figure 1. EPPC subgroup analysis of the association between health facility-based delivery and postpartum care uptake, compared to other places (reference).

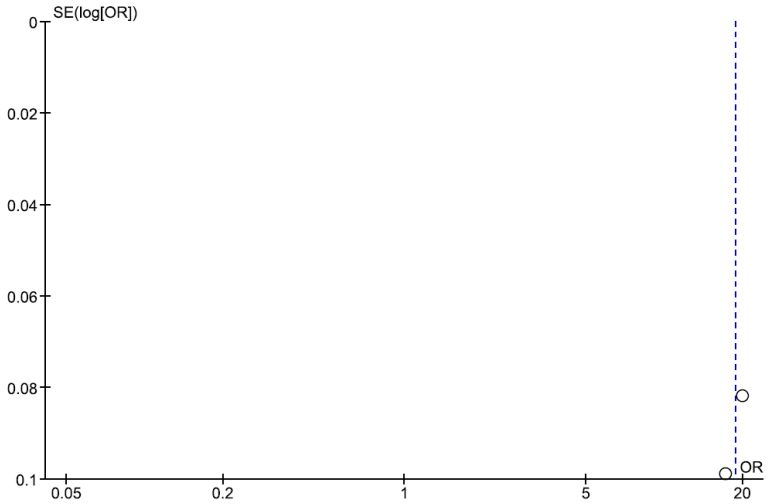


Figure 2. Funnel plot without publication bias in the studies pooled for the meta-analysis between health facilities and EPPC.

Appendix 4.1. Information sheet for women

The following information sheet will be translated into Arabic and French.

Research information sheet

Women's health and care experience during the six weeks after childbirth, in Morocco

You are being invited to take part in a doctoral research project. This document provides you with information about the aims of the research and what your participation will entail. Please read this carefully and take time to decide whether you wish to participate or not. Should you have any queries, please feel free to contact us (see contact below). Thank you for reading this.

What is the purpose of the study?

The purpose of this study is to understand women's health and care experience during the six weeks following childbirth.

Who are the participants?

We are looking to speak to women who have had a baby recently to gain their views on their experience and the care they have received. We hope to interview around 24 women. The interviews will take place face-to-face in the recruitment places (health facilities) or by phone.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part, you will be asked for your consent before the interview. Please note that even if you decide to take part, you can still withdraw at any time up to the point of submission of study findings, without having to provide a reason. If you decide not to take part, the care you receive will not be affected.

What will the research entail?

You will be asked to answer some questions as part of a face-to-face or phone interview. It will take around 30-45 minutes.

What are my responsibilities?

We would be grateful if you could be available for the interview at the agreed time. There are no other commitments or lifestyle restrictions associated with participating.

What are the possible benefits of taking part?

Whilst there are no immediate benefits to participating in the project, it is hoped that this work will enable us to better understand women's health and care experiences after childbirth. In turn, this may help inform policy makers.

What are the possible disadvantages and risks of taking part?

Given the sensitive nature of the study, it is possible that you may feel some emotional discomfort. If you feel distressed, you can stop the interview at any time. At the end of the interview we will provide you with a list of support organisations you can contact if you need to speak to someone as a result of taking part. However, if you think that the subject may be too upsetting, please do not take part.

Will my taking part in this study be kept confidential?

All the information that we collect about you during the interview will be kept strictly confidential. Identities will be kept confidential at all time and data will not be shared with any other party. Any data collected will be stored securely. Data will be anonymised so that no individuals or institutions will be identified or identifiable.

What will happen to the results?

Findings will be written as part of a doctoral thesis. It is likely that they will be published in professional journals. If you would like to receive a short summary of the results, please, leave us your contact details.

Who is the researcher?

The researcher, Asmaa Habib, is a doctoral student of the University of West London (United-Kingdom) and Mohammed V university (Rabat). She works in a team with three supervisors: Professor Hafiz Khan, Professor Caroline Lafarge and Professor Rachid Bezad.

Who has ethically reviewed the project?

This project has been ethically approved by the University of West London Ethics Committee (London, UK) and the Mohamed V University Ethics Committee (Rabat. Morocco).

What happens now?

If you wish to take part, we will ask you to sign a consent form after taking a reflexion time. We will keep one copy and give you another copy to keep.

Contact for further information:

Asmaa Habib: University of West London, email: 21422211@student.uwl.ac.uk

Pr. Rachid Bezad: Mohamed V university, email: r.bezad@um5s.net.ma

Thank you for taking part in this research.

Appendix 4.2. Information sheet for healthcare professionals

The following information sheet will be translated into French.

Research information sheet

Postpartum complications and the use of postpartum care in Morocco

You are being invited to take part in a doctoral research project. This document provides you with information about the aims of the research and what your participation will entail. Please read this carefully and take time to decide whether you wish to participate or not. Should you have any queries, please feel free to contact us (see contact below). Thank you for reading this.

What is the purpose of the study?

The purpose of this study is to explore health professionals' experience of providing postpartum care to women. The aim is not to assess the quality of the care you provide, but rather on your experience of caring for women opinions on the care available to women The study is part of doctoral research project whose aims are to determine postpartum morbidity prevalence and the risk factors associated with it and to understand reasons why women do not attend postpartum care.

Who are the participants?

We are looking to speak to around 15 health professionals who provide postpartum care. The interviews will take place face-to-face in the recruitment places (health facilities) or by phone.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part, you will be asked for your consent before the interview. Please note that even if you decide to take part, you can still withdraw at any time up to the point of submission of study findings, without having to provide a reason.

What will the research entail?

You will be asked to answer some questions as part of a face-to-face or phone interview. It will take around 30 minutes.

What are my responsibilities?

We would be grateful if you could attend to the interview at the agreed time. There are no other commitments or lifestyle restrictions associated with participating.

What are the possible benefits of taking part?

Whilst there are no immediate benefits for people participating in the project, it is hoped that this work will enable us to better understand the experience of providing postpartum care It is hoped that the research findings will be used to inform future interventions aimed at increasing women's attendance to postpartum care, that will directly benefit both patients and health professionals.

What are the possible disadvantages and risks of taking part?

Your participation to this study should not bring any distress to you. However, if you think that the subject may be too uncomfortable, please do not take part.

Will my taking part in this study be kept confidential?

All the information that we collect about you during the interview will be kept strictly confidential. Identities will be kept confidential at all time and data will not be shared with any other party. Any data collected about you will be stored securely. These anonymised data will not allow any individuals or their institutions to be identified or identifiable.

What will happen to the results?

The results will be part of a doctoral thesis and they will be published in professional journals. If you would like to receive a short summary of the results, please, leave us your contact details.

Who is the researcher?

The researcher, Asmaa Habib, is a doctoral student at the University of West London (United-Kingdom) and Mohamed V University (Rabat). She works in a team with three supervisors: Professor Hafiz Khan, Professor Caroline Lafarge and Professor Rachid Bezad.

Who has ethically reviewed the project?

This project has been ethically approved by the University Research and Ethic Committee of the University of West London and Mohamed V University Ethics Committee.

What happens now?

If you wish to take part, we will ask you to sign a consent form after taking a reflexion time. We will keep one copy and give you another copy to keep.

Contact for further information:

Asmaa Habib: University of West London, email: 21422211@student.uwl.ac.uk

Pr. Rachid Bezad: Mohamed V university, email: r.bezad@um5s.net.ma

Thank you for taking part in this research.

Appendix 4.3. Consent form

CONSENT FORM- INTERVIEWS

Title of study: ***Women's health and care experience during the six weeks after childbirth, in Morocco***

Name of researcher: Asmaa Habib

Name of participant: _____

Please initial box

1. I confirm that I have read and understood the information sheet version for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time up to the point of thesis submission, without giving any reason, and without my legal rights being affected. I understand that should I withdraw from the study, then the information collected so far cannot be erased after the thesis submission and that this information may still be used in the project analysis. ☐

3. I understand that data collected in the study may be looked at by authorised individuals from the University of West London and the Mohamed V University where it is relevant to my taking part in this study. I give permission for these individuals to collect, store, analyse and publish anonymised information obtained from my participation in this study. I understand that my personal details will be kept confidential. ☐

4. I agree to the researcher recording the interview. ☐

5. I understand that the original copy of the recording of the interview will be kept at in UK, at University of West London for a duration of 5 years. ☐

6. I understand that anonymous direct quotes from the interview may be used in the study reports. ☐

7. I agree to take part in the above study ☐

Name of participant: **Date:** **Signature:**

2 copies: 1 for the participant, 1 for the project notes

Appendix 4.4. Interview grid for women

➢ Socio-demographic information

1. May I ask you your age, please?

   Age:

2. What is your marital status?
   - Married
   - Divorced
   - Widow
   - Single
   - Cohabitation

3. What is your level of education?
   - Illiteracy
   - Primary school level
   - Secondary school level
   - High school level
   - Higher

➢ Exploring the last delivery experience

4. When did you last gave birth?

   Enter the date:

5. In which place did the delivery occur?
   - Public hospital
   - Public delivery centre
   - Private clinic
   - Home
   - Other:

6. Could you describe your delivery? Please include your experience of accessing care, labour and any complications you may have had.

7. How was your relationship with health professionals during your hospitalisation and what is your opinion about the healthcare you received?

8. How would you describe the support you received from your family, relatives, friends during your pregnancy and/or delivery?

➢ Postpartum morbidity experience

9. Now think about just after the delivery, during your hospitalisation and the 6 weeks after birth. How did you feel physically and psychologically? Which kind of physical or psychological health issues, if any, have you experienced (if at all), and how have you managed them? If issues mentioned

10. How have these affected your family and social life?

➢ Postpartum care experience

11. Now, please, tell me more about the care you have had for you (not the baby) since being discharged and up to 6th week after birth.

Note: go to question 14 if the participants did not attend to any consultations.

12. Why have you chosen to attend to these consultations?

13. What do you think about your relationship with health professionals during this period?

Note: ask the following question, only if the participant did not attend to any consultation.

14. Why did you not attend to these consultations?

The World Health Organisation recommend to women to have four consultations during the six weeks after childbirth in order to check if they recover well after the delivery.

15. What would encourage you to go to these check-ups?

Appendix 4.5. Interview grid for healthcare professionals

1. How long have you been providing postpartum care?

2. In what type of health facilities have you provided postpartum care during your career and how has it changed over time?

3. In general, when do women seek postpartum care after leaving the health facility where they delivered?

4. On average, how many postpartum consultations do women you treat receive?

5. What are the most common postpartum morbidities you diagnosed?

6. How does postpartum mental disorder figure in the care you provide?

7. What do you think about the postpartum care you provide to women?

8. What are the main barriers to providing postpartum care?

9. What are the main facilitators to providing postpartum care?

10. How would you describe your relationship with women during the postpartum cares and delivery?

In Morocco, according to a national survey, since 2011 only 22% of women attend to postpartum care.

11. In your opinion, why is there few women who attend to postpartum care in Morocco and what would encourage them to use them?

Appendix 4.6. Debrief sheet for women

Thank you for taking the time to participate to this research project concerning women's health and care experience during the six weeks after childbirth. Thank you sharing your personal experience. Just to reiterate, all the information you have given me will be treated in the strictest confidence.

If your participation in this study has raised any specific concerns about your health or the care you received, please contact the following associations and institutions, which may be able to support you Morocco Association of Family Planning (contact details depending on geographic location will be supplied), Feminine Solidarity Association (https://solfem.wordpress.com/home), National Institute of Solidarity with Women in Distress (https://www.insaf.ma), and INJAB Centre for reproductive health (+212 691 111100).

Finally, if you have any further questions or concerns, please feel free to contact Asmaa Habib (21422211@student.uwl.ac.uk) or Professor Rachid Bezad (r.bezad@um5s.net.ma).

Appendix 4.7. Debrief sheet for healthcare professionals

Thank you for taking the time to participate to this research project concerning the relationship between postpartum morbidity and postpartum care in Morocco. Thank you sharing your personal experience concerning postpartum care. Just to reiterate, all the information you have given me will be treated in the strictest confidence.

If your participation in this study has raised any specific concerns, please contact the following associations and see the attached websites that can provide you a support: the National Association of Midwives in Morocco (http://www.ansfm.org), the Morocco Association of Midwives (http://www.amsfmaroc.org/a-propos/mission-vision-objectifs), INJAB Centre for reproductive health (+212 691 111100), and the Royal Moroccan Society of Obstetric Gynecology (+212 22 30 49 71).

Finally, if you have any further questions or concerns, please feel free to contact Asmaa Habib (21422211@student.uwl.ac.uk) or Professor Rachid Bezad (r.bezad@um5s.net.ma).

Appendix 4.8. Research data management form

RESEARCH DATA MANAGEMENT STATEMENT

As a student or member of staff undertaking a research project, I understand that I am responsible for the following:

- Not collecting data prior to ethical approval.
- Maintaining accurate records of the methodologies used and the results obtained throughout the research project.
- Ensuring research data is kept in a manner that is compliant with legal obligations, the Research Ethics Code of Practice and the University Data Protection Policy and where applicable the requirements of funding and professional bodies.
- Ensuring backups of data and documents are made and updated at regular intervals during the research project.
- Ensuring anonymisation of research data containing personal information at the point of collection where possible. Where personal data cannot be anonymised, all identifying information must be removed from working files and kept separate in locked filing cabinets/files or secure password protected electronic folders. Working files must not contain identifying information.
- Transcribing all video and/or audio data using codes or pseudonyms for the identification of individuals.
- Ensuring the storage of confidential or personal data, particularly special category research data is treated with care and is made accessible only to authorised persons. Electronic folders containing personal data will be password protected. Electronic folders containing special category data will be encrypted **and** password protected. This relates to information concerning a subject's racial or ethnic origin, political opinions, religious beliefs, trade union activities, physical or mental health, sexual life, or details of criminal offences.
- Ensuring secure physical storage of personal and/or sensitive personal data in lockable cabinets.
- Not re-using data for a different purpose unless separate ethical approval is given.
- Ensuring secure disposal of research data in accordance with legal, ethical, research funder and collaborator requirements.
- Unless otherwise required, disposing of research data after the following periods
  - UG Students – to be destroyed once marks are ratified by the Assessment Board
  - PG Taught Students – as above unless the project is going to be published (in which case it should be retained for five years)
  - Staff and Research Students – after 10 years or five years after publication whichever is the greater.

Name: Asmaa Habib, Application ID: 21422211

Project title: The relationship between postpartum morbidity and postpartum care in Morocco

Appendix 4.9. Offsite ethics form

Psychology Department
School of Human and Social Sciences
Paragon House
Boston Manor Road
Brentford
TW8 9GA

Student : …….....

Supervisor: .....……

Project title: .....

Dear Sir/Madam,

Thank you for agreeing to allow the above-named student to conduct their dissertation research in your organisation. The dissertation is an independent research project conducted by a student researcher under the supervision of the named member of staff above. Dissertations are the most substantial piece of work required for students to achieve their British Psychological Society accredited psychology degree. The cooperation of organisations such as yours can be vital in

allowing students access to real world situations in which they can conduct research and we would like to thank you for your willingness to allow this research to proceed.

Please note that a second copy of this letter is attached. So we can ensure students only conduct research in organisations where approval has been given, we would appreciate it if you would complete the bottom section of this letter on both copies and return one copy to us either by post or via the student concerned. Please keep the other signed copy for your own records.

Any queries about the project or the university's involvement and responsibilities can be directed to the supervisor named above who provides guidance to the student researcher; has responsibility for overseeing the project from an ethical perspective (following ethical standards set by the British Psychological Society); and is expected to oversee the research to ensure an appropriate standard of work is achieved.

Yours faithfully,

To be completed by the individual approving research within the external organisation

This is to confirm that the student named above has permission to conduct his/her dissertation research in association with this organisation.

Name: .....

Position: .....

Organisation: .....

Signature: ..... Date: .....

Appendix 5.1. Distribution of women sociodemographic characteristics

Characteristics	Frequency (n)	Percent (%)
Maternal age_V1		
15-19	96	1.7
20-24	808	14.4
25-29	1386	24.8
30-34	1342	24.0
35-39	1178	21.1
40-44	623	11.1
45-49	160	2.9
Maternal age_V2		
15-29	2289	40.9
30-39	2520	45.1
40-49	783	14.0
Maternal education		
No formal education	3235	57.8
Primary	1835	32.8
Secondary and higher	523	9.4
Partner education level (3 categories)		
Primary	1851	44.0
Preliminary/Moderate	1133	27.0
Secondary and Higher	1220	29.0
Maternal employment status		
Unemployed	5035	90.0
Employed	558	10.0
Socioeconomic status		
Poorest	1275	22.8
Poorer	1146	20.5
Middle	1167	20.9
Richer	1128	20.2
Richest	876	15.7
Marital status		
Married	5452	97.5
Widow	41	0.7
Divorced	72	1.3
Separated	28	0.5

Appendix 5.2. Distribution of women's environmental characteristics

Characteristics	Frequency (n)	Percent (%)
Place of residence		
Urban	3128	55.9
Rural	2464	44.1
Regions		
Tangier-Tétouan- Al Hoceima	642	11.5
Oriental	389	7.0
Fès- Meknès	706	12.6
Rabat - Salé -Kénitra	675	12.1
Béni Mellal -Khénifra	391	7.0
Casablanca- Settat	1031	18.4
Marrakech-Safi	869	15.5
Drâa-Tafilalet	282	5.0
Souss-Massa	446	8.0
Guelmim-Oued Noun	65	1.2
Laâyoune – Sakia El Hamra	73	1.3
Dakhla – Oued ed Dahab	23	0.4
Regions		
Northern	2024	36.2
Central	3408	60.9
Southern	161	2.9
Long distance from a health facility preventing LPPC uptake		
Yes	122	2.8
No	4251	97.2

Appendix 5.3. Distribution of women's obstetric characteristics

Characteristics	Frequency (n)	Percent (%)
Postpartum morbidities		
No	4010	71.7
Yes	1583	28.3
PPC uptake before discharge from health facility		
Yes	3000	53.6
No	1792	32.0
PPC uptake within 6 weeks after birth (LPPC)		
Yes	1219	21.8
No	4372	78.2
Person providing LPPC		
Doctor	668	54.8
Nurse or midwife	547	44.9
Traditional midwife	2	0.1
Another person	3	0.2
Place where LPPC was provided_V1		
Public hospital	160	13.1
Public health centre/ delivery centres	487	40.0
Private clinic	187	15.4
Private surgery (with doctor)	368	30.2
Home	15	1.2
Place where LPPC was provided_V2		
Public health facility	647	53.2
Private health facility	555	45.6
Home	15	1.2
Antenatal care visit		
Yes	4928	88.1
No	664	11.9
Number of ANC visit (3 categories)		
0 visit	701	12.5
1 to 3 visit(s)	1926	34.4
4 visits or more	2966	53.0
Number of ANC visit (4 categories)		
0 visit	701	12.5
1 to 3 visit(s)	1926	34.4
4 visits	1207	21.6
More than 4 visits	1759	31.4
Healthcare professional who provided antenatal care		
Doctor	2288	46.4
Nurses or midwives	921	18.7
Doctor and nurses or midwives	1712	34.7
Traditional midwives	7	0.1
Mode of delivery		
Vaginal delivery	1835	38.2
Vaginal delivery assisted by instruments	1966	40.9
Caesarean delivery	1008	21.0
Wanted caesarean		
Before the labour or by necessity	567	56.1
After the beginning of labour pain	346	34.2
Optional decision	97	9.6
Birth attendant		
Doctors	1053	18.8
Nurses or midwives	3051	54.5
Doctor and nurses or midwives	707	12.6
Traditional midwives	440	7.9

Relatives or friend or neighbours	290	5.2
Another person	31	0.5
Nobody	23	0.4
Place of delivery		
Home	770	13.8
Public hospital	3162	56.8
Delivery centre or health centre	760	13.7
Private clinic	811	14.6
Private surgery	62	1.1
Place of delivery		
Health facility	4795	86.2
Home	770	13.8
Type of health facility governance		
Public	3922	81.8
Private	873	18.2
Length of stay in the health facility after birth		
Less than a day (hours)	461	9.6
From 1 day to 7 days	4278	89.3
A week or more	53	1.1

Appendix 5.4. Distribution of other determinants

Determinants	Frequency (n)	Percent (%)
Reasons of computer usage		
Study	94	1.7
Work	90	1.6
Web navigation	474	8.5
Other	14	0.2
No usage of computer	4621	82.7
Never heard about computer	294	5.3
Computer usage only		
Study	94	14.0
Work	90	13.4
Web navigation	474	70.6
Other	14	2.0
Person deciding of women's employment status		
Women only	436	16.0
Husband only	1351	49.7
Women and husband together	902	33.1
Someone else	29	1.1
Do not know	3	0.1
Postpartum morbidity		
Acute vaginal haemorrhage	264	16.7
Oedema and feet pain	228	14.4
Smelly vaginal discharge with fever	187	11.8
Pelvic pain with fever	426	26.9
Lower back pain with fever	443	28.0
Dorsal pain with fever	243	15.4
Urinary burning with fever	337	21.3
Pain and swelling mammary with fever	817	51.6
Other	237	15.0
Frequency of PPM per women within six weeks after delivery		
No morbidities	4010	71.1
1 morbidity	879	15.7
2 morbidities	311	5.6
3 morbidities	149	2.7
4 morbidities	107	1.9
5 morbidities	67	1.2
6 morbidities	35	0.6
7 morbidities	23	0.4
8 morbidities	8	0.1
9 morbidities	4	0.1
Postpartum morbidities (all types)		
No	4010	71.7
Yes	1583	28.3
Last antenatal care location		
Public hospital	275	5.6
Health centre/delivery centres	1809	36.8
Private clinic	200	4.1
Private surgery	2618	53.3
Home	9	0.2
Last antenatal care location_ type of governance		
Public health facility	2085	42.5
Private health facility	2818	57.5
Contraception usage		
Yes	4404	87.1
No	654	12.9

Contraception means		
Pill	3219	73.1
Intrauterine device	244	5.5
Injectable	63	1.4
Condom	150	3.4
Vaginal diaphragm/ cream or jelly	10	0.2
Female sterilisation	38	0.9
Prolonged breastfeeding	105	2.4
Calendar method	322	7.3
Withdrawal	252	5.7
Other	2	0.0
Breastfeeding		
Yes	5432	97.1
No	161	2.9
Start of breastfeeding after childbirth		
Immediately	2403	44.2
Hours	2300	42.3
Days	729	13.4
Postnatal care for babies before discharge		
Yes	3239	67.8
No	1536	32.2
Postnatal care for babies during the six weeks after delivery		
Yes	1981	35.5
No	3601	64.5
Frequency of morbidities during pregnancy per women		
No morbidities	3092	55.3
1 morbidity	1041	18.6
2 morbidities	542	9.7
3 morbidities	378	6.8
4 morbidities	246	4.4
5 morbidities	160	2.9
6 morbidities	82	1.5
7 morbidities	33	0.6
8 morbidities	18	0.3
9 morbidities	2	0.0
Health issue during pregnancy		
Yes	2501	44.7
No	3092	55.3
Morbidities during pregnancy		
Abnormal face, fingers, and foot swelling	1195	47.8
Vaginal haemorrhage	243	9.7
Convulsions not caused by fever	195	7.8
Intense and persistent headache	824	33.0
Blurred vision	597	23.9
Intense pelvic pain	973	38.9
Difficult or fast breathing	846	33.8
Fever (higher than 38.5C°) and difficulty to stand up	515	20.6
Water breaks 6 hours before the beginning of the labour	531	21.2
Knowledge about breast and cervical cancers		
Yes	5293	94.6
No	299	5.4
Knowledge of breast and cervical cancers screening		
Yes	4937	93.3
No	357	6.7
Experience of cervical cancer screening		
Yes	538	10.2
No	4755	89.8
Place where the cervical screening was delivered		
Health centre or delivery centre	245	45.5

Private surgery or clinic	268	49.8
Another place	26	4.8
Time left after the last cervical cancer screening		
Less than three years	399	74.1
More than three years	139	25.7
Do not know	1	0.2

Appendix 5.5. Associations between other determinants and EPPC

Determinants	EPPC No (%)	EPPC Yes (%)	OR (95% CI)	P-value
Computer usage_V1				
Never heard about it	40.8	59.2	1	
Study	26.8	73.2	1.88 (1.08-3.30)	0.03
Work	12.0	88.0	5.07 (2.49-10.32)	< 0.01
Web navigation	25.0	75.0	2.07 (1.42-3.03)	< 0.01
Other	37.9	62.1	1.13 (0.31-4.10)	0.85
No usage of computer	39.5	60.5	1.06 (0.77-1.46)	0.74
Computer uasage_V2				
No	39.5	60.5	1	
Never heard about it	40.8	59.2	0.95 (0.69-1.31)	0.74
Yes	23.7	76.3	2.11 (1.74-2.55)	< 0.01
Person deciding of women's employment status				
Women only	43.0	57.0	1	
Husband only	38.5	61.5	1.21 (0.95-1.53)	0.12
Women and husband together	37.4	62.6	1.26 (1.05-1.53)	0.02
Someone else	62.9	37.1	0.45 (0.20-1.01)	0.05
Last antenatal care location				
Public hospital	37.4	62.6	1	
Health centre/delivery centres	39.7	60.3	0.91 (0.69-1.19)	0.48
Private clinic	26.0	74.0	1.70 (1.13-2.56)	0.01
Private surgery	35.2	64.8	1.10 (0.84-1.43)	0.48
Home	32.3	67.7	1.25 (0.10-16.50)	0.86
Last antenatal care location_ type of governance				
Public health facility	39.4	60.6	1	
Private health facility	34.6	65.4	1.23 (1.09-1.39)	< 0.01
Health issue during pregnancy				
No	34.8	65.2	1	
Yes	40.5	59.5	0.79 (0.70-0.88)	< 0.01
Number of morbidities during pregnancy per women				
No morbidities	34.8	65.2	1	
1 morbidity	36.5	63.5	0.93 (0.79-1.09)	0.35
2 morbidities	43.0	57.0	0.71 (0.58-0.86)	< 0.01
3 morbidities	43.7	56.3	0.69 (0.55-0.87)	< 0.01
4 morbidities	44.7	55.3	0.66 (0.50-0.87)	< 0.01
5 morbidities	36.3	63.7	0.94 (0.66-1.33)	0.71
6 morbidities	58.0	42.0	0.39 (0.24-0.63)	< 0.01
7 morbidities	41.4	58.6	0.76 (0.36-1.61)	0.47
8 morbidities	34.1	65.9	1.03 (0.36-2.98)	0.96
9 morbidities	33.3	66.7	1.07 (0.05-24.98)	0.97
Postnatal care before discharge from the health facility				
No	84.5	15.5	1	
Yes	15.0	85.0	30.88 (26.09-36.55)	< 0.01
Postnatal care during the 6 weeks after discharge				
No	43.7	56.3	1	
Yes	26.3	73.7	2.17 (1.91-2.47)	< 0.01
Knowledge about breast and cervical cancers				
No	44.1	55.9	1	
Yes	37.1	62.9	1.34 (1.02-1.77)	0.04
Knowledge of breast and cervical cancers screening				
No	37.5	62.5	1	
Yes	37.1	62.9	1.02 (0.79-1.31)	0.90
Experience of cervical screening cancer				
No	37.7	62.3	1	
Yes	31.7	68.3	1.31 (1.07-1.60)	0.01

Cervical screening was delivered				
Health centre or delivery centre	36.3	63.7	1	
Private surgery or clinic	28.7	71.3	1.41 (0.96-2.08)	0.08
Other places	23.2	76.8	1.88 (0.71-5.00)	0.21
Time left after the last cervical cancer screening				
Less than three years	31.3	68.7	1	
More than three years	33.3	66.7	0.91 (0.60-1.39)	0.67
Contraception				
No	36.7	63.3	1	
Yes	37.3	62.7	0.98 (0.81-1.18)	0.81
Breastfeeding				
No	39.6	60.4	1	
Yes	37.3	62.7	1.10 (0.78-1.54)	0.58
PPM				
No	34.8	65.2	1	
Yes	44.1	55.9	0.68 (0.60-0.77)	< 0.01
Number of PPM per women within six weeks after delivery				
No morbidities	34.8	65.2	1	
1 morbidity	40.5	59.5	0.78 (0.67-0.92)	<0.01
2 morbidities	39.3	60.7	0.83 (0.64-1.07)	0.15
3 morbidities	57.5	42.5	0.39 (0.28-0.56)	<0.01
4 morbidities	58.9	41.1	0.37 (0.24-0.57)	<0.01
5 morbidities	50.6	49.4	0.52 (0.30-0.90)	0.02
6 morbidities	49.7	50.3	0.54 (0.26-1.13)	0.10
7 morbidities	80.7	19.3	0.13 (0.03-0.51)	<0.01
8 morbidities	32.5	67.5	1.11 (0.17-7.37)	0.92
9 morbidities	37.9	62.1	0.88 (0.10-7.58)	0.90
Acute vaginal haemorrhage/ *Vaginal discharge*				
No	36.9	63.1	1	
Yes	47.2	52.8	0.66 (0.49-0.87)	< 0.01
Oedema and feet pain				
No	36.8	63.2	1	
Yes	52.8	47.2	0.52 (0.39-0.70)	< 0.01
Smelly vaginal discharge with fever				
No	36.9	63.1	1	
Yes	51.4	48.6	0.55 (0.40-0.77)	< 0.01
Pelvic pain with fever				
No	36.2	63.8	1	
Yes	51.1	48.9	0.54 (0.44-0.68)	< 0.01
Lower back pain with fever				
No	36.4	63.6	1	
Yes	48.5	51.5	0.61 (0.49-0.75)	< 0.01
Dorsal pain with fever				
No	36.7	63.3	1	
Yes	52.6	47.4	0.52 (0.39-0.70)	< 0.01
Urinary burning with fever				
No	36.6	63.4	1	
Yes	49.8	50.2	0.58 (0.46-0.74)	< 0.01
Pain and swelling mammary with fever				
No	36.0	64.0	1	
Yes	45.2	54.8	0.68 (0.58-0.80)	< 0.01
Other symptoms related to the delivery				
No	37.2	62.8	1	
Yes	40.7	59.3	0.87 (0.65-1.15)	0.32

Appendix 5.6. Associations between other predictors and PPC within six weeks after delivery (LPPC)

Determinants	LPPC uptake NO (%)	LPPC uptake YES (%)	OR (95% CI)	P-value
Computer usage_V1				
Never heard about it	82.6	17.4	1	
Study	60.1	39.9	3.16 (1.89-5.26)	< 0.01
Work	52.3	47.7	4.35 (2.60-7.26)	< 0.01
Web navigation	58.4	41.6	3.38 (2.38-4.82)	< 0.01
Other	93.3	6.7	0.34 (0.04-2.91)	< 0.01
No usage of computer	80.8	19.2	1.13 (0.83-1.55)	< 0.01
Computer uasage_V2				
No	80.8	19.2	1	
Never heard about it	82.6	17.4	0.88 (0.65-1.20)	0.43
Yes	58.6	41.4	2.97 (2.51-3.52)	< 0.01
Person deciding of women's employment status				
Women only	80.3	19.7	1	
Husband only	74.1	25.9	0.71 (0.55-0.91)	< 0.01
Women and husband together	78.1	21.9	1.14 (0.93-1.40)	0.22
Someone else	76.2	23.8	1.27 (0.53-3.02)	0.59
Place of the last ANC				
Public hospital	77.9	22.1	1	
Public health centre/delivery centres	79.7	20.3	0.90 (0.66-1.22)	0.49
Private clinic	58.7	41.3	2.48 (1.66-3.70)	< 0.01
Private surgery	75.4	24.6	1.15 (0.85-1.54)	0.37
Home	100.0	0.0		
Place of the last antenatal care				
Public health facility	79.5	20.5	1	
Private health facility	74.3	25.7	1.34 (1.17-1.54)	<0.01
Health issue during pregnancy				
No	21.8	78.2	1	
Yes	21.7	78.3	0.99 (0.87-1.13)	0.90
Frequency of morbidities during pregnancy per women				
No morbidities	78.2	21.8	1	
1 morbidity	78.0	22.0	1.01 (0.85-1.20)	0.92
2 morbidities	80.3	19.7	0.88 (0.70-1.11)	0.28
3 morbidities	77.6	22.4	1.04 (0.80-1.34)	0.79
4 morbidities	78.0	22.0	1.01 (0.74-1.38)	0.95
5 morbidities	78.0	22.0	1.01 (0.69-1.49)	0.95
6 morbidities	76.3	23.7	1.11 (0.67-1.87)	0.68
7 morbidities	71.4	28.6	1.44 (0.67-3.07)	0.35
8 morbidities	65.2	34.8	1.91 (0.72-5.10)	0.20
9 morbidities	100.0	0.0		
Postnatal care before discharge				
No	89.4	10.6	1	
Yes	71.2	28.8	3.43 (2.87-4.10)	< 0.01
Postnatal care during the 6 weeks after delivery				
No	90.9	9.1	1	
Yes	55.2	44.8	8.07 (6.99-9.32)	< 0.01
Knowledge about breast and cervical cancers				
No	82.7	17.3	1	
Yes	77.9	22.1	1.35 (1.00-1.83)	0.05

Knowledge of breast and cervical cancers screening				
No	71.9	28.1	1	
Yes	78.4	21.6	0.71 (0.56-0.90)	<0.01
Experience of cervical screening cancer				
No	79.1	20.9	1	
Yes	68.0	32.0	1.78 (1.46-2.16)	<0.01
Cervical screening location				
Health centre or delivery centre	72.8	27.2	1	
Private surgery or clinic	62.9	37.1	1.58 (1.09-2.30)	0.02
Other places	75.0	25.0	0.89 (0.35-2.27)	0.81
Use of contraception				
No	76.0	24.0	1	
Yes	78.2	21.8	0.88 (0.73-1.07)	0.20
Breastfeeding				
No	77.5	22.5	1	
Yes	78.2	21.8	0.96 (0.66-1.40)	0.83
PPM				
No	79.8	20.2	1	
Yes	74.0	26.0	1.39 (1.22-1.60)	< 0.01
Frequency of PPM per women within six weeks after delivery				
No morbidities	79.9	20.1	1	
1 morbidity	73.1	26.9	1.46 (1.23-1.73)	<0.001
2 morbidities	73.1	26.9	1.46 (1.12-1.90)	0.01
3 morbidities	76.0	24.0	1.25 (0.85-1.84)	0.25
4 morbidities	75.4	24.6	1.30 (0.83-2.03)	0.26
5 morbidities	78.0	22.0	1.12 (0.62-2.00)	0.71
6 morbidities	77.9	22.1	1.12 (0.50-2.50)	0.78
7 morbidities	84.0	16.0	0.76 (0.25-2.30)	0.62
8 morbidities	61.5	38.5	2.48 (0.61-10.13)	0.21
9 morbidities	100.0	0.0		
Acute vaginal haemorrhage				
No	78.4	21.6	1	
Yes	74.2	25.8	1.26 (0.95-1.67)	0.11
Oedema and feet pain				
No	78.3	21.7	1	
Yes	75.0	25.0	1.20 (0.89-1.64)	0.24
Smelly vaginal discharge with fever				
No	78.3	21.7	1	
Yes	76.5	23.5	1.11 (0.79-1.56)	0.56
Pelvic pain with fever				
No	78.6	21.4	1	
Yes	73.5	26.5	1.32 (1.05-1.65)	0.02
Lower back pain with fever				
No	78.2	21.8	1	
Yes	77.3	22.7	1.06 (0.84-1.34)	0.63
Dorsal pain with fever				
No	78.3	21.7	1	
Yes	76.2	23.8	1.12 (0.83-1.52)	0.46
Urinary burning with fever				
No	78.4	21.6	1	
Yes	74.6	25.4	1.24 (0.96-1.60)	0.10
Pain and swelling mammary with fever				
No	78.1	21.9	1	
Yes	78.8	21.2	0.96 (0.80-1.15)	0.66
Other symptoms related to the delivery				
No	78.9	21.1	1	
Yes	62.4	37.6	2.25 (1.72-2.95)	< 0.01

Appendix 5.7. Associations between other predictors and postpartum morbidities (PPM)

Determinants	PPM No (%)	PPM Yes (%)	OR (95% CI)	P-value
Computer usage_V1				
Never heard about it	78.3	21.7	1	
Study	70.4	29.6	1.52 (0.90-2.56)	0.12
Work	79.6	20.4	0.93 (0.52-1.66)	0.79
Web navigation	76.0	24.0	1.14 (0.81-1.62)	0.45
Other	86.7	13.3	0.56 (0.11-2.71)	0.47
No usage of computer	70.6	29.4	1.50 (1.13-2.00)	0.01
Computer uasage_V2				
No	70.6	29.4	1	
Never heard about it	78.3	21.7	0.67 (0.50-0.89)	0.01
Yes	75.9	24.1	0.76 (0.63-0.92)	0.01
Person deciding of women's employment status				
Women only	64.5	35.5	1	
Husband only	73.2	26.8	0.66 (0.52-0.84)	< 0.01
Women and husband together	63.9	36.1	1.03 (0.86-1.22)	0.77
Someone else	62.9	37.1	1.07 (0.50-2.30)	0.86
Last antenatal care location				
Public hospital	59.0	41.0	1	
Health centre/delivery centres	74.8	25.2	0.48 (0.37-0.63)	< 0.01
Private clinic	73.7	26.3	0.51 (0.35-0.76)	< 0.01
Private surgery	71.0	29.0	0.59 (0.46-0.76)	< 0.01
Home	49.3	50.7	1.48 (0.40-5.43)	0.56
Last antenatal care location- type of governance				
Public health facility	72.7	27.3	1	
Private health facility	71.2	28.8	1.08 (0.95-1.22)	0.24
Health issue during pregnancy				
No	84.2	15.8	1	
Yes	56.3	43.7	4.12 (3.64-4.67)	< 0.01
Frequency of morbidities during pregnancy				
No morbidities	84.2	15.8	1	
1 morbidity	71.0	29.0	2.17 (1.84-2.56)	< 0.01
2 morbidities	52.0	48.0	4.90 (4.04-5.95)	< 0.01
3 morbidities	47.5	52.5	5.88 (4.70-7.36)	< 0.01
4 morbidities	42.3	57.7	7.25 (5.53-9.50)	< 0.01
5 morbidities	42.2	57.8	7.28 (5.24-10.11)	< 0.01
6 morbidities	27.4	72.6	14.05 (8.57-23.04)	< 0.01
7 morbidities	27.3	72.7	14.18 (6.55-30.71)	< 0.01
8 morbidities	25.5	74.5	15.53 (5.31-45.37)	< 0.01
9 morbidities	12.2	87.8	38.39 (0.41-3612.87)	0.12
Postnatal care before discharge				
No	67.0	33.0	1	
Yes	74.2	25.8	0.71 (0.62-0.81)	< 0.01
Postnatal care during the 6 weeks after delivery				
No	72.4	27.6	1	
Yes	70.4	29.6	1.10 (0.98 -1.25)	0.11
Heard about breast and cervical cancers				
No	69.7	30.3	1	
Yes	71.8	28.2	0.90 (0.70-1.16)	0.42
Knowledge of breast and cervical cancers screening				
No	74.2	25.8	1	
Yes	71.6	28.4	1.14 (0.89-1.45)	0.31
Experience of cervical screening cancer				
No	72.1	27.9	1	

Yes	69.2	30.8	1.15 (0.95-1.40)	0.16
Place where the cervical screening was delivered				
Public health facility	67.5	32.5	1	
Private health facility	70.2	29.8	0.88 (0.61-1.29)	0.52
Other places	75.2	24.8	0.69 (0.27-1.74)	0.43
Time left after the last cervical cancer screening				
Less than three years	68.9	31.1	1	
More than three years	69.6	30.4	0.97 (0.64-1.48)	0.89
Contraception usage				
No	67.3	32.7	1	
Yes	72.5	27.5	0.78 (0.66-0.93)	0.01
Breastfeeding				
No	62.1	37.9	1	
Yes	72.0	28.0	0.64 (0.46-0.88)	0.01

Appendix 6.1. Selection process of independent variables analysed with the logistic regression

	Removed at step 1 (Duplicate info)	Removed at step 2 (Missing data)	Removed at step 3 (Univariate analyses)	Removed at step 4 (Multicollinearity diagnostic test)	Selected for PPC before discharge	Selected for LPPC	Selected for PPM
- women's age (3 categories)			x		X	X	X
- women's education (3 categories)					X	X	X
- women's partner education (3 categories)		X					
- women's occupation status			x		X	X	
- socioeconomic status					X	X	X
- marital status			x (for each outcome)				
- place of residence					X	X	X
- regions (12 categories)			x				
- regions (3 categories)	X						
- long distance from a HF preventing LPPC uptake			x NF X				
- LPPC location V1 (5 categories)			X x		x		
- LPPC location V2 (3 categories)	X						
- LPPC provider V1			X x		x		
- LPPC provider V2 (dichotomous)	X						
- Reasons for not using LPPC			X	Linear regression did not work when this variable is included			
- ANC visit (dichotomous)	X						
- ANC visit frequency (3 categories)	X						
- ANC visit frequency (4 categories)					x	x	x
- ANC provider			x	x			
- Mode of delivery		x			x	x	x
- wanted caesarean			x	Linear regression did not work when this variable is included			
- SBA (all types)			x		x	x	
- SBA (dichotomous)	X						
- Place of delivery (all types)					x	x	x

	Removed at step 1 (Duplicate info)	Removed at step 2 (Missing data)	Removed at step 3 (Univariate analyses)	Removed at step 4 (Multicollinearity diagnostic test)	Selected for PPC before discharge	Selected for LPPC	Selected for PPM
- HF governance			x		x	x	
- length of stay in HF after childbirth				X x x			
- PPM frequency			x		x	x	
- Acute vaginal haemorrhage	X						
- oedema and feet pain	X						
- smelly vaginal discharge	X						
- pelvic pain with fever			x		x	x	
- lower back pain with fever	X						
- dorsal pain with fever	X						
- urinary burning with fever	X						
- pain and swelling mammary with fever	X						
- other symptoms related to the delivery			x x			x	
- Computer usage V1 (6 categories)				X x x			
- computer usage V2 (3 categories)	X						
- person deciding for women's occupation status		X					
- last ANC location V1 (5 categories)				x x			x
- last ANC visit location V2 (public/private)	X						
- Morbidity during pregnancy	X						
- frequency of morbidities during pregnancy			X		x		x
- PNC before discharge from HF					x	x	x
- PNC within 6 weeks after birth			x		x	x	
knowledge about breast and cervical cancers			x x	**X (excluded by SPSS)**			
knowledge about breast and cervical screening			x x	x			
experience of cervical screening			x		x	x	
- cervical screening location			X x				
- time left after the last cervical screening			**X (for each)**				
- contraception usage		X	X x				x
- breastfeeding			X x				

			x				
- PPC before discharge			NF				x
- LPPC			x NF		X		x
- PPM	x not necessary as info in PPM frequency						

Caption:

PPM: postpartum morbidities, LPPC: later postpartum care, PPC: postpartum care, PNC: postnatal care for baby, HF: health facility, ANC: antenatal care, SBA: skilled birth attendant, NF: not feasible