

**Investigating antenatal care services, intimate
partner violence and non-psychotic mental
health disorders among postpartum women in
Rwanda**

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Gothenburg 2018

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ISBN 978-91-7833-065-2 (PRINT)
ISBN 978-91-7833-066-9 (PDF)
Printed in Gothenburg, Sweden 2018
Printed by BrandFactory

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ABSTRACT

Background: Although maternal mortality has decreased in the past years and more women visit antenatal care (ANC) services during pregnancy in Rwanda, initiation and completion of the recommended number of visits remain a problem. It has also been suggested that the quality of health care pregnant women receive may be inadequate and that some maternal conditions may be overlooked.

Aims: The aim of this thesis is to investigate pregnant women's attendance and timing of ANC visits and the occurrence of intimate partner violence (IPV) with associated factors. A further aim is to investigate the prevalence of non-psychotic mental health disorders (MHDs) during pregnancy and after childbirth and to what extent violence exposure would contribute to poor mental health. Healthcare providers' (HCPs) practices in prevention, detection and management of maternal conditions were investigated quantitatively including patients' records (quality control sub-study).

Methods: Studies were cross-sectional population and facility based. Data collection was performed using an interviewer-administered questionnaire. Simple random sampling was done to select villages and households. In total, 921 women who gave birth ≤ 13 months before being interviewed were included. Additionally, 312 HCPs were interviewed and

605 ANC medical records were scrutinized by use of a structured observation checklist. For the analyses, descriptive statistics and bi- and multivariable logistic regression modeling were used.

Results: In total, 22% of participants did not make any visit to ANC services during the first trimester of pregnancy while 54% did not complete the WHO recommended four visits. The prevalence rates of physical, sexual, psychological violence and controlling behaviour during pregnancy were 10.2%, 9.7%, 17.0% and 20.0%, respectively. Usage of ANC services was less common among pregnant women reporting exposure to controlling behaviour (AOR) 1.93 (95% CI: 1.34, 2.79). Generalized anxiety disorder, suicide ideation and PTSD were reported by 19.7%, 10.8% and 8.0% of the women, respectively. Exposure to all individual forms of IPV during pregnancy was associated with each of the non-psychotic MHDs investigated. HCPs failed to mention a number of pregnancy-related conditions that, according to WHO recommendations, need urgent referral to a higher level of health care. Of the ANC medical records that were checked, there was no report on tetanus immunization in 12%, of anthelmintic treatment in 13% and of syphilis testing in 15%.

Conclusions: There are numerous deficiencies in utilization and quality of ANC services in Rwanda. Strategies aimed at improving awareness of ANC services and early identification and prevention of violence and MHDs should be enhanced at all levels of care in Rwanda. Both IPV and MHDs may be integrated into guidelines for perinatal care. Finally, HCPs need to be educated and trained in a consistent manner in order to be able to provide quality ANC services.

Keywords: antenatal care, intimate partner violence, non-psychotic mental health disorders, pregnancy, quality of care, Rwanda

ISBN: 978-91-7833-065-2 (PRINT)

ISBN: 978-91-7833-066-9 (PDF)

SAMMANFATTNING PÅ SVENSKA

Bakgrund: Trots att mödradödligheten har minskat under de senaste åren i Rwanda och att fler gravida kvinnor besöker mödrahälsovården är antalet besök per gravid kvinna fortfarande otillfredsställande. Det har även visat sig att kvaliteten i vården av gravida kvinnor är inadekvat, och att vissa allvarliga tillstånd under graviditet riskerar att missas.

Syfte: Att undersöka antal besök gravida kvinnor gör inom mödrahälsovården och hur dessa besök förläggs i tid under graviditeten. Vidare att undersöka förekomst av olika former av partnervåld och eventuella samband med psykosociala faktorer. Ett annat syfte var att undersöka förekomst av icke-psykotiska psykiska sjukdomar hos gravida och nyförlösta mödrar och samband med utsatthet för partnervåld. Hälsopersonalens arbetssätt vad gäller preventiva insatser, upptäckt och behandling av olika allvarliga tillstånd under graviditeten undersöktes samt kvaliteten i form av om vissa specificerade åtgärder uppgetts i medicinska journaler.

Metod: Tvärsnittsstudie, populationsbaserad, där data insamlades med hjälp av intervjuer enligt ett strukturerat frågeformulär. Slumpmässigt urval av byar, hushåll och deltagare gjordes utifrån särskilda kriterier. Totalt intervjuades 921 kvinnor som fött barn under de senaste 13 månaderna. Även hälso- och sjukvårdspersonal, d.v.s. 312 sjuksköterskor och barnmorskor, intervjuades och 605 medicinska journaler granskades efter en strukturerad checklista. I analyserna användes beskrivande statistik och modellering för bi- och multivariabla logistiska regressioner.

Resultat: Totalt 22 % av deltagarna (gravida kvinnor) gjorde inte något besök i mödrahälsovården under den första trimestern av graviditeten och 54 % fullgjorde inte de av WHO rekommenderade fyra besöken. Utsatthet för fysiskt, sexuellt och psykologiskt våld och kontrollerande beteende under graviditet drabbade 10.2 %, 9.7 %, 17.0 % respektive 20.0 %. Gravida kvinnor utsatta för kontrollbeteenden sökte i mindre utsträckning förebyggande mödrahälsovård (AOR) 1.93 (95 % CI: 1.34, 2.79). Generaliserat ångestsyndrom, suicidtankar och PTSD rapporterades av 19.7 %, 10.8 % respektive 8.0 % av deltagarna. Utsatthet för fysiskt,

psykiskt eller sexuellt våld av en partner under graviditeten visade samband med alla de psykiska tillstånden som undersöktes. Hälso- och sjukvårdspersonalen uttryckte osäkerhet kring vilka allvarliga tillstånd under graviditet, definierade av WHO, som kräver omedelbar remiss till sjukhus för klinisk handläggning. Av de genomgångna medicinska journalerna saknades anteckning om vaccinationer (12 %), behandling mot maskinfektion (13 %) och syfilistestning (15 %).

Konklusion: Den förebyggande mödrahälsovården i Rwanda kan förbättras ur flera aspekter. Strategier för att öka medvetenheten om nyttan av mödrahälsovård och tidig identifiering av våld och psykisk ohälsa behöver förbättras i Rwanda. Hälso- och sjukvårdspersonal likaväl som unga kvinnor behöver medvetandegöras och preventiva insatser utvecklas. I regelverket som föreskriver hur mödrahälsovård ska bedrivas bör det finnas instruktioner om att fråga om såväl partnervåld som psykisk ohälsa under graviditet. Hälso- och sjukvårdspersonalen behöver utbildning och återkommande fortbildning så att kvaliteten förbättras i omhändertagandet inom mödrahälsovården.

LIST OF PAPERS

This thesis is based on the following studies, referred to in the text by their Roman numerals.

- I. Rurangirwa AA, Mogren I, Nyirazinyoye L, Ntaganira J, Krantz G. Determinants of poor utilization of antenatal care services among recently delivered women in Rwanda; a population based study. *BMC Pregnancy and Childbirth* (2017) 17:142 DOI 10.1186/s12884-017-1328-2
- II. Rurangirwa AA, Mogren I, Ntaganira J, Krantz G. Intimate partner violence among pregnant women in Rwanda, its associated risk factors and relationship to ANC services attendance: a population-based study. *BMJ Open* 2017; 7:e013155 doi: 10.1136/bmjopen-2016-013155, Open access
- III. Rurangirwa AA, Mogren I, Ntaganira J, Govender K, Krantz G. Intimate Partner Violence during Pregnancy in Relation to Non-Psychotic Mental Health Disorders in Rwanda: A Cross-Sectional Population-Based Study. (In press)
- IV. Rurangirwa AA, Mogren I, Ntaganira J, Govender K, Krantz G. Quality of Antenatal Care Services in Rwanda: Assessing Practices of Health Care Providers. (Submitted manuscript)

CONTENT

ACRONYMS AND ABBREVIATIONS	IV
DEFINITIONS IN SHORT	V
1 INTRODUCTION	1
1.1 Antenatal care (ANC) services in Rwanda	3
1.2 Intimate partner violence (IPV).....	6
1.3 Intimate partner violence (IPV) and Maternal Health.....	7
1.4 Non-psychotic Mental Health Disorders (MHDs) and Maternal Health.....	9
1.5 Pregnancy-related or concurrent conditions.....	10
1.6 Theoretical framework	12
1.7 Conceptual framework for poor quality and utilization of Antenatal care (ANC) services, Intimate partner violence (IPV) and non-psychotic Mental Health Disorders (MHDS).....	14
1.8 Thesis rationale	17
1.9 Scientific methods	18
1.9.1 Quantitative methods.....	18
2 AIMS	20
2.1 General aims.....	20
2.2 Specific aims	20
3 MATERIALS AND METHODS	21
3.1 Studies I-III	23
3.1.1 Design, target population, sample size and participants selection.....	23
3.1.2 Data collection.....	24
3.1.3 Variables	24
3.1.4 Instruments	26
3.2 Study IV	27
3.2.1 Design, target population, sample size and participants selection.....	27
3.2.2 Instruments and Data collection	28

3.2.3 Variables.....	28
3.3 Data analyses.....	30
3.4 Ethical considerations	31
4 RESULTS	33
4.1 Determinants of poor utilization of Antenatal care (ANC) services among recently delivered women in Rwanda; a population based study (Paper I).....	33
4.2 Intimate partner violence (IPV) among pregnant women in Rwanda, its associated risk factors and relationship to Antenatal care (ANC) services: a population based study (Paper II).....	34
4.3 Intimate partner violence (IPV) during pregnancy in relation to non-psychotic Mental health disorders (MHDs) in Rwanda a cross-sectional population based study (Paper III).....	36
4.4 Quality of antenatal care (ANC) services in Rwanda: assessing practices of Healthcare providers (Paper IV).....	37
5 DISCUSSION	40
5.1 Usage and timing of Antenatal care (ANC) services and socio-demographic and psychosocial factors associated with low or no attendance.....	41
5.2 Prevalence of Intimate partner violence (IPV) and associated factors	42
5.3 Relationship of Intimate partner violence (IPV) with Antenatal care (ANC) services attendance.....	44
5.4 Prevalence of non-psychotic Mental Health Disorders (MHDs) during pregnancy and after childbirth.....	45
5.5 Association between Intimate partner violence (IPV) exposure during pregnancy and non- psychotic Mental Health Disorders (MHDs) during pregnancy and after child birth.....	46
5.6 Health care providers’ (HCPs) practices in prevention, detection and management of maternal conditions	48
5.7 Methodological considerations	51
6 CONCLUSIONS AND IMPLICATIONS	54
6.1 Conclusions	54
6.2 Implications.....	55
7 FUTURE PERSPECTIVES	58
ACKNOWLEDGEMENT	59
REFERENCES	62

ACRONYMS AND ABBREVIATIONS

ANC	Antenatal care
AOR	Adjusted odds ratio
CHWs	Community health workers
CI	Confidence interval
HCPs	Health care providers
HICs	High-income countries
HIV	Human immunodeficiency virus
IPV	Intimate partner violence
LICs	Low-income countries
LMICs	Low and middle-income countries
MDG	Millennium development goals
MHDs	Mental health disorders
MINI	Mini International Neuropsychiatric Interview
NISR	National Institute of Statistics of Rwanda
UTH	University teaching hospital
NRHs	National referral hospitals
PAF	Population attributable fraction
PTSD	Posttraumatic stress disorder
RN	Registered nurse
SDGs	Sustainable Development Goals
TB	Tuberculosis
UN	United Nations
UR	University of Rwanda
WHO	World Health Organization

DEFINITIONS IN SHORT

Poor utilization of ANC services	In this thesis poor utilization of ANC services is defined as having made ≤ 2 visits to ANC clinic during pregnancy irrespective of the timing.
Intimate partner violence (IPV)	Intimate partner violence refers to being exposed to at least one act of physical, sexual, psychological or controlling behaviours violence as measured by World Health Organization's Violence Against Women Questionnaire and Controlling Behaviour Scale (CBS) developed by Graham-Kevan and Archer.
Non-psychotic mental health disorders (MHDs)	In this thesis non-psychotic MHDs refer to conditions of the mind that affected woman's feelings, way of thinking or her behaviour without causing psychosis. In study III non-psychotic MHD refers to meeting diagnostic criteria for depressive disorder, anxiety disorder, posttraumatic stress disorder and suicide ideation as defined by the Mini International Neuropsychiatric Interview.

1 INTRODUCTION

Despite various efforts to reduce maternal and neonatal morbidity and mortality over the past two decades, they have remained major global public health problems [1, 2]. The majority of cases (99%) occur in low-income countries (LICs) in sub-Saharan Africa and South Asia [3]. In Rwanda, maternal and neonatal mortality rates were estimated at 210 maternal deaths per 100 000 live births and 20 neonatal deaths per 1000 live births in 2015, respectively [4]. This has been an extraordinary decrease considering that the rates were extremely high following the 1994 Tutsi genocide during which much of the health infrastructure was destroyed [5]. The presence of community health workers (CHWs) in each village in Rwanda and the fact that more than three-quarters of Rwandans have some form of health insurance coverage are some of the reasons behind the noticeable achievement compared to other countries in the region [6, 7].

The majority of maternal and neonatal deaths in Rwanda and other LICs are related to pregnancy conditions and inter-current diseases that can be detected early and addressed by antenatal care (ANC) and delivery services such as preeclampsia/eclampsia, pregnancy-related infections and emergency conditions like severe bleeding [8]. ANC can be defined as the care provided by skilled health-care professionals to pregnant women and adolescent girls in order to ensure the best health conditions for both pregnant woman and baby during pregnancy [9]. The services should be able to identify pregnant women who have pregnancy related or intercurrent diseases and those at a higher risk. Most conditions can then be properly managed or prevented through health education and health

promotion. Ultimately a healthy pregnancy for mother and baby will contribute to a positive labour, and motherhood experience [10]. In addition, ANC consultations offer a unique opportunity and crucial time to discuss and investigate sensitive health matters (e.g. intimate partner violence, (IPV) and mental health disorders, (MHDs). However, the full life-saving potential that ANC promises for pregnant women has not been achieved in most of African countries including Rwanda [11-13]. Poor maternal health services attendance due to household poverty, higher fertility rates and inadequate health services funding are some of the reasons as to why this has been the case [8, 14, 15]. Inevitably, lack of trained staff and shortage of equipment and infrastructure have also contributed to the slow progress in reducing maternal and newborn deaths to acceptable levels [13, 16, 17].

The relentless maternal mortality and morbidity being observed in several LICs is of a great concern considering that international human rights law includes fundamental commitments of all states to enable women and adolescent girls to have a positive pregnancy experience[18] . This human rights-based approach to health is not just about avoiding maternal mortality and morbidity. It requires that states put in place multisectoral measures that include empowerment of women. Factors that prevent women from safely experiencing pregnancy and childbirth and enjoying their sexual and reproductive health are supposed to be continuously identified and addressed within the country's socio-economical framework. States have to ensure that health care is available, accessible, acceptable, and of good quality and where countries need assistance due to lack of resources, those in a position to assist are obliged to do so [18, 19].

In summary, Rwanda is one of a few countries in Africa that have achieved the Millennium Development Goal 5 (MDG5) that was intended to reduce maternal mortality by three quarters, between 1990 and 2015 and to achieve universal access to reproductive health. The attention has now turned to maternal and child health targets that lie ahead in the United Nations (UN) Sustainable Development Goals (SDGs) [20]. (i.e. to reduce maternal mortality ratio to less than 70 per 100,000 live births and reduce neonatal mortality to at least as low as 12 per 1,000 live births by 2030). Therefore, ANC services need to be improved and access to the services should coincide with adequate quality of care. In addition to routine assessments and procedures performed on women during their visits to ANC clinics, conditions that may be overlooked such as IPV and MHDs should always be investigated.

1.1 Antenatal care (ANC) services in Rwanda

Figure 1 illustrates the levels of healthcare in Rwanda. The healthcare system in Rwanda is mainly public and decentralized extending from the community-based health workers to the National Referral Hospitals (NRHs) [21]. ANC services are mostly provided at health posts and health centers [21, 22]. District hospitals are the entry points to the hospital system and seldom offer ANC services. They place an emphasis on treating the referred complicated cases from health centres, including the treatment of high-risk pregnancies. More severe cases are referred to the Provincial Referral Hospitals or National Referral and University Teaching Hospitals (NRH/UTH). The CHWs are a crucial part of healthcare in Rwanda and provide a vital link between the community and the health facilities. The community selects the CHWs from their

respective villages after which they undergo basic training in prevention and treatment of the most common diseases. One of their main activities is to help in identifying the healthcare needs of pregnant women within the community. They can also refer a pregnant woman to a health centre for further treatment if she presents such signs and symptoms as swollen face and hand, fever, bleeding or breast infection. The National Referral and University Teaching Hospitals (NRH/UTH) offer the highest level of care provided within Rwanda and provide education and training for medical staff including midwives and nurses.

There are three different levels of competence in HCPs' training in Rwanda who are eligible for ANC employment i.e. A2 nurses, A1 nurses or midwives and A0 nurses or midwives. A2 level nurses have seven years of secondary school training with a general nursing focus. Some of A2 nurses were A3 nurses (auxiliary nurses with three years of post-primary school training in nursing) who later continued their education and were upgraded to A2 nursing level. A1 nurses have continued with three years at an institution of higher education while A0 nurses completed four years obtaining a qualification equivalent to a Bachelor of Science Degree. A1 and A0 are registered nurses (RNs). A1 and A0 midwives completed 3 and 4 years of training in midwifery at an institution of higher education, respectively. Although training of A2 nurses in Rwanda ended in 2007, most practicing nurses are still at this level. There are very few midwives in the country with a midwife population ratio of 1 midwife: 18,790 people in 2015 [23].

In almost all health centers in Rwanda, HCPs are not recruited to specifically work in ANC clinics. They rotate to all services in the health

center according to duty roster and are involved in other activities such as nutritional, hygiene and sanitation activities.

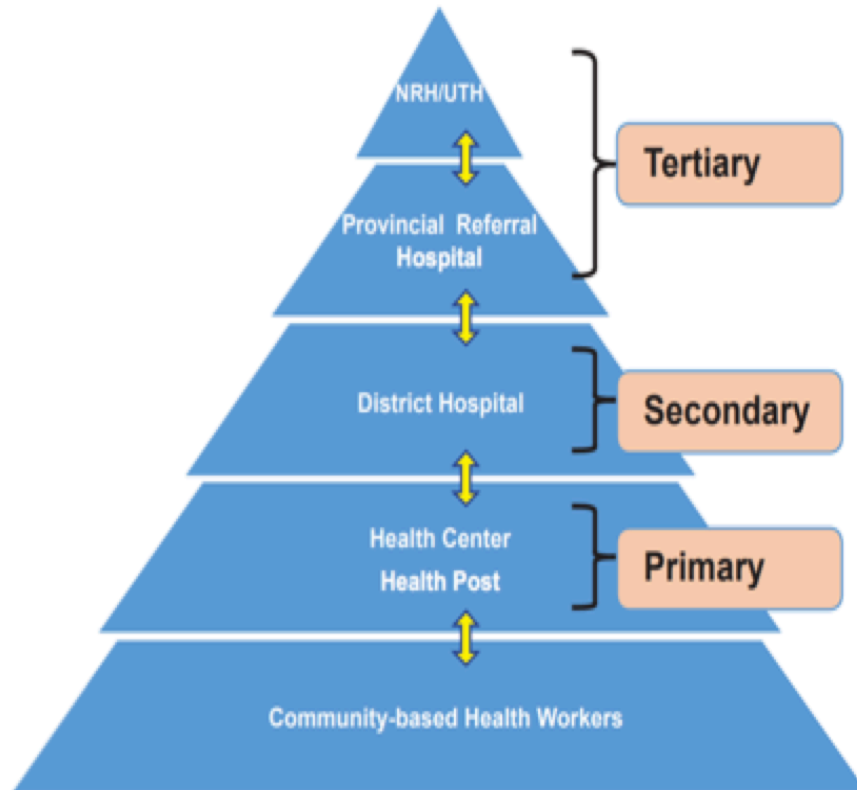


Figure 1. Levels of healthcare facilities within the public healthcare system in Rwanda. Source: Rwanda Ministry of Health.

1.2 Intimate partner violence (IPV)

World Health Organization (WHO) has defined intimate partner violence as “behaviour by an intimate partner or ex-partner that causes physical, sexual or psychological harm, including physical aggression, sexual coercion, psychological abuse and controlling behaviours” [24]. It affects more than 30% of all women worldwide and has been widely associated with multiple adverse health consequences [25-27].

Risk of violence against women is greatest in lower-socio-economic status communities and families and in societies where use of violence is a socially accepted way of solving conflicts [28]. While many researchers have investigated the prevalence rates, risk factors and potential interventions of physical, sexual and psychological violence against women, the majority of the studies excluded controlling behavior [29-31]. However, there has been a growing body of evidence suggesting that if intimate partner violence is to be understood and effective preventive measures are to be taken, distinctions of different forms of violence must be made in research [32, 33]. The distinction is particularly important in societies like Rwanda where some forms of IPV may not necessarily be considered as violence at all because of the prevailing cultural norms and beliefs. The culture per se does not condone violence but some cultural norms such as considering men as the sole decision making authority in the family, have been entrenched into the Rwandan society for hundreds of years and may be hard to change [34]. Furthermore, due to social attitudes, early warning signs of IPV such as controlling how wives/partners spend their money and restrictions of their movement and social networking may be regarded as normal by the general population.

Several measures have been initiated to promote gender equality and improve awareness, reporting and punishment of violent acts. For instance Rwanda has the largest number of women in Parliament anywhere in the world (61.3%) and gender based violence is a criminal offence in Rwandan penal code [35, 36]. Nevertheless, female representation in other institutions is not as impressive and rates of domestic violence are very high [35]. There is a high level of tolerance for domestic violence by both men and women mainly due to traditional patriarchal attitudes that continue to prevail in the society and women may still choose to remain silent about IPV exposure due to the same sociocultural constraints [37].

WHO definition of various forms of IPV underscores the importance of the controlling aspect of violence. Likewise, studies have suggested that controlling behaviour is the most common of all forms of IPV and in most cases precedes other forms [38, 39]. Thus, early identification of controlling behaviour is pivotal for any approaches aimed at preventing and responding to IPV. Some factors have consistently been associated with a man's increased likelihood of committing violent acts against his wife/partner [40-42]. At individual levels these factors include husband's lower level of education, having witnessed or experienced violence as a child and feeling that it is acceptable for a man to beat his wife/partner. Several other factors at community and societal levels include among others weak community sanctions against IPV and gender-inequitable socio-economic attitudes especially those that link notions of manhood to dominance and aggression.

1.3 Intimate partner violence (IPV) and Maternal Health

The health effects of IPV are amplified in pregnancy, with an increased risk of intrauterine growth restriction and adverse pregnancy outcomes such as preterm birth, low birth weight, and small for gestational age [42-44]. IPV perpetrated against pregnant women has also been widely associated with perinatal depression, anxiety disorders, PTSD and suicide thoughts [45-47]. Moreover, pregnant women who have been exposed to violence may not be able to obtain appropriate medical care, partly because the husband/partner prevents them from seeking care or they may present with unspecific common symptoms (e.g. stomach or low back pain), which can make IPV difficult to detect by health care providers (HCPs) [48-50]. Asking direct question on IPV exposure to all pregnant women attending ANC services is now a common routine in some countries. Eventually, IPV against women will affect not only women themselves but their children as well, leading to dire social and health consequences, including poor school performance, anxiety and depression among others [51-53].

While many risk factors have been suggested as risk factors for IPV perpetrated against women [54-56], there is still a knowledge gap regarding which factors may mostly expose pregnant women to different forms of IPV, especially in LICs [57-59]. Nevertheless, it is plausible to assume that prevalence rates of all forms of IPV against women and their effects are increased and more severe in Rwanda and many other African countries considering the local cultural and economic hurdles. Additionally, ANC services are most often inadequate in terms of identifying abused women and offering appropriate support [60, 61].

1.4 Non-psychotic Mental Health Disorders (MHDs) and Maternal Health

Non-psychotic mental health disorders (MHDs) continue to increase with serious consequences worldwide [62, 63]. More women are affected than men and health consequences are severe during pregnancy and the postpartum period partly due physiological changes during pregnancy.[62, 64, 65] Furthermore, women suffering from mental health conditions during the peripartum period are at an increased risk of inadequate use of maternal health services [66, 67]. Depression is the most common of the non-psychotic MHDs affecting women and has been the main research focus on maternal mental health [62, 68]. However, evidence shows that other disorders such as anxiety and posttraumatic stress disorder (PTSD) are also common and lead to substantial co-morbidity with depression [69, 70].

MHDs have diverse causal factors including genetic predisposition [70]. It is also well known that life circumstances like difficulties meeting basic needs, timing and nature of life events play a crucial role [70-72]. Pregnant women from LICs have more material hardships stemming from low household income, insufficient social support and gender inequality [73-75]. Moreover, violent traumatic events such as conflicts and IPV, which have been associated with development of MHDs, are more common in LMICs [76, 77]. It is therefore unsurprising that higher prevalence rates of non-psychotic MHDs in women during and after pregnancy have generally been reported from these countries than from high-income countries (HICs) [45, 47, 78]. Studies from Rwanda suggest that the genocide against the Tutsi in 1994 has contributed to the increase

in some of the non-psychotic MHDs [79-81]. Also, the effects of MHDs may be more severe in situations where the disorders may go undiagnosed or mismanaged because of gaps in knowledge and attitude among health care providers and the public in general [82-84].

1.5 Pregnancy-related or concurrent conditions

The main component of ANC is prevention and management of pregnancy-related or concurrent conditions that can lead to serious complications during pregnancy or delivery [85]. ANC services can either treat these conditions or identify pregnant women with or at risk of the conditions that they cannot manage and refer them to a higher level of health care where appropriate diagnosis and treatment can be ensured [10, 86]. Studies show that more than half of severe maternal outcomes i.e. maternal deaths or maternal near misses in LMICs are due to severe bleeding and pre-eclampsia or eclampsia [87]. Although occurrence of postpartum bleeding can be unpredictable, some of the risk factors such as placenta praevia can be detected during ANC. Furthermore, early recognition and management of risk factors for bleeding during and after childbirth such as prolonged labour, uterine atony, lacerations, retained placenta and coagulopathy is extremely important [88].

Similarly, HCPs need to be vigilant at all times so that they do not misjudge dangerous signs and symptoms such as visual disturbances, severe abdominal pain and fits that may herald eclampsia. Identification of pre-eclampsia during ANC visits particularly over the last 2 months of pregnancy is important to avoid severe consequences [89]. Timely induction of labour or caesarian section can then be arranged before the

woman reaches a life-threatening state or an effective management plan can be put in place for the life-threatening cases. Other conditions like HIV, malaria and diabetes mellitus also cause substantial maternal morbidity and mortality [90-92]. Both diabetes mellitus in pregnancy and gestational diabetes mellitus increase the risk of adverse pregnancy outcomes including macrosomia and hypertensive disorders and need referral and improved monitoring at advanced health facility [10].

One of the conditions of pregnancy that has generated mixed arguments regarding its clinical management is previous caesarean section. Some researchers argue that pregnant women who have had a caesarean section should be offered a trial of labour and can have a successful vaginal delivery [93, 94]. They insist that this could significantly reduce short-and long-term morbidity and mortality associated with repeated caesarian section. However, the risk of uterine rupture and other morbidities associated with vaginal delivery in previous caesarian section remains a concern especially in rural settings from LICs due to deficiencies in delivery of maternal health services [95]. As a result, previous caesarian section is one of the most common indications for caesarian section in sub-Saharan Africa [96]. In Rwanda, a caesarean section cannot be performed at health centres; all women with a previous caesarean section are referred to District hospitals as high-risk pregnancies for delivery.

Predictably, living conditions of pregnant women in LICs exposes them to more severe consequences of pregnancy related complications. For example, more than 55% of pregnant women in sub-Saharan Africa suffer from anaemia during pregnancy, which aggravates postpartum hemorrhage if it occurs [97].

1.6 Theoretical framework

Public health has been defined as the science and art of preventing disease, promoting health and prolonging life through the organised efforts of society [98]. Many public health activities are targeted at populations rather than individuals such as health campaigns, immunization programmes and distribution of impregnated bed-nets. However, public health services also include the provision of personal services to individual persons, such as vaccinations, behavioural counselling, or health advice [98]. The public health approach to health involves working with other sectors to address the wider determinants of health in order to promote greater health and well-being of the society in a sustainable way that strengthens integration of health services and reduces inequalities. The main challenges facing public health in Rwanda in particular and Sub-Saharan Africa in general include diseases like HIV/AIDS, malaria, tuberculosis, high maternal and newborn mortality, unmet basic sanitation needs for many people and weak health systems [99].

This study is based on the socioeconomic model of health and its inequalities, which is a slightly modified Göran Dahlgren and Margaret Whitehead's model of determinants of health [100, 101]. The model postulates the main determinants of health as factors acting together at different levels [100]. At the centre are *individual factors* such as age and sex and constitutional factors. Next, *individual lifestyle characteristics* such as smoking habits and physical activity that also have the potential to promote or damage health. The next level includes *social and community influences*, which provide mutual support for members of the community

in unfavorable conditions. But they can also provide no support or have a negative effect. Communities can be influenced and supported in ways that can improve health [102]. The wider influences on a person's ability to maintain health include their living and working conditions, food supplies and access to essential services and provision of essential facilities. Finally is the *structural level* where political and economic system along side cultural practices influence people's health. Within culture is the gender system which forms an important part of how men's and women's rights, possibilities and responsibilities are apprehended in society which will in turn influence men's and women's health. The model emphasizes the interactions between different factors at different levels. For example, individual lifestyles are embedded in social and community networks and in living and working conditions, which in turn are related to the wider cultural and socioeconomic environment.

The socioeconomic model of health and its inequalities and the social determinants of health model by Göran Dahlgren and Margaret Whitehead are closely related to Behavioral Model of Health Services Use that has been widely used in public health research [103, 104]. According to this model, predisposing factors, enabling resources and need determine personal health practices and use of health care services. Predisposing factors include one's age, education, occupation and knowledge about health and diseases. Enabling factors include distance to the health facility, quality of care, availability of transport, road conditions and income. The individual need factors include users' perception of their own health and their level of awareness, tradition, culture and women's role in the society [103]. Some studies suggest that the best way to improve health is to reduce economic inequalities in society, [105] and this is one of the main

aims within public health science.

1.7 Conceptual framework for poor quality and utilization of Antenatal care (ANC) services, Intimate partner violence (IPV) and non-psychotic Mental Health Disorders (MHDS)

Investigations regarding the best policies and interventions to make ANC services more effective in LICs have been going on for many years, mainly because of persistent maternal and neonatal morbidity and mortality [106-109]. The underlying conceptual framework of this thesis (Figure 2) is that poor quality and utilization of ANC services in Rwanda would result from a nexus of multiple factors at individual, family, community and societal levels.

Factors associated with poor utilization of ANC services at individual level may include among others, young age, being unmarried, low education of both woman and husband/partner, women's lack of financial independence and personal perception of the benefits of ANC. Studies have demonstrated the association of these factors with poor attendance of women at ANC clinics [14, 110]. Deficient health literacy among women, especially in rural areas may make them view ANC attendance as an unnecessary exercise if they assume they can stay home, do their work and deliver without complications.[110] Underlying factors at family level would for example include family conflicts, large family size and low house hold income. To go to ANC clinics, women need time, transport and support by someone to stay at home especially when they have very young children for attendance. Conflicts are closely linked to IPV, which has been associated with poor health seeking behavior [111].

At the community level, poverty lack of social support and employment opportunities can hinder ANC services utilization [112]. Cultural norms and beliefs that tolerate violence as a way of solving conflicts can increase rates of IPV and decrease ANC services attendance [113]. Factors that are associated with poor quality and utilization of ANC services at societal level are mainly related to institutional and infrastructural reasons [114]. They concern barriers to accessibility, acceptability, availability and quality of ANC services. Perceptions and hence utilization of ANC services are influenced by factors that promote or discourage utilization by the pregnant mothers such as the complexity and duration of receiving ANC services [115]. Attendance would be lower if pregnant women would doubt the quality of health care they would receive at ANC clinics. This is especially true if they have to walk or travel for a long distance to reach the health facility.[116] Availability of ANC services entails that the ANC services are delivered at a time convenient for the pregnant woman and that professional help is available at the time of need. Lack of well-educated and trained staff who can manage a wide range of pregnancy related conditions, shortage of equipment and medical supplies would also lead to poor quality and ultimately poor utilization of ANC services [117-119].

Lori L. Heise's ecological approach to abuse conceptualizes violence against women as a multifaceted phenomenon grounded in an interplay among personal, situational and sociocultural factors that can be analysed at four levels [120]. The first level represents the personal history factors that each individual brings to his or her behaviour and relationships. Factors at this level that could predict women's risk of exposure to

violence include husband/partner who witnessed or experienced violence as a child, educational level and income. The next level represents the immediate context in which abuse takes place, mainly the family or other intimate or acquaintance relationship. Factors associated with violence at this level include male dominance in the family, marital conflicts and male control of wealth in the family. The third level encompasses the institutions and social structures, both formal and informal that embed the world of work, neighbourhood, social networks and identity groups. Factors related to violence exposure at this level include unemployment or low socioeconomic status and lack of social networks. The final level represents the general views and attitudes that permeate the culture at large. Factors that expose women to violence at this level are among others, cultural beliefs that links masculinity to dominance, toughness and honor, rigid gender roles at societal level and approval of violence as a means to settle interpersonal disputes.

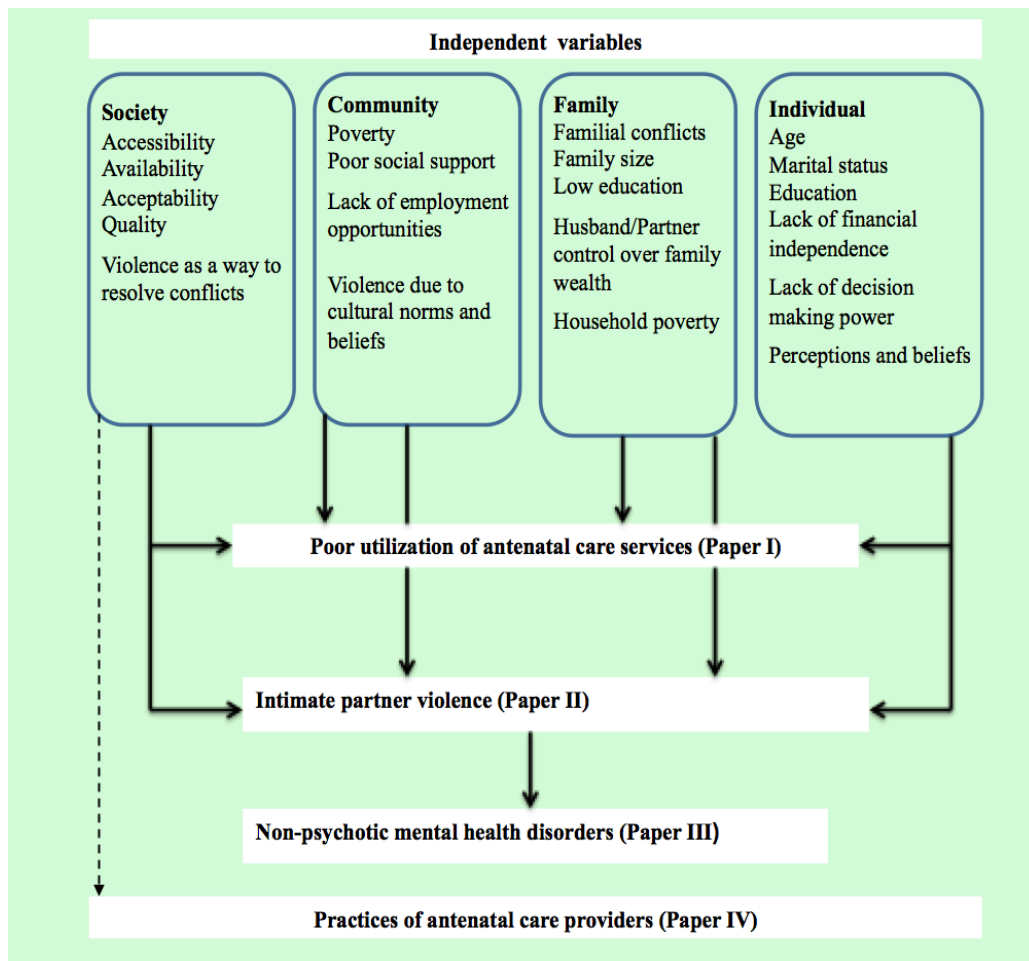


Figure 2. Conceptual framework for poor quality and utilization of antenatal care services, intimate partner violence and non-psychotic mental health disorders.

1.8 Thesis rationale

Usage of ANC services is one of the most important ways to reduce maternal and neonatal mortality. From an epidemiological and public health perspective, ANC services should be viewed as unique platform where biological, socio-economical and cultural matters of importance

could potentially be discussed with women and their accompanying husbands. A few studies have assessed factors that are associated with poor quality and utilization of ANC services in Rwanda. Furthermore, although IPV and MHDs have gained some prominence in research and national debates, there has been no attempt to assess what quality of ANC services as regards pregnant women's exposure to IPV and MHDs or the association of IPV exposure during pregnancy with MHDs.

Knowledge of the determinants of poor quality and utilization of ANC services at all levels of the society and the magnitude and severity of IPV and MHDs could be used to develop national healthcare policies and ANC guidelines aimed at improving Maternal and Child care.

1.9 Scientific methods

1.9.1 Quantitative methods

Based on the nature of research questions and literature review on the problems that are studied in this thesis, quantitative methods including biostatistics and epidemiology were used. In quantitative research, the investigator identifies a research problem based on trends in the field or on the need to explain why certain observations occur [121, 122]. From these trends and observations, the investigator generates explanations or theories from which predictions can be made. Data are then collected on identified relevant measurable variables that can be analyzed and used to test the predictions. The quantitative methods are especially useful for addressing specific questions about relatively well-defined phenomena. They serve mainly the purpose of testing the set hypothesis.

Epidemiology is the study of the distribution and determinants of health-related states or events in a specified human population [123]. Measurement is a central feature of epidemiological methods and epidemiological studies may be viewed as measurement exercises undertaken to obtain estimates of health related determinants [124]. The fundamental scientific approach in designing an epidemiological study is to attempt to reduce sources of two broad types of errors that afflict epidemiological studies i.e. random error and systematic error in order to get accurate results and ensure that the study is valid and reliable.

Validity refers to whether an instrument measures what it sets out to measure or the extent to which a concept is accurately measured in a study [125, 126]. Internal validity pertains to the source (study) population while external validity pertains to other populations and addresses generalizability of the results [125]. Internal validity is a pre-requisite for external validity. Reliability of data reflects whether the results would be repeated if research were replicated in the same context and with the same subjects i.e. the extent of agreement between repeated measures. To be valid the instrument or results must be reliable.

2 AIMS

2.1 General aims

To assess the quality and utilization of ANC services in Rwanda focusing on factors associated with poor attendance, intimate partner violence and non-psychotic mental health disorders.

2.2 Specific aims

Study I: To investigate the number and timing of ANC visits and socio-demographic and psychosocial factors associated with low or no attendance.

Study II: To investigate the prevalence of IPV during pregnancy, its associated factors and relationship with usage of ANC services.

Study III: To investigate the prevalence of non-psychotic MHDs during pregnancy and after childbirth and the association between different forms of IPV exposure during pregnancy with MHDs

Study IV: To assess health care providers' practices in prevention, detection and management of maternal conditions.

3 MATERIALS AND METHODS

The studies presented in this thesis were designed to investigate the determinants of deficient ANC services in Rwanda and women's exposure to IPV and non-psychotic MHDs during pregnancy. The studies form part of Maternal Health Research Programme, a population-based study programme designed to investigate pregnancy related complications, quality and utilization of ANC services, delivery services and costs of healthcare services.

Table 1 gives an overview of all the studies included in this thesis.

Table 1. An overview of studies included in this thesis

	Study I	Study II	Study III	Study IV
Design	Cross-sectional population-based study	Cross-sectional population-based study	Cross-sectional population - based study	Cross-sectional facility based-study
Data collection	Interviewer administered questionnaire	Interviewer administered questionnaire	Interviewer administered questionnaire	Interviewer administered questionnaire and observation checklist
Study sample	Random population-based sample of 921 women	Random population-based sample of 921 women	Random population-based sample of 921 women	Random facility-based sample of 312 HCPs and 605 medical records
Main aims	Investigate the number and timing of ANC visits and factors associated with low or no attendance	Investigate the prevalence of IPV during pregnancy, its associated factors and relationship to ANC attendance	Investigate the prevalence of non-psychotic MHDs during pregnancy and after childbirth and the association of IPV exposure with the MHDs	Assess HCPs practices in prevention, detection and management of maternal conditions
Main analyses	Descriptive statistics and multivariable logistic regression modeling	Descriptive statistics and multivariable logistic regression modeling	Descriptive statistics, PAFs and multivariable logistic regression	Descriptive statistics and multivariable logistic regression modeling

IPV; Intimate partner violence, MHDs: Mental health disorders; ANC: Antenatal care; HCPs: Health care providers; PAFs: Population attributable fractions

3.1 Studies I-III

The materials and methods used in studies I-III are presented under the sub-headings below.

3.1.1 Design, target population, sample size and participants selection

All studies were cross-sectional population-based that were conducted in The Northern province of Rwanda and in Kigali. Rwanda consists of 4 provinces and one city, Kigali (the capital and largest city in the country). The northern province is mostly mountainous and predominantly rural while half of the total urban population in Rwanda lives in Kigali. The target population was women who had given birth ≤ 13 months before the commencement of the interviews. The sample size was calculated based on the estimated prevalence of hypertensive disorders during pregnancy (10%). The desired level of precision was set at 0.025 and a design effect of 1.5 was used to take care of the multistage nature of the study. In total, 921 women participated in the study. Random sampling involving villages, households and participants was used to obtain the participating women from a total of 4791 villages in the study area.[127] In order to mirror the country's rural-urban divide, 20% of the villages were selected from Kigali city and its surroundings. All the eligible women were identified with the help of community health workers (CHWs). Each village in Rwanda has at least 2 CHWs who manage all the health related data including maternal and neonatal records for all women living in that particular village.

3.1.2 Data collection

Data collection was conducted between July and August 2014 and performed by a structured, paper-based interviewer administered questionnaire. In close collaboration with CHWs, the list of all eligible women from each village was compiled. From the list, the women to be interviewed were randomly selected and thereafter visited in their households for the interview. Twelve experienced data collection enumerators guided by four supervisors (thesis author and three others) conducted the interviews in privacy with participating women in Kinyarwanda, the local language. The research team ensured that all selected women were contacted and if anyone was not ready or unavailable at that particular time, the team waited for the eligible participant to come home or went back as soon as her availability was confirmed. At the end of all the interviews in the village, the filled-in questionnaires were reviewed before the team left the village. Only one woman refused to participate in the study.

3.1.3 Variables

Three outcome variables are used in this thesis i.e. poor utilization of ANC services, IPV (physical, sexual, psychological and controlling behaviour) and non-psychotic MHDs (depressive disorders, anxiety disorders, PTSD, and suicide ideation). Women were classified as having had poor utilization of ANC services if they made ≤ 2 visits to ANC services at any time during pregnancy and as having good utilization if they made ≥ 3 visits. Hence, we had a binary outcome variable (0/1) in paper I. For each form of IPV (physical, psychological, sexual and controlling behavior), women were asked whether they had been exposed

to any of the violent acts or not. A composite, dichotomous outcome variable was then created for each of the forms of IPV where 0 indicated women who reported no exposure to any violent act and 1 indicated those who reported exposure to any of the violent acts (Paper II). Similar technique was used to assess odds of being exposed to suicide ideation (anytime in life) as one of the non-psychotic MHDs in paper III. Three more non-psychotic MHDs were assessed and used as the outcome variables in paper III: major depressive episodes during the past two weeks before the interview and earlier in life (≥ 2 weeks before the interview), generalised anxiety disorder (in the past six months) and PTSD current (in the past month). The major depressive episodes, generalised anxiety disorder and PTSD were screened and coded as no (disorder is absent) and yes (disorder is present) outcome variables.

The explanatory variables (independent variables) were socio-demographic and psychosocial attributes at different levels that would influence outcomes of interest i.e. ANC services attendance, IPV and MHDs. For paper III in particular, the explanatory variables of primary interest were the four forms of IPV. Variables at individual level included age, level of education, marital status, monthly income and assets. According to the conceptual framework in this thesis low income and no assets reflected women's lack of financial independence and decision-making power. Considered Family attributes included husband's age and education, family size, and household wealth. The independent variables at the community and society level in this thesis included social support, employment opportunities and variables that are related to how ANC services are available, accessible and of good quality such as distance to ANC clinics and training of HCPs.

3.1.4 Instruments

The questionnaire for studies I-III included items on three main areas i.e. socio-demographic characteristics including social support, intimate partner violence and non-psychotic mental health disorders. The questionnaire was pre-tested in four villages in Eastern province of Rwanda and was well understood by respondents. A few modifications on Kinyarwanda wording were added to the questionnaire for better understanding of some items of forms of IPV and MHDs. The items on physical, sexual and psychological violence were from the Violence Against Women Instrument, a data collection tool that was developed by WHO to assess different forms of IPV in a Multi-Country Study on Women's Health and Domestic Violence Against Women [128]. To assess controlling behaviour, seven items from the Controlling Behaviour Scale (CBS) developed by Graham-Kevan and Archer were used [129]. These instruments have been shown to be valid and reliable and have been widely used in IPV research [130, 131]. In total, 20 items were used to investigate four forms of IPV i.e. physical violence (six items), sexual violence (three items), psychological abuse (four items) and controlling behaviour (7 items). For investigating non-psychotic MHDs, the questionnaire included the Mini International Neuropsychiatric Interview (MINI) version 5.0.0 developed to explore disorders according to Diagnostic and Statistical Manual of Mental Disorders fourth edition (DSM-IV). The MINI has been shown to be a valid tool in settings like Rwanda [79]. The interviews on all non-psychotic MHDs except suicide ideation started with screening questions and ended with a *yes/no* diagnostic conclusion indicating whether the disorder was present or not.

The likelihood of suicide ideation was assessed using six items from which a composite binary variable was created.

3.2 Study IV

The materials and methods used in study IV are presented under the sub-headings below.

3.2.1 Design, target population, sample size and participants selection

This was a facility-based cross-sectional study in the same study area as studies I-III (Northern province and Kigali city). The interviews were aimed at the HCPs working at ANC clinics in all the 121 health centers in the study area. These were mostly nurses and some few midwives. Sample size was calculated according to the total population of HCPs (n=1890, nurses and midwives) employed at the health centers in the study area. It was assumed that 50% of the HCPs would have poor knowledge of pregnancy conditions calling for urgent assessment at a higher level of care, and accepting a sample error of 5% with a 95% confidence interval (CI), the sample size was calculated to 319 participants [132].

The HCPs who participated in this study were proportionally and randomly selected from all the health centers in the study area. At the beginning of the interview it was found that seven of the participants had not attended to any pregnant women in ANC clinics before and were therefore excluded from the study. Hence, we included 312 participants overall. Eligible participants were identified with the help of the health facility's administration. Concurrently a random sample of 5 ANC

medical records was reviewed from each health facility i.e. 605 in total from all health facilities with the aim of assessing which services or procedures were received by pregnant women including provision of tetanus immunization, syphilis test, anthelmintic treatment and malarial prevention by providing insecticide-treated nets [133].

3.2.2 Instruments and Data collection

The interviews, using a structured, paper-based interviewer-administered questionnaire and the medical records review, using the observational checklist were held in ANC clinics by experienced enumerators who were all registered nurses. Two supervisors (first and third authors of Paper III) provided guidance whenever and wherever it was needed. The questionnaire had been pretested and included questions concerning information given to pregnant mothers (related to among others, HIV, TB, other sexual transmitted infections and intimate partner violence), HCPs education and training in ANC services delivery, what conditions that can be diagnosed and treatment practices as well as available equipment. The interview questions and observational checklist were selected based on the WHO guidelines for ANC services provision and Safe Motherhood Assessment Manual, respectively [133, 134]. The Ministry of Health in Rwanda has adopted the guidelines. The enumerators began by interviewing the HCPs after obtaining their consent and proceeded to reviewing the medical records. The individual interviews lasted for 45-60 minutes and all the HCPs agreed to take part.

3.2.3 Variables

All the variables in this study are related to quality of care pregnant women may receive from HCPs when they attend ANC clinics in line with the conceptual framework in this thesis.

At individual HCPs level, variables that could impact ANC services delivery included level of education, experience, training and feed back from her/his supervisor. Practice regarding the recognition of most dangerous conditions that pregnant women may present at ANC clinics was assessed by asking HCPs an open question to mention any urgent pregnancy-related conditions that would need a prompt referral of a pregnant woman to a higher-level health facility (district hospital, provincial or national referral hospital) for advanced clinical management. Nine variables namely: severe hypertension, fits, cessation of fetal movements, preeclampsia, severe vaginal bleeding, severe abdominal pain, visual disturbances, previous caesarean section and diabetes mellitus were then used to estimate HCPs practices. A composite binary variable was created from the nine variables, which was later used as an outcome variable in assessing the HCPs characteristics that might compel them to mention fewer conditions. The rationale for choosing the nine conditions was that they have been included in WHO and Rwanda ANC services recommendations for better pregnancy outcome [10, 134].

One of the most important tasks for the HCPs in ANC consultation during pregnancy is to be able to ask about and discover conditions that may not be revealed by pregnant women yet they have dire consequences on maternal and child health. Such conditions include violence [135-137]. Currently, there are no ANC guidelines in Rwanda regarding the management of IPV exposure. Nevertheless, WHO strongly recommends clinical enquiry about the possibility of (IPV) during ANC visits [10]. IPV

was therefore an important variable in this particular study as a mark of HCPs' knowledge and the quality of care that ANC services provide. HCPs were asked to indicate whether they had met a woman who had been exposed to IPV in their clinic. Furthermore, HCPs were asked whether they have been trained on how to handle violence during pregnancy and what they would do if they encountered a pregnant woman exposed to it.

3.3 Data analyses

This section describes the statistical methods used for analyses in all studies (I-IV) in this thesis.

We meticulously designed SPSS data entry templates defining each of the variables in the data collection questionnaires before entering the data into computer. Descriptive statistics was used to determine the frequencies and percentages for all the variables used in this thesis. Bivariable and multivariable logistic regression models were used to examine the association of different socio-demographic and psychosocial characteristics with the likelihood of occurrence of different adverse outcome (poor utilization of ANC services, IPV, MHDs and mentioning of fewer conditions needing urgent referral to a higher level of care for better management) during pregnancy and after childbirth. Variables were included in the same models if the effect estimates changed more than 10% in exploratory analyses and multicollinearity between independent variables had been excluded. Moreover, potential effect modifications were tested in all models.

For study III focusing on non-psychotic MHDs, we also measured the

PAFs (proportion of prevalent cases of each of non-psychotic MHDs that could be attributed to the exposure to all forms of IPV). All analyses were performed using SPSS V.22.0 for Windows or Macintosh (SPSS, Armonk, New York, USA).

3.4 Ethical considerations

This section describes the ethical considerations for all studies (I-IV) in this thesis.

The Institutional Review Board of the College of Medicine and Health Sciences of the University of Rwanda (UR) and the National Institute of Statistics of Rwanda (NISR) approved the studies (No: 0425/2014/10/NISR). We also informed local government authorities and district hospitals' administration about the study and secured their collaboration. The interviews were conducted in privacy. Before starting the interviews, the enumerators explained the nature, rationale and estimated time for participation in the study. Participants were able to stop their participation at any time during the interview.

Next, a written signed consent was obtained from all participants. For studies I-III, if a woman was not able to neither read nor sign, the enumerator read the content of the consent form for her and the woman signed with a thumbprint if she consented. Furthermore, if the interview was to be interrupted by husband/partner or a visitor, the interviewers had been trained either to terminate the interview or to stop asking about sensitive matters and move on to the less sensitive topics. Health facilities in the study area were alerted of possibilities of some cases that may need medical assistance since some interviews on sensitive matters such as IPV

and MHDs could trigger strong feelings among the exposed women. All data were anonymous.

4 RESULTS

This section summarises the key findings for all the papers in this thesis (I-IV) based on the specific aims of individual papers.

4.1 Determinants of poor utilization of Antenatal care (ANC) services among recently delivered women in Rwanda; a population based study (Paper I)

The section that follows below describes socio-demographic and psychosocial characteristics for participants in studies I-III.

Among 921 participants, 68% were ≤ 30 years old and over half had never gone to school or had not completed primary school. Just under one third of all the households earned less than 30US\$ a month and 20.2% (n=186) reported no social support. The majority of women, 81.6% (n=746) were accompanied by their husband/partner during their first visit to ANC clinic while 30% (n=276) walked for an hour or longer to reach the health center. The mean time since birth of the index child and the time of the interview was 7.1 months. The majority of the husbands/partners to the participants were non-skilled workers or not employed at all (77%, n=596).

Usage and timing of ANC services and socio-demographic and psychosocial factors associated with low or no attendance

The overwhelming majority of the participants (99%, n=915) had made at least one visit to ANC services during pregnancy while only 45.6% (n=418) had completed 4 visits or more to ANC services. Only 13.3%

(n=122) of women made ≤ 2 visits to ANC services but 22% of women (n=200) did not make any visit during the first trimester of pregnancy. The odds that women would not utilize ANC services were higher among older women (adjusted odds ratio (AOR) 1.78 (95% CI: 1.14, 2.78), women who were single, divorced, widowed or separated AOR 2.99 (95% CI: 1.83, 4.75) and among women who reported poor social support AOR 1.71 (95% CI: 1.09, 2.67), respectively.

4.2 Intimate partner violence (IPV) among pregnant women in Rwanda, its associated risk factors and relationship to Antenatal care (ANC) services: a population based study (Paper II)

Prevalence of IPV and associated risk factors

Figure 3. Shows the prevalence rates of different forms of IPV and their changes over different time periods. During pregnancy, physical partner violence was reported by 10.2% (n=94) of all women, psychological abuse by 17.0% (n=157), sexual violence by 9.7% (n=89) and controlling behaviour by 20.0% (n=163). Psychological violence increased to 17% during pregnancy as compared to 13.3% one year before pregnancy while physical violence decreased slightly during pregnancy. All forms of IPV perpetrated against pregnant women increased after childbirth the highest increase being observed for controlling behavior. Of all women in the study, 22.6% (n=208) reported at least one form of IPV during pregnancy with 16% (n=33) of them reporting overlapping between physical and psychological violence. The likelihood of reporting IPV was higher among women with low socio-economic status, those living in urban

areas, older women, women with larger family size and among those with low income and no social support. The level of education was not associated with IPV.

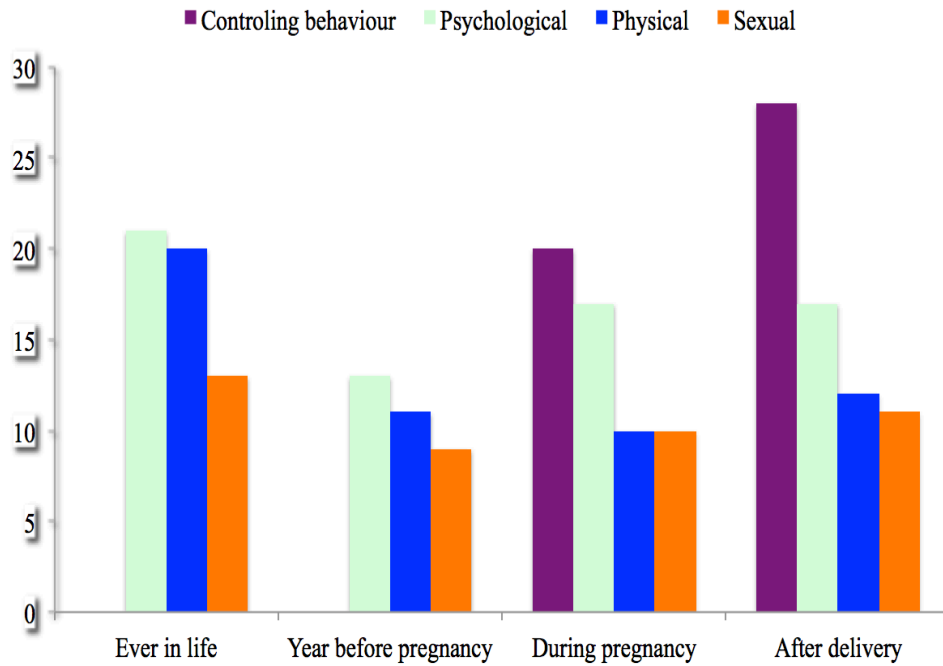


Figure 3. Prevalence rates of different forms of intimate partner violence at different life phases (Values are percentages, N=921).

Relationship of IPV with ANC services attendance

Women who reported controlling behaviour during pregnancy had higher odds ratios of making fewer visits to ANC services as compared to those who did not report controlling behavior (AOR 1.93 (95% CI 1.34 to 2.79). All other forms of IPV during pregnancy did not show any differences

between those who reported IPV exposure and those who did not as regards to ANC services utilization.

4.3 Intimate partner violence (IPV) during pregnancy in relation to non-psychotic Mental health disorders (MHDs) in Rwanda a cross-sectional population based study (Paper III)

Prevalence of non-psychotic MHDs during pregnancy and after childbirth

Of all participating women, 11.9% (n=110) met the diagnostic criteria for a major depressive episode in the past two weeks preceding the study while 9.5% (n=88) met the criteria for a major depressive episode in the earlier periods. Generalised anxiety disorder (in the past six months), PTSD (in the past month) and suicide ideation (any time in life) were diagnosed in 19.7% (n=182), 8.0% (n=74) and 10.8% (n=98) of all the participants, respectively. Of all the participants, 27.1% (n=247) met at least one diagnostic criteria for anyone of the four non-psychotic MHDs. Place of living, marital status, social support and socio-economic status were associated with the non-psychotic MHDs.

Association between IPV exposure during pregnancy and non-psychotic MHDs during pregnancy and after childbirth

The odds of meeting diagnostic criteria for each of the four non-psychotic MHDs were higher and statistically significant for women exposed to any of the four forms of IPV i.e. physical violence, psychological violence,

sexual violence and controlling behaviour during pregnancy as compared to women who were not exposed (Table 2).

*Table 2. Associations between women's exposure to IPV during pregnancy with non-psychotic MHDs. N=921**

Form of IPV	Major depressive episode in the past two weeks	Major depressive episode in earlier periods	Generalised anxiety disorder	Suicide Ideation	Post-traumatic stress disorder
Physical	3.37(2.00, 7.14)	4.43(2.17, 9.05)	2.02(1.12, 3.17)	3.16(1.53, 6.52)	4.52(2.14, 9.58)
Psychological	3.52(1.98, 6.26)	3.99(2.08, 7.67)	3.26(1.99, 5.34)	2.89(1.5.55)	6.29(3.18, 12.5)
Sex	2.57(1.28, 5.18)	2.65(1.23, 5.73)	3.45(1.91, 6.25)	3.04(1.40, 6.60)	6.22(2.99, 12.9)
Controlling behaviour	7.06(3.78,13.2)	9.17(4.22, 19.9)	5.90(3.54, 9.82)	6.28(3.20, 12.3)	6.90(3.15, 15.1)

*Values are odds ratio and 95% confidence interval that indicate the differences in the odds of meeting diagnostic criteria for women exposed to different forms of IPV compared to those who were not exposed. IPV: Intimate partner violence; MHDs; Mental health disorders; CB: Controlling behavior.

For all the MHDs, the PAFs attributed to controlling behaviour were the highest: 42% for major depressive episode in the past two weeks, 48% for major depressive episode in earlier periods, 36% for generalised anxiety disorder, 38% for suicide ideation and 44% for PTSD.

4.4 Quality of antenatal care (ANC) services in Rwanda: assessing practices of Healthcare providers (Paper IV)

The section that follows describes socio-demographic and psychosocial characteristics for participants (HCPs) in study IV.

Only 7.9% (n=24) of the HCPs were midwives. Two-thirds of the HCPs

were ≥ 31 years or older while 16% (n=50) were ≥ 42 years old. Just over two thirds had four years or more of work experience in ANC services. The majority of the participants (90%, n=280) had not received any in-service training in the delivery of ANC services over the past 2 years and over half had never received any in-service training at all. Of all the HCPs interviewed, 25.3% (n=79) spent an average of 15 minutes or less to receive and consult a pregnant woman in ANC clinics.

HCPs practices in prevention, detection and management of maternal conditions

Over three-quarters of all the HCPs provided advice and information on diet and nutrition as well as sexually transmitted diseases including on HIV/AIDS whereas 20.9% (n=63) of the HCPs did not discuss what to do if the pregnant woman experienced problems requiring immediate attention such as fits or heavy vaginal bleeding. Only 7.3% (n=22) gave advice on exposure to violence during or before pregnancy. Offering advice and information was more often reported by midwives than nurses.

Figure 4. Shows the proportions of HCPs who mentioned any of the nine conditions considered needing urgent assessment at a higher-level health facility as a function of each educational level category (A3/A2 nurses, A1/A0 nurses and A1/A0 midwives). Most of the HCPs, regardless of educational category, mentioned heavy bleeding, severe hypertension and cessation of fetal movements. Only 23% (n=50) of the A3/A2 nurses, 26% (n=18) of the A1/A0 nurses and 4% (n=1) of the midwives mentioned fits. For preeclampsia, only 39% (n=82) of the A3/A2 nurses, 44% (n=30) of the A1/A0 nurses and 46% (n=11) of the midwives mentioned it.

Proportion of HCPs who mentioned conditions needing urgent assessment was higher among midwives than among other HCPs for most conditions, but none of these differences were statistically significant.

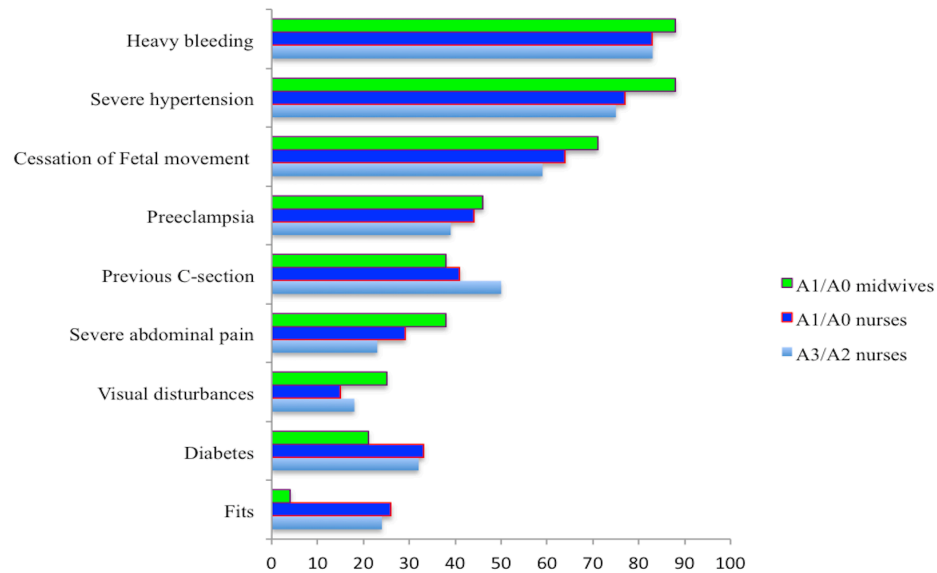


Figure 4. Healthcare providers' mentioning of conditions requiring urgent referral and assessment at a higher level of care. (Values are percentages, N= 303)

In 15% (n=34) of pregnant women's medical records, syphilis testing was not recorded. Anthelmintic treatment was not reported in 13% of the records (n=30) and tetanus immunization treatment in 12% (n=27) of the records. Furthermore, in 69% (n=160) of the medical files HCPs did not record any information on malarial prevention in form of providing insecticide-treated mosquito nets.

5 DISCUSSION

In low-and middle-income countries (LMICs) maternal and perinatal morbidity and mortality is a major public health and human right problem [18]. The lamentable consequences of poor maternal health go beyond mothers and their babies and undermine countries' socio-economic development. Timely and appropriate ANC is one of the ways by which maternal experiences and outcomes can be improved by detection and treatment of pregnancy-related complications and identification and referral of women and girls at increased risk to an appropriate level of care. Crucially, given the privacy nature of ANC, it provides a unique opportunity to discuss with women about a wide range of diseases and traumatic conditions that may have psychosocial and cultural roots such as IPV and MHDs. Although almost all maternal and neonatal morbidity and mortality occur in low-income settings, there is evidence that most of the life-threatening maternal complications can be prevented or treated at reasonable cost [138]. For this to happen, research on maternal health care that is pertinent and adaptable to the local settings is imperative.

The aim of the studies presented in this thesis was to assess the quality and utilization of ANC services in Rwanda focusing on factors associated with poor attendance, intimate partner violence and non-psychotic mental health disorders. This section provides a general discussion of the main findings of the studies and discusses methodological issues.

5.1 Usage and timing of Antenatal care (ANC) services and socio-demographic and psychosocial factors associated with low or no attendance

There has been progressive increase in ANC and delivery services attendance in Rwanda over the past fifteen years [5]. As a result, maternal and neonatal morbidity and mortality have improved remarkably. Nevertheless, we have found in this thesis that 46% of pregnant women do not complete the four visits that are recommended by WHO during pregnancy. Moreover, one in five women did not make any visit during the first trimester of pregnancy. An early ANC visit gives the opportunity to provide screening and tests that are most effective early in the pregnancy such as correct assessment of gestational age and screening and treatment for iron deficiency anaemia and sexually transmitted infections. Our findings are inline with those reported by researchers elsewhere in the region [112, 139]. Lack of knowledge, financial constraints and long distance to a health facility have been given as some of the reasons for making few visits to ANC services or late initiation [139, 140].

Consistent with results in this thesis, a recent study in Ethiopia shows that young pregnant women are more likely to utilize maternal health services than older pregnant women [141]. However, different results have been reported. A cross-sectional facility-study involving 272 pregnant women in South Africa showed that the probability of making more visits was higher among older women as compared to young women [142]. Our findings could be explained by the fact that older women in Rwanda, where the average fertility rate is 4.2 are more likely to have more children.[5] Having a large family size has been associated with poor

ANC attendance [139]. In this thesis we show that single women, divorced or widowed women and those without social support were more likely to make few visits to ANC services. Studies assessing the effect of marital status on ANC utilization have given conflicting results [143-145]. Our results are however not unexpected considering that over three-quarters of women in our study were accompanied by their husbands or partners during their first visit to ANC services. In Rwanda, men have generally been actively targeted in all ANC initiatives. The association of lack of social support with inadequate utilization of ANC services is expected and in line with findings from other studies [146-148]. Family and friends motivate pregnant women to seek ANC [148]. During the Tutsi genocide in Rwanda many women lost parents, siblings, relatives and friends and may find it difficult to find someone who can lend support.

5.2 Prevalence of Intimate partner violence (IPV) and associated factors

Comparability of prevalence rates of different forms of IPV and their associated factors in our study with previous finding is problematic because what constitutes violence varies across cultures and data collection tools may be adjusted to suit the local settings. Furthermore, very few studies have investigated controlling behaviour as separate form of IPV during pregnancy. Nevertheless, similar prevalence rates of physical violence were reported in neighbouring Tanzania.[149] A rather higher prevalence rate of physical violence (30%) has been reported in Kenya.[31] Similarly, the prevalence rates of sexual and psychological violence are comparable to our results or higher [31, 150]. Even though

studies on prevalence rates of physical, sexual and psychological violence give highly variable estimates between studies, as in our study, most of them show that psychological violence is the most prevalent form [31, 150].

Very little is known regarding the prevalence rates of controlling behaviour during pregnancy as the few available studies that investigated controlling behaviour did so before or after pregnancy [151, 152]. It is therefore not surprising that the 20% prevalence rate of controlling behaviour during pregnancy in our study is lower than reported rates in other studies since pregnancy may offer some protection against controlling behavior [153]. The statistically significant change in prevalence rates of psychological violence during pregnancy as compared to one year before pregnancy that is observed in this thesis is perplexing since other forms of IPV did not show such change. We have found no study from LICs that has explicitly tracked changes of IPV before and during pregnancy. Nevertheless, a study that investigated the evolution of intimate partner violence before and during pregnancy among 1894 Belgian women shows that psychological violence was lower during pregnancy [153]. Other than cultural and gender inequality issues due to different settings, another plausible explanation for the differences is that due to knowledge and availability limitations, women in Rwanda are comparatively less likely to use any form of contraceptive methods for convenient timing of conception. Psychological abuse would then ensue as their husbands/partners blame them for getting pregnant.

Consistent with studies in LICs, low social economic status, large family size and poor social support are associated with IPV [154-158]. Household poverty can provoke conflicts and violence. Having many

children can aggravate the situation by presenting more economic challenges and dependence. This is particularly pertinent in Rwanda where many women are involved in subsistence farming and have very low monthly income. On the other hand, as a result of isolation from friends, relatives and forums in which IPV can be discussed women with poor social support are at higher risk of being exposed to violence by husband/partner.

Studies have given mixed results regarding the association between women's age and IPV, with some showing that young women were more exposed while others show it is the older women instead that are exposed [42, 152, 159]. In this study, we show that older women (≥ 31 years) were more likely to report violence exposure. This finding could be explained by the fact that older women have more children or after more years in marriage, are more confident and able to challenge their husbands, all of which may result in increased violence. A recent study in sub-Saharan Africa shows that the odds of experiencing IPV were high among women who are employed compared to those who were not employed and among those women with decision-making capacity [159]. Women residing in and around Kigali are comparatively more likely to be employed, make decisions on family matters and outgoing all of which may be at odds with traditional gender role expectations.

5.3 Relationship of Intimate partner violence (IPV) with Antenatal care (ANC) services attendance

In this thesis the odds of poor utilization of ANC services are higher among women who reported controlling behavior. This is not surprising

since IPV has been widely associated with poor maternal healthcare and [158, 160, 161]. What is different in this study compared to most other studies is that physical, sexual and psychological violence were not associated with poor ANC services utilization. Researchers have suggested that due to negative sanctions that result from discussing violence like public ridicule and shaming prevailing in some African societies, abused women may conceal that they are being abused [162]. Furthermore, Rwanda has most recently been promoting gender equality policies from families onwards. It therefore would not go down well with the village leaders and CHWs if a husband were to be found abusing his wife. The lack of negative effect of physical, sexual and psychological violence could therefore be a result of disguising intentions as abused women attend ANC services in an attempt to protect their families and own status. This worrisome perspective is supported by the observation in this thesis that controlling behavior, which may not be considered as violence in strict traditional societies is associated with poor ANC services usage. On the other hand, it is also possible that physical, sexual and/or psychological violence exposure lead to other health issues that compel women to go to ANC clinics but without revealing the exposure, hence the lack of negative effect of IPV. Our study findings strengthen the existing evidence on importance of including controlling behaviour in all studies on IPV, as it is a most serious form of IPV. Exposure to controlling behavior often leads to serious isolation and may escalate into physical violence [32].

5.4 Prevalence of non-psychotic Mental Health Disorders (MHDs) during pregnancy and after childbirth

Recent studies have shown prevalence rates of non-psychotic MHDs somewhat similar to ours.[45, 163, 164] The few discrepancies that have been observed may be due to differences in data collection instruments and the time frame during which the non-psychotic MHDs were investigated. For instance, the prevalence of 6 months postpartum depression among 950 women in a longitudinal population based study was 18.5%, which is higher than 11.9% in our study [163]. Likewise, higher prevalence rates have been reported for anxiety and PTSD in a study including 1180 women from Tanzania [165]. All the prevalence rates of non-psychotic MHDs in this study are within the ranges of the rates observed in a systematic review which assessed perinatal mental health disorders in low and lower middle income countries [45]. Despite the different instruments used and contextual differences between countries, all studies from LICs demonstrate a high prevalence of non-psychotic MHDs during pregnancy and after child birth. This emphasizes the need to have effective screening tools and management guidelines for how to identify those in need of treatment.

5.5 Association between Intimate partner violence (IPV) exposure during pregnancy and non- psychotic Mental Health Disorders (MHDs) during pregnancy and after child birth

IPV is a worldwide public health problem that affects women disproportionately [166, 167]. It has a substantial impact on a women's physical and mental health. Physical effects include the direct consequences of injuries sustained after physical violence, such as

fractures, lacerations and head trauma, sexually transmitted infections and unintended pregnancies as a consequence of sexual violence, and various pain disorders [76]. Impact on mental health includes an increased risk of depressive and anxiety disorders, PTSD and suicide [45, 168]. The adverse health effects of IPV may be more severe during pregnancy and in LICs [169-171].

Consistent with other studies, we show in this thesis that all forms of IPV suffered by pregnant women in Rwanda are associated with non-psychotic MHDs during and after pregnancy. A recent cross-sectional study in Tanzania shows a strong association of physical, sexual and psychological violence with peripartum depression [170]. Likewise, maternal exposure to physical, sexual and psychological violence has been shown to increase the odds of reporting PTSD, anxiety disorders and suicide ideation during and after pregnancy among women in LICs [45, 47].

As at any time period, controlling behaviour as a form of IPV during pregnancy has generally not been studied in LICs. Accordingly, it is not surprising that few studies from LICs have investigated the relationship between exposure to controlling behaviour during pregnancy and perinatal MHDs. The findings in this thesis that women who were exposed to controlling behaviour during pregnancy had higher odds of reporting non-psychotic MHDs during and after pregnancy is therefore very important. Moreover, of all forms of IPV, controlling behaviour showed the highest proportion of prevalent cases of non-psychotic MHDs during pregnancy that could potentially be prevented if it was eliminated. Future studies and policy makers alike need to always consider controlling behaviour when assessing and laying out strategies for IPV.

5.6 Health care providers' (HCPs) practices in prevention, detection and management of maternal conditions

Knowledge of pregnancy danger signs among women attending ANC services in Rwanda and other LICs has generally been shown to be lacking [172-174]. Pregnant women's awareness of danger signs of pregnancy is critical because many maternal morbidities and mortalities may result from delays in reaching a relevant health facility probably because of time wasted in deciding whether a condition needed a medical attention or not [175]. It is therefore of importance that ANC healthcare providers are able to furnish the visiting pregnant women with the needed information that will improve their awareness of the dangers signs so that they can seek care without delay if any complication arises and also discuss practical details on how to reach appropriate health services.

However, available evidence suggests that the HCPs may not be able to provide the information or carry out some of the ANC tasks due to among other factors, insufficient knowledge of the importance of doing so or structural issues like insufficient staff training and lack of equipment [13, 175]. In this thesis we indicate that recurrent training opportunities for HCPs are rare and the information being given to pregnant women attending ANC services is not sufficient. Moreover, the practices of HCPs related to some maternal conditions requiring urgent assessment at a higher-level of health care was suboptimal and some crucial elements of ANC services were not provided to some of the pregnant women.

In this study, one in five HCPs working in ANC services did not discuss or tell the pregnant women what to do if she experienced problems requiring immediate attention such as heavy bleeding or fits. Further,

more than one third of the HCPs did not discuss the place of delivery with pregnant women and almost half did not provide information on how to take care of the newborn. Similar alarming findings pointing to inadequate ANC have been observed in other countries in Africa [85, 176]. In a study carried out in rural Tanzania, two out of five pregnant women who attended ANC clinics were not counseled on pregnancy danger signs [85]. Similarly, a multi-country study in Africa shows that one in three women was not informed of any danger sign of pregnancy during their ANC visits [176]. The observation in this study that some HCPs are not be able to respond appropriately to pregnant women who have been exposed to IPV is not surprising considering our results, which show that only 14% had ever been trained in how to handle such patients.

Also in line with available research, we have found that HCPs handling of some maternal conditions requiring urgent assessment at a higher-level of care may be inadequate [177, 178]. For instance, only 43% of HCPs were able to mention preeclampsia as one of the conditions that needed urgent referral to a higher level of health care for better management despite the ANC guidelines stating so. Although failure of HCPs to mention conditions requiring urgent referral may have its shortcomings if used as a measure of their knowledge, it is nevertheless a reasonable way to assess what they may know or how they may perform in real practice. In a similar study design in Uganda using interviewer administered questionnaires that included multiple choice questions, only 40% of HCPs were able to mention the basic interventions that are offered during ANC consultations [177]. Inadequate knowledge of ANC services and failure to adhere to guidelines among HCPs has also been reported in Tanzania and many other LICs countries [13, 178]. As expected, midwives were

generally more likely to mention the maternal conditions requiring urgent referral to higher level of care for better management than nurses at all levels (A2, A1 and A0). However, due to the little number of midwives among HCPs in our study, which reflects the real situation in Rwanda, we are unable to draw any conclusions regarding the observed variability.

In Rwanda, CHWs are at the forefront of maternal healthcare. It would therefore be interesting to assess their knowledge of danger signs of pregnancy. Nevertheless, results in this thesis suggest that their knowledge of pregnancy and its complications could be inadequate and any interventions aimed at improving the knowledge and practice should also target them.

The thesis also assesses the ANC records in order to determine which procedures or assessments were not performed on women visiting ANC clinics as per ANC guidelines. Failure to record any assessment or procedures by HCPs may not necessarily mean that it was not performed since it cannot be ruled out that some procedures or tests were done but the HCPs failed to record them in the ANC medical records. However, in line with the conceptual framework in this thesis this would constitute inadequate quality of care in relation to continuation of care and documentation procedures. We observed that syphilis testing was not recorded in 15% of the medical files, tetanus in 12% and in 69% of the medical files HCPs did not record any information on malarial prevention in form of providing insecticide-treated mosquito nets.

Failures of HCPs to perform some procedures and assessment stipulated in ANC guidelines have been reported by others [179]. These findings suggest that in order to achieve the maternal and child health targets

ahead, encouraging women to follow the recommended number and timing of ANC visits access should go hand in hand with HCPs recurrent training so that they are able to provide adequate quality of health care.

5.7 Methodological considerations

The strengths of the studies in this thesis include the large sample size, the low non-response rate and the use of internationally recognized instruments to investigate no-psychotic MHDs, all forms of IPV and HCPs' practices. After the primary data entry for all the studies in this thesis, the information from 10% of the questionnaires (studies I-III) and 6% (study IV) were re-entered to check the accuracy of the first data entry. For studies I-III there was a very low error rate of 0.05% while no erroneous data was found for study IV. Also Rwanda is a homogenous society, and therefore we believe that the findings are generalizable to the entire country in women who have just given birth. Furthermore, we had experienced data collection personnel and supervisors with diverse skills in research methods. However the studies have limitations not least the cross-sectional design, which means that drawing any causal inferences from the findings is difficult. In the following paragraphs, limitations regarding selection bias, information bias and confounding are discussed.

Selection bias

Selection bias is a systematic error in a study that stems from the procedures used to select participants and from factors that influence the study participation.[180] Selection bias will therefore occur in a study if the association between the determinant and outcome of interest is different in subjects who participate in the study and those who are

eligible for the study, but do not participate in the study. In all studies in this thesis participants were randomly selected. If the selected woman or HCP (study IV) was not present at the time of interview, the team waited for her/him to come or went back later to do the interview at the earliest possible time, hence the very high response rate of 99.9%. We had a relatively small number of midwives in study IV but this reflects the general picture of the shortage of midwives in the country rather than selection towards nurses. It is therefore very unlikely that selection bias is an issue in this thesis.

Information bias

Systematic error in a study can arise because the information collected from study participants is erroneous. Owing to cultural beliefs and the sensitive nature of IPV and MHDs, there could have been under-reporting or over-reporting of some events. Furthermore underreporting of other lifestyle-related factors might have occurred and led to an underestimation or overestimation of the observed effects. For example, in the studies presented here, information on important determinants like social support, household income, family assets and staff training was self-reported. Nevertheless, data collection was conducted with utmost care by a team of experienced medical personnel who were of the same sex and of similar age as the participants, which makes the possibility of information bias less likely.

One of the most common types of information bias is recall bias, which may occur if participants in a study are interviewed to obtain exposure information after an outcome of interest has occurred. Data for studies I-III were collected retrospectively from respondents who gave birth

between 1-13 months before the interview. This time interval may have resulted in recall bias, however 52% of the participants had given birth ≤ 6 months before the interview suggesting that this time frame may not be a serious concern.

Confounding

A confounding factor is an extraneous variable associated with both the determinant and the outcome, and this variable is not an intermediate variable in the causal pathway between the exposure and the outcome.[180] If a confounding factor is not taken into account, it may lead to a biased effect estimate of the association between the determinant and the outcome. In this thesis we dealt with confounding by adjusting all the analyses for multiple potential confounders. The potential confounders were selected based on theoretical reasons grounded in previous research, their associations with the outcomes of interest or a change in effect estimate of more than 10%. If two variables were highly correlated, one was to be excluded from the model. In most of the studies presented in this thesis, adjustment for potential confounders only moderately affected the effect estimates, which suggests that the observed associations are possibly true associations between the determinants (socio-demographic and psychosocial attributes and IPV) and the outcomes of interest. Although information about many potential confounders was available in the studies performed in this thesis, residual confounding will always be an issue. Also, information about several confounding variables was self-reported, which may be problematic.

We used adjusted odds ratios in the calculations of PAFs in order to obtain non-confounded estimates.

6 CONCLUSIONS AND IMPLICATIONS

6.1 Conclusions

Findings from this thesis suggest that despite progress made in Rwanda regarding maternal healthcare, there are still numerous deficiencies in ANC services coverage and quality. Majority of pregnant women do not comply to the WHO recommended number of four visits during pregnancy and many do not adhere to the ANC initiation standards of making at least one visit at gestational age <12 weeks. Older age, being single, divorced or widowed and poor social support were determinants of poor attendance of ANC services. These findings suggest that strategies focusing on raising the awareness among women and their husbands/partners of the importance of making recommended number of ANC visits and correct timing of these visits should be scaled up. Social-economic support should be available for the most vulnerable pregnant women so that they are able to access maternal healthcare services.

This study demonstrates that all forms of IPV are common during pregnancy and the majority of HCPs do not inquire about them during ANC consultation. Household poverty, lack of social support and large family size are all associated with IPV exposure. Women who are exposed to controlling behavior during pregnancy are more likely to not attend ANC services. Also, non-psychotic MHDs are common during pregnancy and after childbirth and IPV exposure during pregnancy plays a crucial role in their occurrence. These findings emphasize the need for HCPs to always ask about all forms of IPV during their practice. HCPs including CHWs should regularly be trained and made aware of warning signs of presence of IPV and MHDs. Community-owned punitive and preventive

measures designed to eradicate all forms of IPV should be initiated. Our findings also suggest that community discussions on non-psychotic MHDs should be instituted at all levels to inform about these kinds of diseases and to reduce the stigma.

Finally, there are gaps among HCPs regarding the information they give to pregnant women during their ANC services visits and adherence to national ANC services guidelines. This highlights the need to educate more midwives and offer regular training to HCPs who are already in practice. Curriculum revision for courses leading to degrees in midwifery and nursing may also be necessary in order to improve practices.

6.2 Implications

Rwanda is committed to achieving the SDGs specific targets of reducing maternal mortality to less than 70 per 100,000 live births and neonatal mortality to at least as low as 12 per 1,000 live births in 2030. Although this is not insurmountable, results in our thesis suggest that the effort should be intensified at all levels to improve the quality and utilization of ANC services if the targets are to be reached. This is particularly important as WHO has recently increased to eight the number of visits a pregnant woman should make to ANC services during pregnancy[10].

The section below suggests measures aimed at improving ANC that may be taken at different levels of the society.

At individual and family levels

Through home visits, sensitize and educate women and their partners about the importance of maternal health care, including early initiation of ANC visits and importance of completing all the recommended ANC

visits. Home visits may also be conducted to discuss with family members especially the husband/partner about the dangers of IPV and benefits of gender equality.

Women may be encouraged and supported to set up small income generating projects. Support and educate members of the family on how to recognize warning signs of MHDs.

At community level

Regular open discussions about IPV and MHDs in the community should be encouraged in order to abolish traditional norms and stigma associated with IPV and MHDs.

Empower and train CHWs so that they can identify warning signs of IPV and MHDs in the community.

Help the community to initiate their own punitive and preventive measures for IPV.

Enhance awareness of IPV, MHDs and ANC through community radios and TV programs.

At society level (policy level)

Develop standard operating procedure on how to ask about violence and how to respond and consider including all forms of IPV and MHDs in ANC guidelines.

Curriculum leading to degrees in nursing and midwifery may be revised and include training on management of IPV and MHDs.

Resources need to be mobilised to equip ANC facilities, train more midwives and provide regular refresher courses for HCPs who are already in practice.

Regular national televised debates on IPV and MHDs involving prominent people in the society.

Practical legal framework on violence committed at all levels should be enacted.

7 FUTURE PERSPECTIVES

We have described the associations of exposure to different forms of IPV during pregnancy with several non-psychotic MHDs during pregnancy and after childbirth. Due to the cross-sectional design of our study, we cannot establish causal relationship of the observed associations. Nevertheless, our findings highlight the need for studies that could be able to establish causality. Results in this thesis provide a crucial starting point. Conclusive findings regarding causality would raise further the awareness of IPV and MHDs and improve maternal and child health immensely.

Next, IPV has widely been associated with child health [181]. Also there is a growing body of evidence suggesting that early-life events play a powerful role in influencing later susceptibility to certain chronic diseases. [182] IPV violence perpetrated against pregnant women may therefore be one of the factors that underlie fetal programming. Future long term studies such as long term follow-up of birth cohorts to determine any effects of all forms of IPV exposure in pregnancy on birth outcomes, child development and early adulthood are important.

Finally, although both IPV and MHDs during pregnancy and childbirth are well-documented global health problems, interventional strategies to prevent and manage them may differ between countries, societies and communities due to existing variable cultural and social norms. Therefore, further research especially in Rwanda and other LICs on the suitable measures to prevent and manage IPV and MHDs during pregnancy are needed.

ACKNOWLEDGEMENT

This thesis wouldn't have happened without the support and contribution from the following people to whom I extend my sincere gratitude.

To the *women* and *men* who welcomed us and took their valuable time to answer our questions, thus making this thesis possible.

To *Gunilla Krantz*, my main supervisor, who not only guided me on everything throughout this project, but also had unwarranted faith in me. We were together at each and every inch of this journey. Your knowledge, energy and enthusiasm were a constant source of motivation for me. Knowing and working with you has made me a better person and I am deeply in your debt for giving me the opportunity to work on this enticing project.

Ingrid Mogren, my co-supervisor, for your unyielding specialized contribution right from the beginning of the project until manuscript submission and revision. As a co-supervisor, you are probably the best there can ever be. I literally could not have done some things without your insights.

Joseph Ntaganira, my co-supervisor, you have been my mentor for sometime. It is you who first inspired me to pursue a PhD and supported me all the way. I am very lucky to have you as a colleague, but most importantly as a friend at the School of Public Health, University of Rwanda.

Kaymarlin Govender and Laetitia Nyirazinyoye. Both of you have taken time out of your busy schedule to contribute to some of my articles. Thank you so much!

I am grateful to my mid-term and final seminar review panel members *Fredrik Spak, Margareta Larsson, Max Petzold, Rune Andersson* and *Laith Hussain*. I benefited from your thorough comments and the success of this thesis has been in no small part due to your constructive inputs.

PhD colleagues in this study programme, *Judith Mukamurigo, Semasaka Sengoma Jean-Paul* and *Regis Hitimana* for your intensive discussions on the design and conduct of the studies and your unwavering support throughout, especially during data collection.

My colleagues at the Section for Epidemiology and Social Medicine (EPSO), University of Gothenburg and the School of Public Health, College of Medicine and Health Sciences, University of Rwanda for your support. My biggest thanks go to *Robin Fornazar*. Thank you for making my life easier.

To all my friends in Rwanda and Sweden who have always believed in me and supported me in one way or the other towards completing this project. My late long-time friend *Raymond* deserves special mention. It is agonizing to remember how just back in December 2017, we were discussing the possibility of you coming to Sweden for my defense. Thank you for your enlivening and trust. For being a true friend while we were together on earth. Yes, life goes on but it will never be the same.

To my family, my father *John* in particular, who loved and supported me unconditionally but did not live to see me reach this landmark. I am

confident you are looking down with pride, but I miss you. My mother *Stephanie*, you have been the single most important person behind everything I have done and achieved. *Dorah Kayitesi*, you have been a blessing and a constant source of inspiration, happiness and success throughout my adulthood.

To *Elior, Holy, Sam, Peninah, Alex, Emma, Fiona, Myriaum* and *Silivanus*, for your love and support.

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