Estimation of postpartum morbidities and risk factors of women presenting for their first postpartum visit at a midwife obstetric unit in eThekwini, South Africa

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Background. Despite reduction of the global maternal mortality ratio by 38% between 2000 and 2017, morbidities during the postpartum period remain the leading cause of maternal death in developing countries. In Africa, most maternal deaths occur during the postpartum period, and deaths during this period are common in South Africa (SA).
Objectives. To estimate the incidence of postpartum morbidities and associated risk factors among women attending a community health centre in SA.
Methods. A facility-based cross-sectional study was undertaken. Both continuous and categorical variables were described using descriptive statistics. Factors associated with postpartum conditions were determined by logistic regression with adjusted odds ratios (ORs), 95% confidence intervals (CIs) and *p*-values. Statistical significance was set at $p<0.05$.
Results. A total of 399 postpartum women participated, with a mean age of 26.1 years. The teenage pregnancy rate was 19.3%, the majority fell into the age group 20 - 34 years (66.5%) and were single (70.1%), and 68.4% had no income. Only 30.2% of mothers had planned the index pregnancy. All of them knew their HIV status, and 41.7% were HIV infected. The postpartum morbidity rate was 35.9%. Logistic regression analysis showed that women who had normal vaginal deliveries (NVDs) and were in full-time employment had lower ORs for any postpartum morbidity (OR 0.47; 95% CI 0.26 - 0.86; $p=0.014$ and OR 0.44; 95% CI 0.21 - 0.88; $p=0.022$, respectively). Participants with no education had an OR of 3.1 (95% CI 1.21 - 8.15; $p=0.019$).
Conclusion. The high postpartum morbidity rate is comparable to previously reported findings at midwife obstetric units in SA. Women who had no education were at increased risk of postpartum conditions, while full-time employment and NVD had protective effects. Skilled obstetric care and maintenance of strict asepsis during delivery are necessary to prevent common postpartum morbidities. Postnatal care should be improved to address the main risks to mothers, and socioeconomic challenges need to be addressed.

Keywords. Puerperium, maternal morbidity, first postnatal visit, risk factors

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The global maternal mortality ratio (MMR, the number of maternal deaths per 100 000 live births) fell by 38% between 2000 and 2017.[1] However, problems during the postpartum period remained the leading cause of maternal deaths in developing countries. A maternal death is defined as death during pregnancy or within 42 days after giving birth, regardless of the length or location of the pregnancy, from any cause related to or exacerbated by the pregnancy or its management, but not from incidental or accidental causes.[2] Two-thirds of all maternal deaths occur in sub-Saharan Africa (SSA). South Africa (SA), the southernmost country in SSA, has a high rate of maternal deaths, with an MMR of 308 per 100 000 live births.[1]

After the baby and placenta are delivered, the 6-week postpartum period, also known as the puerperium, begins. According to the most recent Saving Mothers report, 36% of all maternal deaths in SA occur during the puerperium, and 43% and 50% of institutional maternal deaths are caused by maternal complications (morbidities) identified during labour and the puerperium in midwife-run obstetric units (MOUs) and district hospitals, respectively.[3] The majority of these issues arise during pregnancy and can be prevented or treated. Pregnancy can also exacerbate pre-existing issues, particularly if they are not addressed as part of the woman's care. Severe bleeding (typically after delivery), infections (usually

after delivery), high blood pressure during pregnancy or after delivery (pre-eclampsia and eclampsia), and difficulties during delivery are the main factors that cause over 75% of all maternal deaths.[4] The wide range of postpartum issues includes postpartum haemorrhage (PPH), pregnancy-induced hypertension (PIH), and other serious obstetric and medical morbidities.

During the first year after giving birth, 70% of women experience problems such as difficulties with breastfeeding, sexual dysfunction, urinary incontinence and postpartum depression.[5] Even if a mother has no complications, a routine postpartum visit for a check-up and treatment of any problems is advised within the first 3 weeks following delivery. The goal of postpartum care is to assist women in returning to their pre-pregnancy state of health. Globally, nations are striving to achieve Sustainable Development Goal (SDG) 3, which calls for lowering the worldwide MMR from 216 to less than 70 per 100 000 live births by 2030, with no nation having an MMR that is more than twice the average for the world.[6]

The three most common causes of maternal deaths in SSA related to direct obstetric morbidities are sepsis (10.3%), hypertension (16.0%) and haemorrhage (24.5%).[7] The antepartum period (during pregnancy before the onset of labour), the intrapartum period (during labour and up to 24 hours after delivery), the puerperium (24 hours to 42 days after delivery), and late maternal death from a pregnancy-rated cause (43 days to 1 year after delivery) are the four time frames into which maternal deaths are typically categorised internationally.[8] More than 60% of maternal deaths in SSA take place during the puerperium and the late postpartum period.[8] To reduce maternal deaths as quickly as possible, tailored interventions should address obstetric morbidities that arise during the puerperium and late postpartum period. The objectives of this study were to estimate the incidence of postpartum morbidities and associated factors.

Methods

Study design

Women who attended their initial postnatal care (PNC) appointments at KwaDabeka Community Health Centre (KCHC) in eThekwini, SA, participated in a cross-sectional descriptive survey.

Setting and population

The study was conducted at KCHC, a primary healthcare (PHC) facility that provides comprehensive maternity care for low-risk pregnant women through an MOU. Additionally, it offers a full range of PHC services (first-level care) to residents of the peri-urban areas on the northern and western edges of the eThekwini metropolitan area. The distance between the facility and the heart of eThekwini is ~35 km. For the entire catchment population of the health facility (>150 000), there are seven additional PHC fixed clinics under KCHC that offer PHC service packages including maternity care. Most of the residents are poor and without employment, black African, living in both formal and informal housing, and dependent on public health facilities. According to the clinic's unpublished data, there is a head count of 240 000 annually, with an average of 5 000 related to pregnancy (prenatal, delivery and postnatal). About 1 500 pregnant women attend the antenatal clinic each year, and there are ~700 deliveries. With qualified and experienced midwives and other support staff, KCHC offers 24-hour delivery and emergency services, as well as regular care during the day (07h30 - 16h00) for antenatal care (ANC) and PNC of women and their newborns.

ANC, delivery services, PNC, and comprehensive reproductive healthcare for women and adolescents are all included in the PHC service package in SA.[9] Pregnant women with low-risk pregnancies go to designated PHC clinics for ANC, and in our study setting many give birth at KCHC MOU. PHC facilities, including KCHC, refer intermediate- and high-risk pregnancies to hospitals for antenatal care and delivery. Low-risk women who give birth in hospital are referred back to KCHC for PNC. At KCHC, PNC includes access to a midwife and involves general examination of the mother (blood pressure, pulse, temperature, urinalysis, etc.), screening for anaemia (haemoglobin concentration) and diabetes (random blood sugar for women with known diabetes mellitus who are receiving treatment and those who are at increased risk), HIV testing and HIV infection management in accordance with the SA national protocol, family planning services, and provision of psychosocial support in accordance with national guidelines.[9] Weight checks, completion of the Road to Health card, and any issues pertaining to the newborn's feeding are all part of the baby's care.

Selection of the study sample

During the study period January - June 2021, all women who had given birth – vaginally with or without instrumental assistance, or by caesarean section (CS) – were attending KCHC for their first PNC visit, and provided written consent for the study were eligible to participate. Mothers who declined to participate and those attending for repeat PNC visits were excluded from the study.

Definitions

Postpartum morbidity was defined as any health problem or complication, whether life-threatening or not, arising from pregnancy and childbirth and experienced between 24 hours and 6 weeks after the birth of a baby (during the period referred to as the puerperium). Some of these problems are caused by the woman's body reverting to its pre-pregnancy state.[6] For this study, we considered any morbidity that was present at the first PNC visit.

Perineal wound infections and postpartum infections of various uterine anatomical layers (such as endometritis, myometritis and chorioamnionitis) were categorised as puerperal sepsis. Clinical symptoms and indications of maternal pyrexia, with or without foul-smelling discharge, were used to diagnose endometritis.[10] Infection of the perineum resulting from episiotomy or perineal damage was identified.

Excessive vaginal bleeding was classified as primary PPH if it occurred within the first 24 hours after delivery, and as secondary PPH if it took place between 24 hours and 6 weeks after delivery.[11] In this study, any PPH was secondary PPH.

Deep-vein thrombosis (DVT) and all related conditions, including ischaemic stroke, pulmonary embolism (PE), ovarian vein thrombosis, myocardial infarction, amniotic fluid embolism, and

HELLP (haemolysis, elevated liver enzymes, and low platelet count) syndrome, were included in the category of thrombotic conditions (thromboembolism).[12]

Milk stasis and skin rips can cause acute puerperal mastitis, an acute infectious inflammation of the breast parenchyma during breastfeeding that is linked to pyogenic aggressiveness. Clinical signs and symptoms include discomfort, redness, swelling, and elevated body temperature.[13,14] A breast abscess is a severe form of mastitis.

During pregnancy and the puerperium, women are at increased risk of developing a urinary tract infection (UTI) because of physiological changes in the urinary tract that persist after birth.[15]

PIH, pre-eclampsia and/or eclampsia were all included in the category of postpartum hypertensive disorder. PIH is diagnosed when a pregnant woman's blood pressure is >140/90 mmHg and she has proteinuria (≥300 g in 24 hours). Seizures, severe headaches, and epigastric discomfort are other warning signs and symptoms.

Glucose intolerance that develops during pregnancy is referred to as gestational diabetes mellitus (GDM).

Data collection

The pretested questionnaire included the study participants' demographic and obstetric characteristics in addition to symptoms of common postpartum conditions and the diagnosis of the attending midwife. It was a closed-ended questionnaire that was created in both isiZulu and English. During the consultation, the midwives (trained on study data collection) employed at the postnatal clinic used the instrument. Without affecting their care during consultation, all eligible women were asked to voluntarily take part in the study. The tool assessed the participants' age, education, employment, relationship status, HIV status, delivery method and delivery location, whether the pregnancy was planned, breastfeeding status, and family planning method.

Data analysis

A research assistant double-entered the collected data into an Excel application (Microsoft Office version 16.0; Microsoft, USA), then exported and coded it for analysis in SPSS 24.0.1 (SPSS, USA). Both continuous and categorical variables were described using descriptive statistics. For continuous data, the mean and standard deviation (SD) values were computed, while proportions were computed for categorical variables. The midwife evaluated the maternal morbidity symptoms and signs to determine the postpartum condition or problems in accordance with the SA maternity care standards.[10] In situations involving misunderstandings and challenges with regard to diagnosis, treatment and hospital referrals, the opinion of a medical officer was sought. For this study, the presence of one or more postpartum problems was regarded as the outcome variable, with binary values (1 = yes and 0 = no). Obstetric and demographic factors were regarded as exposure or independent variables. Using cross-table analysis using Pearson's χ^2 and *p*-values for the outcome variable, significant exposure variables were identified with *p*-values <0.05. To find a potential predictor or predictors for the outcome variable, binary logistic regression analysis was performed on the relevant exposure variables. The outcomes of the regression model were presented as adjusted odds ratios (ORs) along with corresponding *p*-values and 95% confidence intervals (CIs).

Ethical considerations

The researchers approached eligible participants to participate in the study. After ensuring that the subject understood her rights and outlining the study's goals and methodology prior to data collection, informed consent was obtained. Study participants remained anonymous. The KwaZulu-Natal Health Research and Knowledge Management Unit (ref. no. KZ_202110_023) and the uMgungundlovu Health Ethics Research Board (ref. no. 012/2021) both approved the research proposal.

Results

Our study sample consisted of 399 women attending for their first postpartum visit out of the 756 women who came for first and subsequent visits at the postnatal clinic during the study period. All these women consented to participate in the study. The study participants' demographic and obstetric data, along with the results of a cross-tabulation analysis with the outcome variable (having or not having any postpartum morbidities), are shown in Table 1. The participants' ages ranged from 14 to 44 years, with a mean (SD) of 26.1 (6.3) years. The rate of teenage pregnancies was 19.3%. Almost half of the participants (49.2%) were between the ages of 20 and 29 years, 70.1% were unmarried, and 56.1% had matriculated. Almost all the participants (99.0%) were breastfeeding (3 mothers had lost their babies), and 84.5% were using some kind of modern birth control method. Just over one-third (35.7%) of the participants had given birth at KCHC, with the majority (64.3%) delivering at a hospital. The rates for CS and NVD were 15.3% and 74.7%, respectively. Every woman was aware of her HIV status, and 41.7% of them were HIV infected and on antiretroviral therapy (ART). In cross-tabulation with the outcome variable, the exposure variables level of education, employment status, whether the pregnancy was planned, and mode and place of delivery were shown to be significant ($p<0.05$). To find risk factors, these significant exposure variables were put into a (backward) binary logistic analysis.

Evaluation of the participants' postpartum problems (Table 2) showed that 143 (35.9%) of them had at least one complication. The most prevalent issue was secondary PPH (9.7%), followed by acute puerperal sepsis (8.0%), UTI (6.7%) and acute mastitis (5.2%). Only 3% of postpartum morbidities were nonspecific. Twenty-five women (6.3%) were referred to hospital for additional care.

Binary logistic regression analysis (Table 3) showed that women who had an NVD had a lower OR for any postpartum morbidity (OR 0.47; 95% CI 0.26 - 0.86; $p=0.014$) compared with CS delivery (reference group). Similarly, full-time employment was associated with a lower OR (OR 0.44; 95% CI 0.21 - 0.88; $p=0.022$). Conversely, the OR for women with no education was greater at 3.1 (95% CI 1.21 - 8.15; $p=0.019$) than ORs for women who had some schooling.

Discussion

The first objective of this study was to measure the prevalence of postpartum problems among women who were attending the MOU for their first PNC visit, and analysing the risk factors associated with them. We found that 35.9% of the study participants had at least one postpartum complication, and 6.3% of women needed to be sent to the hospital for serious conditions. Similar percentages of hospital referrals during the postpartum period were observed at

Table 1. Analysis of study participants' characteristics with outcome variables (*N*=399)

Variables	Participants, *n* (%)*	Frequency of any morbidity, *n* (%)	χ^2-value	*p*-value
Age (years)			3.43	0.487
<20 (adolescent)	77 (19.3)	30 (21.0)		
20 - 2 4	98 (24.6)	35 (24.4)		
25 - 29	98 (24.6)	28 (19.6)		
30 - 34	69 (17.3)	28 (19.6)		
>34	57 (14.3)	22 (15.4)		
Mean (SD)	26.1 (6.3)			
Relationship status			20.4	0.360
Single	279 (70.1)	102 (71.3)		
Married	119 (29.6)	40 (28.0)		
Widow	1 (0.3)	1 (0.3)		
Level of education			14.70	0.005
No education	31 (7.8)	20 (14.0)		
1 - 5 years	2 (0.5)	1 (0.7)		
6 - 11 years	59 (14.8)	24 (16.8)		
Matric completed	224 (56.1)	75 (52.4)		
Higher education	83 (20.8)	23 (16.1)		
Employment status			10.02	0.018
Full-time employment	70 (17.5)	14 (9.8)		
Part-time employment	56 (14.0)	19 (13.3)		
Student	132 (33.1)	53 (37.1)		
Unemployed	141 (35.3)	57 (39.9)		
Parity			1.21	0.161
1	171 (43.0)	63 (44.1)		
2 - 3	190 (47.8)	65 (45.5)		
≥4	37 (9.2)	15 (10.4)		
Planned pregnancy			3.41	0.041
Yes	121 (30.2)	35 (24.5)		
No	278 (69.8)	108 (75.5)		
HIV status at birth			2.003	0.367
HIV negative	229 (58.3)	80 (56.0)		
HIV positive	170 (41.7)	63 (44.0)		
Taking ART/PMTCT (*n*=170)	170 (100.0)			
Mode of delivery			15.11	0.001
NVD	298 (74.7)	94 (65.7)		
Vaginal delivery with use of forceps	6 (1.5)	4 (2.8)		
Vaginal delivery with use of ventouse	34 (8.5)	11 (7.7)		
CS	61 (15.3)	34 (23.8)		
Breastfeeding			3.31	0.431
Yes	395 (99.0)	137 (96.4)		
No	4 (1.0)	5 (3.6)		
Using any form of contraception			1.551	0.96
Yes	341 (85.5)	120 (84.5)		
No	58 (14.5)	22 (15.5)		
Place of delivery			3.83	0.033
KCHC	142 (35.7)	60 (42.0)		
Hospital	257 (64.3)	83 (58.0)		

SD = standard deviation; ART = antiretroviral therapy; PMTCT = prevention of mother-to-child transmission; NVD = normal vaginal delivery; CS = caesarean section; KCHC = KwaDabeka Community Health Centre.
*Except where otherwise indicated.

two MOUs in rural SA (5.9% and 6.1%, respectively) and in Tanzania (5%).[16-18] It has been reported that 91% of women in SA give birth in a facility with trained birth attendants, and 92% of them attend ANC at least once.[19] It was unknown, however, what percentage of mothers gave birth and sought PNC at public health facilities, specifically at KCHC. One would anticipate a higher rate of PNC utilisation among our target group given that maternity care, including ANC and delivery, are provided free of charge in SA public health facilities, and initiatives are in place to encourage women to use these facilities for maternity care.

The sociodemographic characteristics of our sample, including a high rate of adolescent pregnancies (19.3%), low levels of basic education (56.1% of participants had matriculated) and a high rate of unemployment (35.3%), point to precarious socioeconomic circumstances. It is therefore assumed that the majority of the study participants, if not all, attended the free PNC services offered at KCHC near their homes, despite the fact that a significant proportion of them (64.3%) gave birth in hospitals. The study sample is believed to be representative of the community's postnatal population because the high HIV prevalence (41.7%) and the high proportion of adolescents in the sample (19.3%) are similar to those found in a previous study at the same health facility (41.6% and 18.2%, respectively).[20]

Table 2. Postpartum complications experienced by the study participants (*N*=399)

Independent variables	*n* (%)
PPH	39 (9.7)
Puerperal sepsis	32 (8.0)
UTI	27 (6.7)
Acute mastitis	21 (5.2)
Thrombotic condition	11 (2.7)
Suspected PE	9 (2.3)
Hypertensive disorder (PIH, pre-eclampsia or eclampsia)	7 (1.7)
Diabetes mellitus (both GDM and known diabetes mellitus)	7 (1.7)
Other conditions	12 (3.0)
Identified any postpartum complication	143 (35.9)
Required referral to hospital	25 (6.3)

PPH = postpartum haemorrhage; UTI = urinary tract infection; PE = pulmonary embolism; PIH = pregnancy-induced hypertension; GDM = gestational diabetes mellitus.

Teenage pregnancy is a complicated emotional issue, with multiple contributing factors in SA. The increasing rate of teenage pregnancy is frequently believed to be related to the child support grant, a social assistance programme that offers pregnant adolescents some relief from financial hardship.[21,22] There has been an increase in teenage pregnancies following implementation of the child support grant.[22] Media influence, the effects of peer pressure on adolescents, not using birth control, carelessness, ambiguity, choice, and a lack of familial ties were found to be additional factors contributing to teenage pregnancies.[22] Because pregnancy often makes it difficult for teenage girls to continue their education, both before and after birth of the baby, this increase has a significant detrimental effect in terms of higher educational achievement of teenage girls and advancement of their future careers.[22] Many of these girls have to drop out of school to care for their child.[22] It is likely that parents who are unlucky enough to be in this situation will not send their daughter back to school.[21] Teenage girls are more likely to seek advice and information about sex from their friends than from their parents. Dysfunctional family dynamics resulting in lack of parental guidance and support is another factor that influences teenage pregnancy.[22,23]

The 69.8% rate of unplanned or unintended pregnancies in this study (all age groups) is significant and concerning. Compared with Ethiopia (51%), Tanzania (46%), Ghana (40%) and Sierra Leone (32%),[24-27] our rate is considerably higher. This discrepancy emphasises how complex unintended pregnancies are and how important it is to understand contextual factors. Another study in an African setting showed that unemployment, age under 20, and single status were individually associated with unintended pregnancies.[22] It is therefore imperative to set up local initiatives such as the creation of national and local guidelines

Table 3. Final step of logistic regression output of study participants' characteristics for postpartum morbidity

Variables*	*p*-value*	Adjusted OR	95% CI for OR
Mode of delivery	0.043		
NVD	0.014	0.475	0.261 - 0.862
Use of forceps	0.528	1.814	0.286 - 11.512
Use of ventouse	0.080	0.444	0.179 - 1.102
Level of education	0.160		
No education	0.019	3.142	1.211 - 8.152
1 - 5 years	0.791	1.489	0.079 - 28.162
6 - 11 years	0.670	1.192	0.532 - 2.672
Matric completed	0.808	1.076	0.597 - 1.938
Employment status	0.077		
Full-time employment	0.022	0.440	0.218 - 0.887
Part-time employment	0.987	0.994	0.503 - 1.966
Studying	0.678	1.122	0.652 - 1.929
Constant	0.903	0.951	

OR = odds ratio; CI = confidence interval; NVD = normal vaginal delivery.
*Reference groups: caesarean delivery, post-matric (>12 years) education, and unemployed women.

and regular in-service training of midwives (in our MOU) or community healthcare workers in accordance with the World Health Organization's recommendations on preventing early pregnancy and poor reproductive outcomes in adolescents and women of reproductive age as part of the SDGs.[28,29]

While more than one-third (35.7%) of the women in our study had given birth at KCHC, the majority (64.3%) had delivered in hospitals. These figures are in line with SA's national trend of over 60% of women giving birth in hospitals[9] as a result of problems during the antenatal period or during labour that led to a hospital referral for ANC and delivery. The high HIV prevalence rate of 41.7% is in line with other data from SA, but it is encouraging that the previous study at this facility found that all HIV-positive women in our community were receiving ART at the conclusion of their pregnancies.[20] The fact that HIV status did not predict postpartum morbidities may be because ART was initiated at the appropriate time and compliance with ART was good.

The present study found that the most common problems at the first postpartum visit were UTI, acute mastitis, secondary PPH, and acute puerperal sepsis. Differentiating between normal puerperal blood loss and abnormal haemorrhage proved difficult.[11] Retained products of conception is the most important cause of PPH. Primary PPH, which is most prevalent in low-income countries, is one of the leading causes of maternal death. However, several studies have revealed that high-income countries are seeing an increase in the prevalence of primary PPH.[30] Secondary PPH is defined as excessive blood loss that occurs after 24 hours of delivery, with a higher prevalence before 14 days than after this period.[11] Although it is less common than primary haemorrhage and occurs after only 1 - 2% of deliveries, it is a significant cause of morbidity and mortality.[30] Secondary PPH is usually diagnosed clinically, although the diagnosis is often delayed because it can be difficult to differentiate between pathological and physiological bleeding.[11,30]

Puerperal sepsis, which includes endometritis (infection of the uterine decidua or lining), endomyometritis (infection of the myometrium), chorioamnionitis (infection of the fetal membranes) and perineal infection, was another common postpartum complication in our study. The combined rate of puerperal sepsis in our sample (8.0%) is comparable to other reports. It generally occurs within the first 7 days after delivery and is one of the primary causes of maternal infection after delivery or miscarriage.[31,32] A recent meta-analysis reported that in all deliveries (NVD, assisted vaginal and CS), the incidence of sepsis was 0.5%, wound infection 1.2%, endometritis 1.6%, and chorioamnionitis alone 3.9%.[32]

The 5.2% rate of acute puerperal mastitis in our study is similar to rates reported in earlier research.[13] Breast abscess is a serious outcome of postpartum mastitis.[13,14] Similar clinical signs and symptoms, such as a painfully swollen breast and heat and redness of the affected breast, were evident in both our study and earlier research.[14]

It is well recognised that pregnancy-related changes to the urinary tract that persist after birth increase the risk of developing a UTI during the puerperium. A higher maternal body mass index and/or CS or instrumental vaginal delivery, and postpartum urinary bladder catheterisation, are known to be risk factors for UTI.[5] Some of these risk factors were common in our situation. A significant incidence of such issues (risk factors for UTI) can be avoided with skilled obstetric care, active labour management, avoidance of overcrowding, universal precautions, and maintenance of stricter asepsis during delivery.

The prevalence of thromboembolic problems during pregnancy and the postpartum period is between 5.4% and 12.7%.[12,33,34] Thromboembolism is one of the leading causes of maternal mortality. A study revealed that the rate of embolism was 4.5% during pregnancy and that it was most prevalent during the puerperium, with 61.3% of cases occurring only after birth.[5] The rate in our study was 2.7%. If thrombosis occurred during a previous pregnancy, the rate of recurrence without thrombotic prophylaxis is significant, reported as ranging from 5.5% to 15.5%.[33,34] During the puerperium, thromboembolism can occur at any time. Our figure of 2.7% and the 4.5% incidence in the North American study are comparable.[5] Two of the main causes of morbidity and death during pregnancy and the postpartum period are DVT and PE. It has been estimated that the risk of thrombosis during the postpartum period is almost five times greater than that during pregnancy.[35]

Hypertensive conditions, including pre-eclampsia and eclampsia, occur more frequently during pregnancy than during the puerperium, although postpartum cases can occur. Blood pressure is known to peak 3 - 6 days after giving birth.[36,37] Increased blood pressure and pre-eclampsia or eclampsia can have various causes, including medications such as non-steroidal anti-inflammatory drugs, excessive fluid administration, or the return of vascular tone to its pre-pregnancy level.[37,38] Similar to previous studies, 1.7% of the women in our study had hypertensive conditions, including PIH and pre-eclampsia.[39] These women frequently have visual abnormalities or recurrent headaches that may occur suddenly.[38] In our facility, we have a high clinical index of suspicion when taking blood pressure, doing urinalysis, and speaking with clinic or hospital obstetricians about potential referrals. To avoid HELLP syndrome and other end-organ consequences, all women with postpartum hypertension are referred to the hospital, despite the fact that pre-eclampsia and PIH typically resolve by 12 weeks after delivery.[37,40] Eclampsia, which is considered an emergency, is initially managed in the labour ward and the patient is referred to a hospital. Postpartum hypertension, pre-eclampsia and eclampsia were not common in our cohort. Similar to earlier data from SA, the low frequency of hypertensive conditions (1.7%) at the first PNC visit may be due to the relatively young median age of the study population.[16]

Another pregnancy complication is GDM, which can occur during pregnancy and the puerperium.[41] GDM is on the rise in many countries, much like type 2 diabetes mellitus.[42] An estimated 30% of women with GDM continue to have glucose intolerance after delivery, and more than half of them eventually have a diagnosis of overt diabetes.[43] The incidence of type 2 diabetes is higher after an index pregnancy with GDM than after a pregnancy without GDM.[43] It is therefore recommended that women who have had GDM should see their primary care physician within a year of giving birth.

The present study found that women with no education had a OR of 3.1 (95% CI 1.21 - 8.15; p=0.019), indicating a three

times increased chance of experiencing postpartum morbidities. Women who were employed full time and those who had an NVD were 56% (OR 0.44; 95% CI 0.21 - 0.88; p=0.022) and 53% (OR 0.47; 95% CI 0.26 - 0.86; p=0.014), respectively, less likely to have postpartum morbidities than those who were unemployed or had an instrumental delivery or a CS. This is comparable to previously reported findings.[14,16] To improve maternal health outcomes over the long term, policies and initiatives that are known to support girls' access to and completion of formal education, especially in under-served and rural regions, should be strengthened. This is especially true for younger women. Long-term strategies to promote women's employment and socioeconomic empowerment should be prioritised. Economic empowerment is known to increase women's health knowledge and access to healthcare services. Interventions should also concentrate on establishing conditions that allow women to work, such as flexible work schedules, maternity protections in the workplace, and health education in work environments. The study findings also point to the need to promote and support safe NVD, when medically appropriate, to reduce postpartum morbidities. In order to reduce needless CSs, enhance the quality of skilled birth attendance, and detect and treat concerns early, health systems should improve prenatal care. Additionally, because women without formal education and those not working full time seem to be more susceptible to postpartum morbidities, targeted postnatal therapies should be prioritised for high-risk groups.

Study limitations

In this study, none of the major maternal morbidities were significantly impacted by HIV status; however, there remain worries over the potential long-term side-effects of HIV and ART. Longitudinal cohort research should be conducted to further investigate such implications. The potential for broad application of our results was restricted by the single-centre study. Nonetheless, we determined the extent of and related risk factors for postpartum problems among women who attended for PNC, as well as the necessary interventions. Additionally, it was assumed that the majority of postpartum women in the catchment area attend this MOU because they are disadvantaged and receive free medical care at public health facilities. Owing to maternal problems, high-risk groups may have visited hospitals and/or continued care at hospitals.

Conclusion

A mother, her baby and her family go through a crucial phase of physiological, emotional and social adjustment during the postpartum period. In our study, the most frequent early puerperal complications were PPH (9.7%), sepsis (8.0%), UTI (6.7%) and mastitis (5%), with a total rate of postpartum morbidity of 35.9%. Uneducated women were particularly vulnerable, while full-time employment and an NVD were shown to be protective against puerperal problems. A significant proportion of such issues can be avoided with skilled obstetric care, active labour management, and maintenance of stricter asepsis during delivery. Additionally, it is crucial for midwives in our context to have a basic understanding of the most prevalent and serious conditions experienced by postpartum women during the puerperium.

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