ORIGINAL RESEARCH ARTICLE

Effect of pregnancy intention on the timing and sustained use of antenatal care services in Rwanda

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Abstract

We investigated the relationship between intended pregnancy and utilization of antenatal care services in Rwanda. Using Demographic and Health Survey 2014/2015, secondary data was obtained on maternal health services utilization. We performed stepwise logistic regression analysis to examine the effect of independent variables on women's early and late utilization, as well as their sustained use of antenatal services. Dependent and main independent variables included: first trimester visits, completed antenatal visits and intended pregnancy respectively. Of 5,944 women sampled; 56.6% had made early antenatal visits and 44% had completed 4 visits. Unintended pregnancies were less likely to make early antenatal visits and complete 4 antenatal visits. Religion and being in union had positive association with standard antenatal visits; while age (>24 years), grand multiparty, and poor economic status had negative association. Our results call for deeper sensitization on utilization of antenatal services and more use of contraception to reduce unintended pregnancies. *(Afr J Reprod Health 2021; 25[1]: 90-100).*

Keywords: Antenatal care, pregnancy intention, maternal health

Résumé

Nous avons étudié la relation entre la grossesse prévue et l'utilisation des services de soins prénatals au Rwanda. À l'aide de l'Enquête démographique et de santé 2014/2015, des données secondaires ont été obtenues sur l'utilisation des services de santé maternelle. Nous avons effectué une analyse de régression logistique par étapes pour examiner l'effet de variables indépendantes sur l'utilisation précoce et tardive des femmes, ainsi que leur utilisation soutenue des services prénatals. Les variables dépendantes et principales indépendantes comprenaient: les visites au premier trimestre, les visites prénatales terminées et la grossesse prévue respectivement. Sur 5 944 femmes échantillonnées; 56,6% avaient effectué des visites prénatales précoces et 44% avaient effectué 4 visites. Les grossesses non désirées étaient moins susceptibles de faire des visites prénatales précoces et d'effectuer 4 visites prénatales. La religion et le fait d'être en union avaient une association positive avec les visites prénatales standard; tandis que l'âge (> 24 ans), le grand multipartisme et la mauvaise situation économique avaient une association négative. Nos résultats appellent à une sensibilisation plus profonde sur l'utilisation des services prénatals et une plus grande utilisation de la contraception pour réduire les grossesses non désirées. *(Afr J Reprod Health 2021; 25[1]: 90-100).*

Mots-clés: Soins prénatals, intention de grossesse, santé maternelle

Introduction

Unintended pregnancies are pregnancies that are either mistimed, unplanned or unwanted at the time of conception[1]. It is estimated that over 44% of all pregnancies worldwide are unintended with higher percentages in developing countries[2]. In sub-Saharan Africa, approximately 14 million pregnancies yearly occur unintentionally[3]. A pregnancy whether intended or unintended, can effect maternal behaviour and infant health as a result of various factors[4]. Meanwhile, a pregnant woman needs to make several antenatal visits during which she gets education on pregnancy, preparation for delivery, postnatal services, breastfeeding and counselling on family planning. She also gets a minimum package of vaccination, iron and vitamin supplements, early detection and management of pre-existing health conditions as well as receive tracking for newly detected health conditions related to her pregnancy. Until 2016, the World Health Organization (WHO) recommended

a minimum of 4 antenatal visits throughout pregnancy. Recently the recommendations have been upgraded to 8 due to proven reduction of maternal-fetal mortality and morbidity compared to 4 antenatal visits[5–8].

Rwanda has generally made significant progress towards reducing maternal and child mortality. The utilization of skilled birth attendants at deliveries is high at 91 percent, because of the Community Health Worker program[9]. Further, the Rwandan government is committed to further improve access and utilization of maternal and child health (MCH) services in Rwanda to meet the Sustainable Development Goals (SDG) 4 and 5. However a number of factors affect the use of antenatal services and among them include unintended pregnancy[10]. Studies in Tanzania have shown lower rates of timing of first antenatal visit and subsequent visits among women who had unintended pregnancies compared to those who planned to be pregnant[10,11].

According to a woman's feelings about whether she wanted to have a baby and whether pregnancy was well timed significantly influence her healthcare seeking behaviors, particularly her utilization of antenatal health services[12,13]. Various studies have also discussed other risk factors associated with unwanted pregnancy including neonatal death, preterm birth, complications during pregnancy and poor psychosocial health[14,15]. Furthermore, Thogarapalli et al (2015) working in Rwanda found that women who reported unintended pregnancies where more likely to report non-use or inconsistent use of recommended insecticide-treated bed and yet these bed nets are freely distributed to pregnant women during antenatal care services (ANC) as a government strategy to prevent malaria to more susceptible groups[13,16]. Other risk associated with unplanned pregnancies include a lack of sustained breast-feeding, alcohol consumption and poor uptake of malaria prophylaxis[13,17–20].

In Rwanda, what remains unclear is the effect of pregnancy intention on a woman's decision to access maternal health services during the first trimester and follow through with the WHO recommended number of visits (at least 4 times). More so, it is not known how geography within Rwanda – Kigali (capital) and provinces, North, South, East, - influences the timing and utilization of ANC. In response, this paper investigates the relationship between pregnancy intention and the utilization of ANC. The results will be useful for policy as Rwanda strives to meet its SDG targets.

Methods

Cross-sectional design

This cross-sectional study utilized data from the Rwanda Demographic and Health Surveys (RDHS 2014/2015). The RDHS is a nationally representative cross-sectional dataset collected by Rwanda's Ministry of Health in collaboration with the Monitoring and Evaluation to Assess and Use Results (MEASURE) project, funded by the US Agency for International Development (USAID) Measure. Districts were selected from administrative regions, which were further divided into Enumeration Areas (EAs) and classified into rural and urban areas[9]. A representative sample of households was drawn from EAs within the rural and urban clusters.

Like other DHS datasets, the RHDS 2014–15 data are freely available online, subject to a brief application to DHS MEASURE providing justification for requesting access to the dataset and a statement of commitment to ethical use of the information. The criteria for sample selection in this study was based on women aged 15-49 years with at least one live child at the time of RDHS survey and, a total sample of 5,944 women met the criteria and were used for the analysis. The survey captured information on respondent's characteristics (e.g. age, religion, education, literacy, and employment), sexual and reproductive health and maternal health seeking behaviors. Details of the RDHS 2014–15 sampling procedure and techniques are in the final report of the survey itself (Rwanda Government 2014–15).

Outcome and explanatory variables

Two dependent variables, which serve as indicators for maternal health service utilization both in the Millennium Development Goals (MDG) and SGDs, were used in this analysis. These were: timing of first visit– derived from a question on whether a woman visited for ANC during the last pregnancy;

and number of visits –from a question on total number of antenatal visits during the last pregnancy. Informed by WHO recommendations, we categorized timing of first antenatal visit into early – women who had their first antennal visit in the first trimester, and late – those who attended their first antenatal beyond the first trimester and those who never had antenatal service throughout their pregnancy. Early and late visits were coded 1 and 0, respectively. Number of antenatal visits was categorized into those that had at least four visits (4+ antenatal visits) and those who never had or had less than four antenatal visits (coded 1 and 0, respectively).

The main independent variable was pregnancy intention of a recently completed pregnancy, derived from response to the survey question "wanted pregnancy when became pregnant?" The variable was coded based on the responses to the question. Thus 0=wanted then, 1=wanted later and 2=wanted no more. Other independent variables included the provinces of residence (which encapsulates a measure of availability of health facilities and services), transportation to health facilities, travel and wait times at facilities, which enable or constrain utilization of maternal health services. All five provinces of the country were used (coded: 1=Kigali city, 2=South, 3=West, 4=North and 5=East) with Kigali city used as the reference province in the regression analysis. Other independent variables were: place of residence (coded urban=1 rural=2), distance to health facility (coded small problem=1 and big problem=2), household wealth index according to the poverty line (coded richest=1, richer=2, middle=3, poor=4, and poorest=5), employment status (coded Yes=1, No=2), and money for health care (coded small problem=1 and big problem=2). The rest were age (coded 15-24=1, 25-39=2 and 40-49=3) level of education (coded secondary and higher=1, primary=2 and no education=3), marital status (coded currently married=1, currently not married=2 and never in a union=3), parity (coded 1-6 children=1, and 7 or more children=2), and religion (coded Christian=1, and non-Christian=2).

Data analysis

A bivariate analysis was conducted to identify the association between the dependent and relevant independent variables in our analysis. A stepwise logistic regression model to examine the effect of the independent variables on women's early and late utilization, as well as sustained use of maternal health services was performed. The assumption behind the models is that respondents are independent but given that most RDHS surveys follow hierarchical sampling whereby respondents are nested within clusters of enumeration areas, the results could be potentially biased. To address this limitation, a cluster variable was imposed (respondent's unique ID) to produce robust estimates for uptake of antenatal services in Rwanda. Sample weights (available in DHS surveys) were used to account for the probability of selection of each participant to improve proportionality in the samples. Thus, the odds ratios for the bivariate and multivariate analysis, together with their standard errors are reported. All data were analysed using STATA 15SE.

Results

Sample characteristics

Table 1 shows the characteristics of the sample used in the study. It indicates that 56.6% of the sampled women went for early antenatal visit in the first trimester of their pregnancy, while 44.04% followed through with the recommended 4+ antenatal care visits. Approximately 60% of the women intentionally got pregnant at the last pregnancy, 26.78% later wanted the pregnancy even though it was not intentional, whereas 13% no longer wanted their last pregnancy after they became pregnant.

In terms of spatial distribution of the respondents, 25.03% were resident in the Eastern province, whereas Kigali city had the fewest number of respondents (11.98%). Meanwhile, majority of the women (77.93%) lived in rural areas, 14.15% had no formal education and 14.74% were unemployed.

Table 1: Descriptive statistics (n=5,944)

Dependent variables	Frequency (%)
Timing of first ANC visit	
Early	3,339 (56.64)
Late	2,556 (43.36)
Number of ANC visits	
4+ visits	2,618(44.04)
< 4 visits	3,326(55.96)
Pregnancy intention	
Intended	3,583(60.28)
Unintended but wanted later	1,586(26.68)
Wanted no more	775(13.04)
Province	
Kigali City	712(11.98)
South	1,482(24.93)
West	1,398(23.52)
North	864(14.54)
East	1,488(25.03)
Place of residence	
Rural	4,632(77.93)
Urban	1,312(22.07)
Educational level	
No education	841(14.15)
Primary education	4,227(71.11)
Secondary or higher	876(14.74)
Employment status	
Yes	5,104(85.87)
No	840(14.13)
Marital status	
Never in union	623(10.48)
currently in union/living with a man	4,736(79.68)
Formerly in union/Living with a man	585(9.840
Age	
15-24	1,253(21.08)
25-39	4,084(68.71)
40-49	607(10.21)
Religion	
Christians	5,770(97.07)
Non-Christians	174(2.93)
Wealth index	
Richest	1,155(19.43)
Richer	1,036(17.43)
Middle	1,117(18.79)
Poorer	1,238(20.83)
Poorest	1,398(23.52)
Distance to Health Facility	
Not A Big Problem	4,633(77.94)
Big Problem	1,311(22.06)
Money for health care	
Not a big problem	2,814(47.34)
Big problem	3,130(52.66)
Terminated pregnancy	
No	5,038(84.76)
Yes	906(15.24)
Parity	
1 to 6	5,430(91.35)
7 or more	514(8.65)

Nonetheless, 77.94% considered distance to health facility as a small problem. More than 40% of women were classified in the poor or poorest wealth bracket and reported money for healthcare as a big problem (52.66%).

Bivariate analysis

The results of the bivariate analysis are presented in Table 2. Relative to women with intended pregnancy, women who had unintended pregnancy but later wanted the pregnancy were less likely (OR=0.593, p≤0.001) to make an early antenatal visit and were less likely (OR=0.659, p≤0.001) to make the WHO-recommended 4+ visits during the pregnancy. Compared to women who wanted to be pregnant, women who no longer wanted their pregnancy at some point were also less likely (OR=0.484, p≤0.001) to make an early antenatal visit and were less likely (OR=0.604, p≤0.001) to meet the recommended 4+ visits. Compared to Kigali city, women in the Southern and Northern provinces were significantly more likely (OR=1.506, p≤0.001 and OR=1.627, p≤0.001, respectively) to make antenatal visit during the first trimester. Also, women in the Western province were more likely (OR=1.265, p≤0.05) to make 4+ antenatal visits even though there is no statistical significance to the timing of first visit; whilst those in the Eastern province were more likely (OR=1.249, p≤0.05) to visit the hospital during the first trimester, but the association with completed number of visits was not statistically significant. Aged women (40-49years) were less likely (OR=0.587, p≤0.001) to utilize the first trimester visit for antenatal services compared with those within the younger age group (15-24years), and were less likely (OR=0.804, p≤0.05) to make 4+ visits during pregnancy. Similarly, those in poorer and poorest wealth brackets were less likely to utilize early antenatal visit.

Multivariate analysis

In model 2, we controlled for the effect on socio-demographic variables. Table 3 presents results of the multivariate analysis on the effect of pregnancy intention on maternal health service

Table 2: Results for bivariate analysis (significance levels (*) are defined at end of table)

	Timing of 1st ANC Visit Odds Ratios (SE)	**4+ ANC Visits Odds Ratios (SE)**
Pregnancy Intention		
Intended	1.000	1.000
Unintended but wanted later	0.593(0.04)***	0.659(0.04)***
Wanted no more	0.484(0.04)***	0.604(0.05)***
Province		
Kigali City	1.000	1.000
South	1.506(0.14)***	1.627(0.15)***
West	1.183(0.11)	1.265(0.12)*
North	1.452(0.15)***	1.417(0.15)***
East	1.249(0.11)*	0.946(0.09)
Place Of Residence		
Urban	1.000	1.000
Rural	0.897(0.06)	0.970(0.06)
Level Of Education		
Secondary or higher	1.000	1.000
Primary	0.619(0.05)***	0.764(0.06)***
No Education	0.458(0.05)***	0.577(0.06)***
Employment Status		
Yes	1.000	1.000
No	0.904(0.07)	0.906(0.07)
Marital Status		
Currently in union/living with a man	1.000	1.000
Formerly in union	1.232(0.11)*	1.252(0.11)*
Never In union	0.803(0.09)	0.773(0.09)*
Age		
15-24	1.000	1.000
25-39	0.916(0.06)	0.999(0.06)
40-49	0.587(0.06)***	0.804(0.08)*
Religion		
Christians	1.000	1.000
Non-Christian	0.880(0.14)	0.678(0.11)*
Wealth Index		
Richest	1.000	1.000
Richer	0.894(0.08)	1.040(0.09)
Middle	0.905(0.08)	1.042(0.09)
Poorer	0.782(0.06)**	0.937(0.08)
Poorest	0.772(0.06)**	0.865(0.07)
Distance To Health Facility		
Not a big problem	1.000	1.000
Big problem	0.847(0.05)**	0.912(0.06)
Money For Health Care		
Not a big problem	1.000	1.000
Big problem	0.689(0.04)***	0.770(0.04)***
Terminated Pregnancy		
No	1.000	1.000
Yes	0.942(0.07)	1.057(0.08)
Parity		
1 to 6	1.000	1.000
7 or More	0.486(0.05)***	0.677(0.07)***

*p<0.05, **p<0.01, ***p<0.001, SE = standard error

Table 3: Results for multivariate analysis (significance levels (*) are defined at end of table)

	Timing Of 1st ANC Visit Odds Ratios (SE)		**4+ ANC Visits Odds Ratios (SE)**	
Main Variable	Model 1	Model 2	Model 1	Model 2
Pregnancy Intention				
Intended	1.000	1.000	1.000	1.000
Unintended but wanted later	0.593(0.04)***	0.620(0.04)***	0.659(0.04)***	0.701(0.05)***
Wanted no more	0.484(0.04)***	0.631(0.06)***	0.604(0.05)***	0.723(0.06)***
Province				
Kigali City		1.000		1.000
South		2.034(0.22)***		1.902(0.20)***
West		1.627(0.18)***		1.488(0.16)***
North		1.805(0.21)***		1.513(0.17)***
East		1.602(0.17)***		1.040(0.11)
Place of Residence				
Urban		1.000		1.000
Rural		0.909(0.08)		0.931(0.08)
Level of Education				
Secondary or higher		1.000		1.000
Primary		0.613(0.06)***		0.715(0.06)***
No Education		0.511(0.06)***		0.579(0.07)***
Employment status				
Yes		1.000		1.000
No		0.860(0.07)		0.915(0.07)
Marital status				
Currently in union/living with a man		1.000		1.000
Formerly in union		1.098		1.114
Never In union		0.730(0.09)*		0.721(0.09)*
Age				
15-24		1.000		1.000
25-39		0.849(0.06)*		0.894(0.06)
40-49		0.755(0.10)*		0.878(0.11)
Religion				
Christians		1.000		1.000
Non-Christians		0.876(0.14)		0.702(0.12)*
Wealth index				
Richest		1.000		1.000
Richer		0.919(0.10)		1.078(0.12)
Middle		0.994(0.12)		1.145(0.13)
Poorer		0.882(0.10)		1.038(0.12)
Poorest		0.952(0.11)		1.007(0.12)
Distance to facility				
Not a big problem		1.000		1.000
Big problem		0.952(0.06)		0.995(0.07)
Money for health care				
Not a big problem		1.000		1.000
Big Problem		0.791(0.05)**		0.826(0.05)**
Terminated pregnancy				
No		1.000		1.000
Yes		0.962(0.07)		1.043(0.08)
Parity				
1 to 6		1.000		1.000
7 or more		0.624(0.07)***		0.783(0.09)*
Total Ns		5895.000		5944.000
Log pseudo-likelihood		-3882.230		-3965.236
Pseudo r^2		0.038		0.028

*p<0.05, **p<0.01, ***p<0.001, SE = standard error

utilization among pregnant women in Rwanda after adjusting for socio-demographic variables.

Pregnancy intention and first trimester antenatal care service utilization

In the logistic regression analysis, pregnancy intention was associated with use of antenatal care, whereby women who had unintended pregnancy but wanted the pregnancy afterwards were less likely (OR=0.620, p≤0.001) to utilize antenatal care during the first trimester compared to those with intended pregnancy when the sociodemographic variables were controlled for. Also, pregnant women who later did not desire their pregnancy were less likely (OR=0.631, p≤0.001) to make the first trimester visit compared to women with intended pregnancies.

In the bivariate analysis, the Western province was not statistically significant whilst the Eastern province was significant at the 95% confidence level. However, after controlling for sociodemographic variables, in all provinces, women were more likely to utilize antenatal care during the first trimester compared to Kigali city. The ORs for the provinces were: Southern (2.034), Western (1.627), Northern (1.805) and Eastern (1.602). Rural residents were less likely (OR=0.909) to access antenatal care in the first trimester even though this was not statistically significant in both bivariate and multivariate analysis.

In terms of education, women with primary, or no education were less likely (OR=0.631, p≤0.001 or 0.511, p≤0.001, respectively) to utilize antenatal care services compared to women with secondary or higher education. Women who had never been in a union were less likely (OR=0.730, p≤0.05) to utilize any maternal health services during the first trimester. In addition, compared to younger women (15-24years), women of ages 24-39years and 40-49years were less likely (OR=0.849, p≤0.05 and OR=0.755, p≤0.05, respectively) to utilize antenatal care in the first trimester. Also, the financial status (for those who said that money was a big problem) hindered access to antenatal care during the first trimester compared to those who said it was a small problem with good statistical significance (OR=0.791, p≤0.001). Women with 7 or more children were also less likely (OR=0.624, p≤0.001) to seek antenatal services in the first trimester compared with those who had lesser number of children.

In the multivariate analysis, place of residence, employment status, wealth index, distance to facility and pregnancy termination were not significantly associated with antenatal care service utilization for the group under study.

Pregnancy intention and sustained use of antenatal care services

In the multivariate analysis, women who had unintended pregnancies but later desired them and those who did not want their pregnancies were less likely (OR=0.701, p≤0.001 and OR=0.723, p≤0.001, respectively) to make 4+ visits during the pregnancy compared with those who had intended pregnancy. The analysis further revealed that, compared with Kigali city, residents in the Southern, Western, and Northern provinces were more likely (OR=1.902, p≤0.001, OR=1.488, p≤0.001 and OR=1.513, p≤0.001, respectively) to make the 4+ recommended number of visits, whereas the Eastern province was more likely even though not statistically significant. The odds of making 4+ visits increased compared with the bivariate analysis when the socioeconomic variables were controlled for. There was no statistical significance between number of visits and place of residence in terms of rural urban/urban dichotomy.

When compared with those who had higher levels of education (secondary education and higher), women with primary or no education were less likely (OR=0.715, p≤0.001 and OR=0.579, p≤0.001, respectively) to meet the recommended number of visits, an indication that education plays a critical role in women decision to seek health care. Meanwhile, women who have never been married were less likely (OR=0.721, p≤0.05) compared to married women. Compared to Christians, non-Christians were less likely (OR=0.702, p≤0.05) to meet the recommended number of visits during pregnancy, whilst those who said money was a big problem compared to those who said it was a not a problem were less likely (OR=0.826, p≤0.01) to meet the WHO-recommended number of visits; women with 7 or more children were less likely to

attend 4+ times compared to those with lesser number of children. However, place of residence, employment status, age, wealth index, distance to health facility and pregnancy termination were not statistically significantly associated with maternal health seeking behavior.

Discussion

The results of this study show that, pregnancy intention has a great impact on use of antenatal care services. Among the study population, more than a third (40%) declared their recent pregnancy to be unintended or unwanted and the same population had increased odds in delaying and sustaining the use of antenatal services. This is comparable to the worldwide statistics that highlight that each year there are 38% of unplanned pregnancy but slightly higher compared to results in Ethiopia where 34% constituted unintended pregnancy and this was studied during a fraction of time where our study was also conducted[8].

Pregnancy intention was associated with early antenatal care visit (visit within the first trimester) while women with unintended pregnancy and those who eventually did not want their pregnancy had a lower rate of early antenatal visit. These results are comparable to the results found in Tanzania that shared many similar independent and dependent variables[10]. Other studies highlight that the risk associated with missing the early antenatal care comprise a maternal fetal complex of missing early detection of multiple pregnancy, fetal malformations, maternal vaccination and preparation for the new baby and all these are potential factors that can affect the outcome of pregnancy for both the mother and the baby[5,7]. In addition, women who do not attend early antenatal care or do not complete the 4 antenatal visits not only they miss the education provided during antenatal visits but also they miss the vaccination, iron and vitamin supplements[21].

Consistent with existing literature, unmarried women (never in a union) were likely to miss the antenatal services recommendations likely due to constraining socio-cultural dynamics and limited access to resources for services[22], given that, in the Rwandan context, pregnancy among unmarried women, that is unwanted/ unplanned, is a social taboo that may attract stigmatization[23,24]. Consequently, women not in a defined union may be reluctant to expose themselves to the public and may therefore not attend antenatal services. Their inability to seek health care service is likely reinforced by the lack of resources if they have to rely on their relatives[20,25].

The results in our analysis are also consistent with previous work in other African countries which showed that educated women tend to be more likely to access and fulfil the WHO's recommendations on antenatal services during pregnancy[20,26,27]. Our results also have shown a significant high likelihood to follow the all WHO's required recommendation and accessing antenatal services among women in upper wealth quintiles. This could be related to the Rwandan context in which, women with higher educational attainment generally occupy higher paying jobs that promote them into upper wealth quintile and they tend to have a better understanding of the importance of healthcare and more are able to afford such services[25,28]. According to Boateng *et al*., educated and wealthy women also tend to be more empowered to make decisions regarding the utilization of antenatal care services when compared to their poorer counterparts.

The emergence of religion whereby non-Christians were less likely to utilize antenatal care services is consistent with previous results highlighted by Gyimah *et al*. in Ghana. Furthermore, Mkandawire *et al* observed that women of traditional religious affiliation in Rwanda may perceive institutional based health care services as enforcing Christian and Muslim religious values, and may therefore be opting to rely on traditional birth attendants, especially at delivery, which allows for performance of cultural practices associated with birth. Our results also show that high parity is associated with a woman's likelihood of not utilizing antenatal services. This finding is consistent with earlier studies that argue that high parity women may consider pregnancy and delivery to be less risky and thereby may not see the need to spend time and resources seeking antenatal care services[20]. Furthermore, Tuyisenge *et al*, found that women with childbirth experience preferred to deliver at home when there are no reported complications with their pregnancy[23]. On

the other hand, the scientific view of the parity has consistently associated more and severe maternal morbidities among women with high parities compared to primiparous[29]. For example, it is documented that multiparity is a significant risk for complications such as placenta previa, placenta abruptio, preeclampsia and postpartum hemorrhage that need emergency intervention in health settings which are not readily available if delivery occurs at home[29,30].

Despite the relevance of our findings, there are potential limitations related to the study design. The cross-sectional nature of the data limits the findings to associations. Also, as the data used in our study are self-reported, there is a potential recall bias. Utilization of MHS is influenced by a web of factors such as facility level of healthcare, some of which were not part of the current study because of data limitation. Nonetheless, the findings are generally consistent with the literature and provide important imperatives for maternal health policy in Rwanda and similar contexts.

The results show that, when compared to Kigali, all other provinces are doing better at ANV visits both first trimester and overall. Pregnancy intention indicated a statistically significant impact on use of antenatal care services where women with unintended pregnancy were less likely to attend for early antenatal care and were also less likely to complete four antenatal visits. The attenuation of the effect shows the relevance of other factors and the provinces may be doing better because of programs having been implemented like Rwanda Training, Support and Access Model and others and this may be influencing overall attitude. The capital city of Kigali, on the other hand, may be suffering an urban disorder because it tends to be assumingly put in a better-resourced category[31]. According to a multi-center study conducted in Uganda, a neighbour country to Rwanda, these variables were similarly found to affect not only the use of antenatal visit but also, grand-multiparous women were more likely to deliver at home[6].

Finally, our results shared consistent similarities to a systematic review and meta-analysis on the effects of pregnancy intention on the use of antenatal care services, that demonstrated increased odds of delay in seeking for antenatal services and decreased number of individual antenatal visits among women with unintended pregnancy[4].

Conclusion

The results of this study illustrate inadequate use of antenatal services both in initiation of early visit and completing the previously recommended four antenatal visits among women with unintended pregnancy. Given that, the WHO has increased this previous recommendation to eight visits, there need for greater community education on utilization of antenatal services and the availability of family planning to reduce the rates of unintended pregnancies. For instance, although community health workers in villages are deployed to support health delivery, their mandate in respect to maternal health relates to identifying, registering and sensitizing pregnant women on the need for MHS utilization, and then referring them for antenatal services in health posts at cell level or in health centers and district hospitals (Republic of Rwanda, 2014).Given the increasing role of Community Health Workers (CHW) in the Rwandan healthcare system, the CHWs could be trained and given the mandate to identify and encourage young women who may have unwanted pregnancy to go for ANC services. Furthermore, it may be appropriate for government to intensify sex education in high schools to provide teenagers with knowledge on safer sex and prevention of unintended pregnancies.

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Conflict of Interest

Authors declared they have no conflict of interest.

Contribution of Authors

All authors have read and approved the manuscript. "PB conceived of the study, conducted analysis and prepared the manuscript. AU and IL supervised the analysis and assisted with the manuscript".

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