



## **Factors Associated with Attendance of Antenatal care in the first trimester of Pregnancy in Gicumbi District, Rwanda**

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### **1. Abstract**

Rwanda make progress in reducing maternal death and stillborn, 98% of pregnant women attend antenatal care at least once, only 47% make four or more visits during their entire pregnancy and 59% of pregnant women attend antenatal care in first trimester of pregnancy. The study assess prevalence of antenatal care, the demand side and supply side factors in first trimester of pregnancy in Gicumbi District of Rwanda. An institution-based descriptive cross-sectional study was carried out among 384 pregnant women attended antenatal care services at 12 selected health centers. A systematic sampling technique was used to recruit pregnant women. Bivariate and multivariate logistic regression analysis used to identify an association between independent and dependent variable. The results show the prevalence of attendance of antenatal care in first trimester of pregnancy is (62.6%, n=240), there is association of antenatal care attendance and demand side factors such as attending the antenatal care service in the past, way to recognize pregnancy and planned pregnancy ( $P<0.001$ ). There is also an association between attendance to antenatal care and supply side factors namely, ambulance services at health center ( $P<0.001$ ), time spend for antenatal care service ( $P<0.001$ ), who informed you to attend antenatal care service ( $P<0.001$ ), and planned pregnancy was 5.9 times more likely associated with attending of antenatal care in the first trimester of pregnancy than not unwanted pregnancy (AOR=5.9; 95% Ci: [3.1-11.2];  $P<0.001$ ). Gicumbi District authorities recommended availing ambulance service, using CHWs in mobilization of antenatal care service delivery in health facilities for the women in age of procreation, and encouraging the use of urine pregnancy test (UPT) at village level

## 2. Introduction

Globally 303,000 women and adolescent girls died from pregnancy and childbirth-related complications, in the same year 2.6 million babies were stillborn. Almost all of the maternal deaths (99%) and child deaths (98%) occurred in low- and middle-income countries and of which most can be prevented through early Antenatal care service (Jemila et al., 2021). The care provided by skilled health care professionals to pregnant women and adolescent girls to ensure the best health conditions for both mother and baby during pregnancy is considered Antenatal care (WHO, 2016). The Antenatal care (ANC) remains one of the means to reduce maternal deaths which can be provided at lower-level health facilities (WHO, 2016). The antenatal care period for pregnant mothers is an important time to encourage, allay anxieties and equip mothers with information that promotes healthy behaviors and parenting skills. Appropriate care during pregnancy and childbirth is critical for the health of both the mother and the baby (Gebremeskel, 2015). It is a public health service to prevent health risks, early detection of abnormalities, institution of corrective measures if possible, and preparation of both the woman and fetus and to ensure a good start of life for each newborn child (Manyeh, 2020). Insufficient ANC during pregnancy does not support the model of the continuum of care, which might affect both mothers and babies (Seidu, 2021).

The World Health Organization (WHO 2016) previously recommends a minimum of four ANC visits: ideally, the first visit should occur before 16 weeks of gestation. However, recently WHO recommends a minimum of 8 contacts: with the first contact scheduled to take place in the first trimester (up to 12 weeks of gestation). This new recommendation reduces maternal and perinatal deaths by increasing the opportunity of maternal and fetal assessment to notice complications and get better communication between providers and mothers (WHO, 2016). Provision of iron and folic acid during the first trimester of pregnancy, the risk of anencephaly and spinal Bifida can be minimized. Inadequate care during this time breaks a critical link in the continuum of care and affects both women and babies (Tola, 2021).

Health education on nutrition, monitoring and treatment of sexually transmitted infections (STIs) including human immune virus/acquired immune deficiency syndrome (HIV/AIDS) as well as early detection and management of other chronic diseases and warning signs of complications is also achieved during this period (Manyeh, 2020).

Developing countries marked good progress in the total number of ANC visits, however, the prevalence of late ANC initiation is still high (Yadufashije, 2017). Failure to attend antenatal care at an early period can result in potential complications during pregnancy, delivery, and puerperium (Tola, 2021). For instance in sub-Saharan Africa, women often only initiate ANC after the first trimester and do not achieve the recommended four ANC visits and most the women attend ANC at least once and their descriptions of ANC are often vague; although 71% of pregnant women attend formal ANC at least once, only 44% attend ANC four or more times (Yadufashije, 2017). A population-based cross-sectional study revealed that the prevalence of early ANC initiation was 23.0 % in New Guinea (Seidu, 2021). A study conducted in rural south Ghana revealed that most of the first-time mothers-initiated ANC visits in the first trimester of gestation (57%), 39 and 4% initiated ANC visits in the second and third trimesters respectively (Manyeh, 2020).

In East African Countries, the attendance of ANC varies, Tanzania 70, 4% of pregnant women booked late for antenatal care (Njiku et al., 2017). In other hand, Uganda, only 17% and 47% of mothers initiate the first antenatal visit in the first trimester and attain at least four antenatal visits respectively (Bbaale, 2011). In Rwanda, over 98% of pregnant women attend ANC at least once, only 47% make four or more visits during their entire pregnancy and attendance of ANC in first trimester of pregnancy was 59% (NISR, 2020).

Factors influencing the utilization of antenatal care, in general, have been widely studied. It has been shown that mothers who are educated, and those whose husbands are educated are more likely to utilize antenatal care services (Mgata, 2019). Availability, affordability, and easy accessibility of ANC services increase its utilization. Studies have reported that pregnant women with low socio-economic status are less likely to use antenatal care services than those with higher socioeconomic status (Tola, 2021). Cultural beliefs and ideas about pregnancy also have been reported to influence ANC use and may lead to mothers attending ANC late or attending a few ANC visits. Other studies have reported that younger age and unplanned pregnancy, and lack of knowledge regarding the importance of early ANC are the causes for delayed initiation of ANC (Yadufashije, 2017). Additionally, no data contextualize the initiation of antenatal care in the first trimester of pregnancy and the factors associated with both demand and supply sides in Gicumbi District. Therefore, this study was conducted to assess the factors associated with antenatal care in the first trimester of pregnancy among pregnant mothers of the Gicumbi District of Rwanda. The objectives of the study were:

- i. To determine the prevalence of attendance of antenatal care in first trimester of pregnancy in Gicumbi District, Rwanda
- ii. To determine the factors on the demand side associated with the attendance of antenatal care in first trimester of pregnancy in Gicumbi District, Rwanda.
- iii. To determine the factors on the supply side associated with the attendance of antenatal care in first trimester of pregnancy in Gicumbi District, Rwanda.

### **3. Materials and methods**

#### **3.1. Research design**

This study is of a quantitative a descriptive cross-sectional study design. It was conducted on pregnant women attending antenatal care in Gicumbi District, Rwanda.

#### **3.2. Target population**

The target population of this research is the pregnant mothers who attend the Antenatal Care Service in health centers of Gicumbi District. In this study, the sample of **384** pregnant women was obtained by using the statistical formula of Fisher for calculating sample size.

The formula is  $N = Z^2 p (1 - p) / d^2$  where **N** is the minimum sample size for a statistically significant survey, **Z** is normal deviant at the portion of **95%** confidence interval **1.96** and **P** is the prevalence value of available attendance of ANC standard visits in Rwanda (47.0%), and **d** is margin of error acceptable or measure of precision **0.05**.

#### **3.3. Inclusion criteria**

All pregnant women attending antenatal care service, being a resident of Gicumbi District and located in area of Muhondo, Byumba, Gisiza, Munyinya, Mulindi, Mukarange, Ruhenda, Cyumba, Nyamiyaga, Rubaya, Kigogo and Rushaki Health Centers

#### **3.4. Exclusion criteria**

Pregnant mother below 18 years old, and all pregnant mother who are not the resident of catchment areas of health center included in this study

#### **3.5. Ethics**

The participants' privacy are respected by keeping all the information obtained from the participants confidential and avoiding to be disclosed to anyone except the research supervisors. The computer with a protected password stored all digital data. No information identifying any person would be presented in any written reports. Ethical approval was also obtained from the

Mount Kenya University (MKU) Institutional Review Board (IRB), REF Number: MKU04/PGS&R/0686/2022 and Gicumbi District authority.

### 3.6. Sampling Technique

Among 24 health centers in Gicumbi District, 12 health centers was selected using a systematic sampling technique. An average monthly ANC visit case load of each health center was selected to be assessed before proceeding to the study. Then, the sample size was calculated using population proportion to size the participants for each selected health center. To precise the interval,  $k$ , for each health facility, I divided the total estimated population size by sample size for health facility.

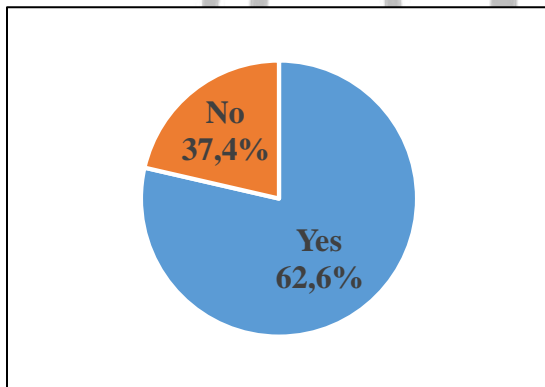
### 3.7. Data collection procedures

The questionnaire was interviewer-administered, twelve enumerators were trained about research ethics and data collection procedures, the participants were mother attended antenatal care service at health center

## 4. Results

### 4.1. Prevalence of attendance ANC in first trimester of pregnancy

Figure 1. Prevalence of antenatal care in first trimester of pregnancy



The figure 1 shows the majority of mothers attending antenatal care in the first trimester of

pregnancy was (62.6%, n=240), while 37.4% (n=144) did not attend.

### 4.2. Supply side factors associated with attendance of antenatal care in the first trimester of pregnancy

The bivariate analysis of supply side factors and attendance to antenatal care in the first trimester of pregnancy. Results showed that there is an association between attendance to antenatal care in the first trimester of pregnancy and attending ANC in the past ( $P<0.001$ ), recognition of pregnancy

( $P < 0.001$ ), and planned pregnancy ( $P < 0.001$ ). The number of parties, miscarriage, and caesarean section have not shown association with attendance to antenatal care in the first trimester ( $P > 0.05$ ).

**Table 1. Supply side factors associated with attendance of antenatal care in the first trimester of pregnancy**

Variables	ANC before 12 weeks		Chi-square	P-value
	Yes n (%)	No n (%)		
<b>Number of parties</b>			2.33	0.31
Para zero	91(82.7)	19(17.3)		
Para one	107(79.3)	28(20.7)		
Para 2 and above	104(74.8)	35(25.2)		
<b>Miscarriage</b>			0.69	0.46
Yes	76(81.7)	17(18.3)		
No	226(77.7)	65(22.3)		
<b>Caesarean section</b>			3.66	0.55
Yes	37(90.2)	4(9.8)		
No	265(77.3)	78(22.7)		
<b>Attended ANC in the past</b>			7.64	0.00*
Yes	178(74.2)	62(25.8)		
No	124(86.1)	20(13.9)		
<b>Recognition of pregnancy</b>			14.6	0.00*
Urine test	182(85.8)	30(14.2)		
Missing period	120(69.8)	52(30.2)		
<b>Pregnancy planned</b>			30.49	0.00*
Yes	237(85.9)	39(14.1)		
No	65(60.2)	43(39.8)		

Source: computed from SPSS, version 22

#### 4.3. Demand side factors associated with attendance of antenatal care in the first trimester of pregnancy

The bivariate analysis of demand side factors and attendance to antenatal care in the first trimester of pregnancy. Results showed that there is an association between attendance to antenatal care in the first trimester of pregnancy and ambulance services at HC ( $P < 0.001$ ), hours ANC service spend ( $P < 0.001$ ), heard of existence of ANC before getting pregnant ( $P < 0.001$ ), informed to attend ANC ( $P < 0.001$ ). The factors of time from home to health center, days ANC services are offered at the HC, and own health insurance have not shown association with attendance to antenatal care in the first trimester ( $P > 0.05$ )

**Table 2. Demand side factors associated with attendance of antenatal care in the first trimester of pregnancy**

Variables	ANC before 12 weeks		Chi-square	P-value
	Yes n (%)	No n (%)		
<b>Time from home to the health centre</b>			2.05	0.15
< 1 hour	122(82.4)	26(17.6)		
>=1 hour	180(76.3)	56(23.7)		
<b>Days ANC services are offered at HC</b>			0.82	0.36
Every day	91(75.8)	29(24.2)		
Every day except weekend	211(79.9)	53(20.1)		
<b>Ambulance services at HC</b>			10.20	0.00*
Yes	75(91.5)	7(8.5)		
No	227(75.2)	75(24.8)		
<b>Hours ANC service spend (arrival, waiting, service, returning home)</b>			9.75	0.00*
< 1 hour	216(75)	72(25)		
1-2 hours	9(100)	0(0.0)		
>2 hours	77(88.5)	10(11.5)		
<b>Heard of existence of ANC before getting pregnant</b>			9.67	0.00*
Yes	223(82.9)	46(17.1)		
No	79(68.7)	36(31.3)		
<b>Informed you to attend ANC services</b>			21.68	0.00*
Husband	76(97.4)	2(2.6)		
Myself	127(71.8)	50(28.2)		
CHWs	99(76.7)	30(23.3)		
<b>Own health insurance</b>			0.00	0.92
Yes	259(78.7)	70(21.3)		
No	43(78.2)	12(21.8)		

Source: computed from SPSS, version 22

#### 4.4. Multivariate analysis of socio demographic characteristics and ANC attendance in first trimester of pregnancy (N=384)

Independent variables which had a statistically significant association with attendance to ANC for the first trimester of pregnancy in the bivariate analysis were submitted to the multivariable analysis to determine to which extent they were associated with the dependent variable, as shown

in the Table 3. Eleven factors have shown association with ANC attendance for the first trimester in bivariate analysis: marital status, mother's age, cow presence, mother's education, attend ANC in the past, recognize pregnancy, planned pregnancy, ambulance services, hours spend ANC, heard of ANC before pregnancy, informed you to attend ( $P < 0.05$ ). However, adjusted odds ratios (AOR) were somewhat compared to the crude odds ratios (COR) calculated at 95% confidence interval.

Being married was 7.8 times more likely to attend ANC in the first trimester of pregnancy than other marital status (AOR=7.8; 95% Ci: [2.8-21.5];  $P < 0.001$ ). Mothers within the age group >35 years (AOR=0.1; 95% CI: [0.03-0.2];  $P < 0.001$ ) was more likely to attendance ANC in the first trimester than those in age group of 18-24 years, and 25-34 years. The attendance to ANC in the first trimester of pregnancy was 6.2 times for primary education (AOR=6.2; 95% Ci: [2.6-14.3];  $P < 0.001$ ), 7 times for secondary education (AOR= 7; 95% Ci: [2.6-18.7],  $P < 0.001$ ), and 27 times for tertiary education (AOR=27; 95% Ci: [4.8-157];  $P < 0.001$ ) higher than illiterate mothers. Having attended ANC in the past was 0.24 times compared to not having attended ANC in the past (AOR=0.24; 95% Ci: [0.1-0.4];  $P < 0.001$ ). Having planned pregnancy was 5.9 times more likely associated with attending ANC in the first trimester of pregnancy than not having a planned pregnancy (AOR=5.9; 95%Ci: [3.1-11.2];  $P < 0.001$ ). Spending 1-2 hours at ANC was 2.6 times more likely associated with attending ANC in the first trimester of pregnancy than spending >2 hours at ANC (AOR=2.6; 95% Ci: [1.2-5.7];  $P = 0.01$ ). Having heard of ANC before pregnancy was 1.9 times more closely associated with attending ANC in the first trimester of pregnancy than not having heard of ANC before pregnancy (AOR=1.9; 95% Ci: [1.1-3.3];  $P = 0.01$ ). Being informed by the husband and by CHWs to attend ANC were 14 times (AOR=14; 95% Ci: [3.4-63.8];  $P = 0.001$ ) and 1.7 times (AOR=1.7; 95%Ci: [1.0-3.0];  $P = 0.04$ ), respectively, more associated with attending ANC for the first trimester of pregnancy than being self-informed.

**Table 3. Multivariate analysis of socio demographic characteristics and ANC attendance in first trimester of pregnancy (N=384)**

Characteristics		Crude OR (95%CI)	P- value	Adjusted OR (95%CI)	P- value
<b>Marital status</b>	Married	2.11(1.0-4.1)	0.03	7.8(2.8-21.5)	<b>0.00</b>
	Divorced	-		-	-
	Widowed	-		-	-
	Single	ref			



<b>Mother's age</b>	18-24 years	ref	-		
	25-34 years	1.2(0.7-2.3)	0.41	0.4(0.2-1.1)	0.08
	>35 years	0.4(0.2-0.7)	0.00	0.1(0.03-0.2)	<b>0.00</b>
<b>Cow Presence</b>	Yes	2.2(1.3-3.6)	<b>0.00</b>	0.4(0.2-0.7)	<b>0.002</b>
	No	ref			
<b>Mother's education</b>	Primary	4.9(2.3-10.5)	<0.001	6.2(2.6-14.3)	<b>&lt;0.001</b>
	Secondary	6.0(2.4-14.8)	<0.001	7(2.6-18.7)	<b>&lt;0.001</b>
	Tertiary and above	10.8(2.1-54.2)	<0.001	27(4.8-157)	<b>&lt;0.001</b>
	Illiterate	ref			
<b>Attend ANC in the past</b>	Yes	0.46(0.2-0.8)	<0.00	0.24(0.1-0.4)	<b>&lt;0.00</b>
	No	ref			
<b>Recognize pregnancy</b>	Urine test	2.62(1.5-4.3)	0.00	1.6(0.9-2.9)	0.08
	Missing period	ref			
<b>Pregnancy planned</b>	Yes	4.0(2.4-6.7)	0.00	5.9(3.1-11.2)	<0.00
	No	ref			
<b>Ambulance services</b>	Yes	3.5(1.5-8.0)	<0.00	1.9(0.7-4.8)	0.14
	No				
<b>Hours spend ANC</b>	< 1hour	-		-	
	1-2 hour	2.5(1.2-5.2)	<0.00	2.6(1.2-5.7)	0.01
	>2 hour	Ref		ref	
<b>Heard of ANC before pregnancy</b>	Yes	2.2(1.3-3.6)	<0.00	1.9(1.1-3.3)	0.01
	No	ref			
<b>Informed you to attend</b>	Husband	14.9(3.5-63.2)	<0.00	14(3.4-63.8)	0.00
	CHWs	1.2(0.7-2.1)	0.32	1.7(1.0-3.0)	0.04
	Myself	ref		ref	

Source: computed from SPSS, version 22

## 5. Discussion

The prevalence of attendance of antenatal care in first trimester of pregnancy in our study was found to be (62.6%, n=240), which is almost similar to what was found out during a study conducted in rural South Ghana revealed that most of the first-time mothers-initiated antenatal care visits in the first trimester of gestation (57%), 39% and 4% initiated antenatal care visits in the second and third trimesters respectively (Manyeh, 2020). On the other hand, in East Africa, the recent Uganda study showed that 47% of mothers initiate the first antenatal visit in the first trimester and attain at least four antenatal care visit (Bbaale, 2011). The timing and frequency of antenatal care visits were significantly associated with education of the mother and her partner, wealth status, regional disparities, religious differences, access to media, maternal autonomy in

taking a health decision, occupations of the mother and her partner, timing of pregnancy, birth histories, and birth order (Bbaale, 2011).

In Tanzania the pregnant women attend antenatal care at least once, only 51% make four or more visits during their entire pregnancy, and only 24% of women made their first antenatal care attendance before the fourth month of pregnancy (Mgata, 2019). The supply side factors associated with attendance of antenatal care during first trimester of pregnancy in this study was found to be, attending antenatal care in the past ( $P < 0.001$ ), recognition of pregnancy ( $P = 0.00$ ), and planned pregnancy ( $P < 0.001$ ). In East Africa, Tanzania reported the supply factors associated with the early initiation of antenatal care among pregnant mothers. Among the reasons reported, shortage of trained health care workers, lack of spouse's escort, and health providers' disrespect to pregnant women were the main health system barriers to early antenatal care attendance (Mgata, 2019).

Socio-demographic factors like mother's age ( $P < 0.001$ ), presence of a cow within the household ( $P < 0.001$ ), mother's education ( $P < 0.001$ ), and marital status ( $P = 0.05$ ), were found to be associated with attendance to antenatal care in the first trimester of pregnancy.

## **6. Conclusions and recommendations**

The prevalence of attendance to antenatal care in first trimester of pregnancy in Gicumbi District was found to be 62.6%, little greater than to the national level of 59 % although it is good progress, there are still factors to address in ensuring maternal and newborn health through provision of antenatal care service, the attendance of antenatal care service in the past was 0.24 times compared to not having attended antenatal care in the past (AOR=0.24; 95% Ci: [0.1-0.4];  $P < 0.00$ ), recognition of pregnancy using UPT test 85.6% and planning for pregnancy was 5.9 times more likely associated with attending ANC in the first trimester of pregnancy than not having a planned pregnancy (AOR=5.9; 95%Ci: [3.1-11.2];  $P < 0.00$ ).

Gicumbi District authorities are recommended to use CHWs to mobilize antenatal care service delivery in health facilities for the women in age of procreation, emphasizing on the attendance of antenatal care, child spacing with family planning services and encouraging the use of urine pregnancy test (UPT) at village level for early identification of pregnancy.

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