

# Factors Influencing Late Initiation of First Antenatal Care Services Among Pregnant Women in Kicukiro District, Rwanda 2025

<sup>1</sup>Kubwayo Jean Irene, <sup>2</sup>Dr. Rosemary Okova (PhD)

<sup>1</sup>Author, <sup>2</sup>Co-author

<sup>1</sup>(School of Health Sciences, Mount Kenya University, Rwanda)

<sup>2</sup>(School of Health Sciences, Mount Kigali University)

DOI: <https://doi.org/10.5281/zenodo.17661656>

Published Date: 20-November-2025

---

**Abstract:** Background: Timely initiation of antenatal care (ANC) is essential for preventing maternal and neonatal complications. Despite Rwanda's progress in maternal health, many women still delay their first ANC visit beyond the recommended 12 weeks of gestation. This study assessed factors influencing the late initiation of the first ANC visit among pregnant women in Kicukiro District, Rwanda, aiming to guide evidence-based interventions for improved maternal and fetal outcomes.

**Methods:** A descriptive cross-sectional study was conducted among 383 pregnant women attending ANC services in Kicukiro District. The sample size was determined using Fisher's formula. Data were collected through a validated KOBOLLECT questionnaire and analyzed using SPSS version 25. Descriptive statistics summarized demographic characteristics, while inferential statistics identified associations between independent variables and ANC initiation timing.

**Results:** The findings revealed that 53.26% of respondents-initiated ANC after 12 weeks of gestation, with 52.48% reporting unplanned pregnancies. Maternal age, partner's education level, and pregnancy planning status were significantly associated with ANC initiation timing. Women aged 30–34 years were less likely to delay ANC (AOR=0.377, p=0.021), whereas those whose partners had tertiary education were more likely to delay (AOR=3.470, p=0.027). Surprisingly, planned pregnancies were strongly associated with late ANC initiation (AOR=8.451, p<0.001). Other socio-economic factors showed no significant relationship.

**Conclusion:** Late initiation of ANC remains prevalent in Kicukiro District and is influenced by demographic, educational, and pregnancy-related factors. The study recommends intensifying community awareness, strengthening reproductive health education, involving male partners, empowering community health workers in early pregnancy detection, and improving access and quality of ANC services through mobile clinics and financial support programs. These interventions could promote timely ANC initiation and enhance maternal and neonatal health outcomes in Rwanda.

**Keywords:** antenatal care (ANC), ANC services, maternal and neonatal health, health education.

---

## 1. INTRODUCTION

Maternal mortality continues to be a pressing global health concern despite advances in healthcare access and service delivery. In 2020, approximately 287,000 women died from pregnancy-related causes, with about one-third of these deaths occurring during or shortly after delivery (Palich et al., 2024)(Onambele et al., 2023). Although this represents significant progress compared to previous decades, the global community remains off track to achieve the Sustainable Development Goal (SDG) target of reducing the maternal mortality ratio (MMR) to fewer than 70 deaths per 100,000 live births by 2030 (WHO, 2022). The World Health Organization defines maternal health as the well-being of women during pregnancy, childbirth, and the postnatal period, emphasizing the need for timely access to quality maternal care services (WHO, 2022). Hemorrhage, hypertensive disorders, and sepsis are among the leading direct causes of maternal deaths globally conditions that are largely preventable through early detection and management during antenatal care (Yihune Teshale et al., 2025).

Antenatal care (ANC) remains one of the most effective public health interventions for reducing maternal and neonatal morbidity and mortality. It provides a platform for health professionals to detect, prevent, and manage complications, offer nutritional and birth preparedness counseling, and promote overall maternal well-being. Despite these benefits, early initiation of ANC defined as attending the first visit within the first 12 weeks of gestation remains suboptimal worldwide. Although global ANC coverage increased by 43% between 1990 and 2013, delayed initiation remains particularly high in low- and middle-income countries (WHO, 2022). Late ANC initiation deprives women of timely screening for infections, anemia, congenital anomalies, and other pregnancy-related risks that, if undetected, can lead to adverse outcomes for both mother and child.

In sub-Saharan Africa, the prevalence of delayed ANC is alarmingly high. Studies indicate that 67.3% of pregnant women in Ethiopia, 73% in Uganda, and 76.5% in Malawi initiate ANC after the recommended first trimester (Mgata & Maluka, 2019). The determinants of late ANC initiation in the region are multifaceted and interrelated, including low education levels, limited socioeconomic resources, poor access to healthcare, and cultural norms that discourage early pregnancy disclosure. A study in India revealed that women from lower socioeconomic backgrounds delayed ANC due to transportation challenges and financial constraints (Debelo & Danusa, 2022), findings that reflect similar barriers across Africa. In Cameroon, Warri and George (2020) found that many women considered pregnancy a natural event that did not require early medical attention, while fear of stigma related to unplanned pregnancies further discouraged early care-seeking behavior. Health system factors also contribute significantly, with issues such as distance to facilities, negative provider attitudes, fear of HIV testing, and poor community outreach cited as major barriers (Souza et al., 2024).

Rwanda has made remarkable progress in maternal health outcomes, largely attributed to strong policy frameworks, government commitment, and community-based health initiatives. According to the National Institute of Statistics of Rwanda (NISR) et al. (2021), approximately 98% of pregnant women attend at least one ANC visit, reflecting near-universal coverage. However, only 49% initiate ANC within the first trimester below WHO recommendations. Rwanda’s maternal mortality ratio remains at 203 deaths per 100,000 live births (WHO, 2022), suggesting that the timing and quality of ANC services continue to affect outcomes. Multiple studies have identified factors influencing delayed ANC initiation in Rwanda, including low socioeconomic status, limited education, unplanned pregnancies, long distances to health facilities, and weak male partner involvement (Yihune Teshale et al., 2025).

In Kicukiro District, these national challenges are similarly reflected. Data from the 2024 Health Management Information System (HMIS) reveal that only 49% of pregnant women initiated ANC within the first 12 weeks of pregnancy. This delay results in missed opportunities for early detection and management of high risk conditions such as hypertension, anemia, and infections. Contributing factors include limited awareness of ANC importance, economic constraints, fear of HIV testing, and poor provider client communication. Despite the availability of healthcare services, such delays continue to undermine Rwanda’s progress toward improving maternal and neonatal health. Therefore, this study seeks to assess the factors influencing late initiation of first antenatal care services among pregnant women in Kicukiro District, Rwanda. Findings from this study will help inform targeted interventions to promote timely ANC initiation, strengthen health education, and enhance the overall quality of maternal healthcare services in the district and beyond.

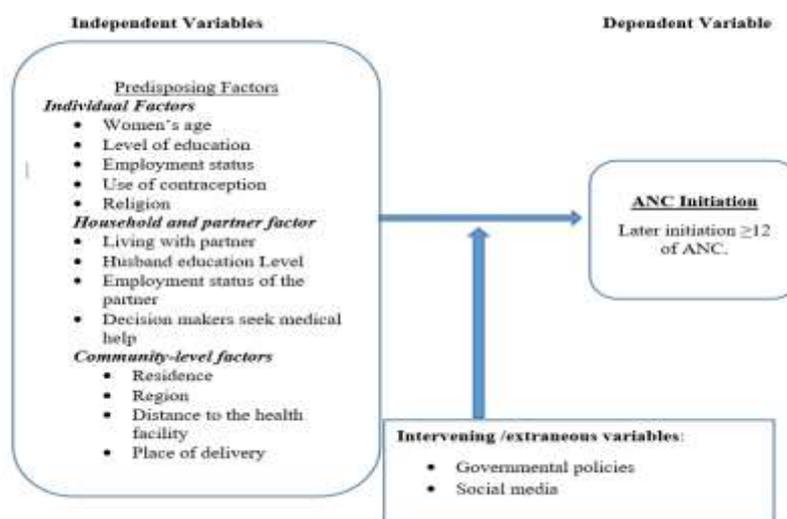


Figure 1: Conceptual Framework

The conceptual framework illustrates the relationship between independent, dependent, and extraneous variables. Independent factors individual, household, and community characteristics influence the dependent variable, which is the timing of ANC initiation. Extraneous factors such as governmental policies and social media indirectly affect this relationship by shaping awareness, accessibility, and decision-making among pregnant women in Kicukiro District.

## 2. RESEARCH METHODOLOGY

### Introduction

This chapter presents the methodological framework employed in this study investigating factors influencing late initiation of first antenatal care (ANC) services among pregnant women aged 15-49 years in Kicukiro District, Rwanda. It covers the study design, study area and period, population definitions, sampling size and procedures, inclusion and exclusion criteria, data collection instruments and procedures (including reliability and validity), data processing and analysis methods, and ethical considerations. The aim is to provide a transparent and replicable account of how the research was conducted, in line with best practices for quantitative cross-sectional studies (Walliman & Walliman, 2021).

### Study Design, Area and Period

**Study design:** This study used a quantitative descriptive cross-sectional design, whereby data were collected at a single point in time from pregnant women attending first ANC in selected health facilities in Kicukiro District. The cross-sectional design enables estimation of the prevalence of the outcome (late ANC initiation) and exploration of associations between explanatory factors (demographic, socio-economic, knowledge, attitude) and the outcome (Berg-Schlosser et al., 2020). In health services research, such designs are efficient and cost-effective for descriptive and analytic aims.

**Study area:** The research was conducted in Kicukiro District, one of the three districts in Kigali City, Rwanda, located in the south-eastern part of the city. According to the 2022 Population and Housing Census, the district had approximately 491,731 residents and a population density of 2,944 people per km<sup>2</sup>, and 99.1 % of the population resided in urban areas.

The district comprises ten sectors, including Gahanga, Gatenga, Gikondo, Kagarama, Kanombe, Kicukiro, Kigarama, Masaka and Niboye. Health-service delivery includes one district hospital and ten health centres offering antenatal services.

**Study period:** Data collection was scheduled within a defined period (to be specified in the final version) during which first-ANC attendees in the selected facilities were approached and interviewed. The exact start and end dates will be reported in the final protocol.

### Population

The **target population** comprises pregnant women aged 15-49 years who attend first antenatal care (ANC) service in the selected health facilities in Kicukiro District. According to the recent census, Kicukiro District contains around 151,276 women of reproductive age (15-49 years). The study population further specifies women who are permanent residents of Kicukiro District during the data collection period and who attend the first ANC visit in the selected facilities and provide consent to participate.

### Sample Size and Sampling Procedure

#### Sample Size

In this study, a sample of 383 pregnant mothers will be the study participants. The minimum sample size was determined using the statistical formula of Fisher for calculating sample size. When the overall prevalence is known but the precise population is unknown, this formula is applied. The formula is  $N = z^2 p (1 - p) / d^2$ , where  $d$  is the acceptable margin of error or measure of precision = 0.05,  $Z$  is the normal deviant at the 95% CI = 1.96, and  $P$  is the prevalence value of available attendance of ANC standard visits in Rwanda (47.0%).  $N$  is also the minimum sample size for a statistically significant survey.

$$N = z^2 p (1 - p) / d^2 = 383$$

This sample size is statistically sufficient to yield valid and generalizable results regarding the factors influencing late initiation of first antenatal care among pregnant women in Kicukiro District. This approach is well supported in the literature on prevalence studies (Naing et al., 2022). Accordingly, the required sample size was 383 participants, including allowance

for non-response. The calculation ensures adequate statistical power to detect meaningful associations while maintaining acceptable precision. Recent reviews emphasize that precision and expected prevalence drive sample size determination, and the formula above remains widely endorsed for cross-sectional prevalence studies (Rahman, 2023).

### Sampling Technique

A **simple random sampling** technique was used, ensuring each eligible pregnant woman in the sampling frame had an equal chance of inclusion, thereby minimizing selection bias and enhancing representativeness (Rudolph et al., 2023). The sampling frame was constructed from ANC registers at the selected facilities (one district hospital, 10 health centres plus one private health facility) within Kicukiro District. The researcher visited the selected facilities, worked with the heads and ANC focal points, and applied random selection procedures among eligible women meeting the inclusion criteria. This strategy supports generalisability within the study setting and maintains methodological rigour.

### Inclusion and Exclusion Criteria

**Inclusion criteria:** Pregnant women aged 15-49 years who attend ANC in the selected health facilities during the study period, Permanent residents of Kicukiro District and Women willing to provide written informed consent.

**Exclusion criteria:** Pregnant women unwilling to participate or decline consent. Women who are too ill or cognitively impaired to participate in the interview. The clear specification of inclusion and exclusion criteria ensures that the sample is appropriate to the study objectives and limits undue bias from non-eligible participants (Koell et al., 2021).

### Data Collection Instruments and Procedures

#### Data Collection Instrument

A structured, interviewer-administered questionnaire with closed-ended questions was used as the primary data collection instrument. Questionnaires remain a preferred method for primary data collection in quantitative studies, particularly when resources are limited and when data confidentiality and standardization are required (Sharma, 2022). The questionnaire was designed by the research team, based on a conceptual framework of ANC predisposing, enabling and need factors, and influenced by previous literature. The instrument was prepared in English and later translated into Kinyarwanda, with a back-translation process to ensure linguistic fidelity and cultural appropriateness. To enhance data capture efficiency and quality, the instrument was programmed into the Kobo Collect platform and uploaded onto Android tablets. Digital data collection enhances speed, reduces data-entry errors, and allows immediate upload to a secure server (Redi et al., 2022).

#### Pilot Testing

Prior to the main data collection, a pilot study was conducted at one health centre (not included in the main sample) with 10 pregnant women to test the instrument. The pilot assessed question clarity, time to complete the questionnaire, reliability and internal consistency, and contextual appropriateness. Based on feedback, ambiguous items were reworded, skip logic adjusted, and question flow refined. Pilot testing strengthens instrument validity and reliability (Mgata & Maluka, 2019).

#### Instrument Reliability and Validity

**Reliability** refers to the consistency of the instrument its ability to produce stable, repeatable results under similar conditions. The study measured inter-interviewer reliability to examine consistency of interpretation across interviewers. This approach aligns with quantitative methodological guidance (Coleman, 2022). **Validity** refers to whether the instrument measures what it purports to measure. Content validity was ensured through expert review of the instrument items, pilot testing, and iterative revisions. The content validity process confirms that items reflect the conceptual constructs of interest (Heale & Twycross, 2015).

#### Data Collection Procedure

The research team liaised with facility management and ANC focal persons to obtain access to the selected sites. Eligible women were approached during their first ANC visit, provided with information about the study, and asked to sign a consent form before participation. Interviews were conducted in a private and confidential space within the facility. Tablets loaded with Kobo Collect were used to capture responses and upload data daily to a secure server. Quality-control measures included daily checks for completeness, logical skip patterns, monitoring of missing data, and follow up queries as needed. Data were stored in password-protected folders and securely backed up.

### Data Processing and Analysis

After data collection, the dataset was exported from KOBO Collect into the Statistical Package for the Social Sciences (SPSS) version 26. Data cleaning then took place, checking for missing data, out-of-range values, duplicate entries, and logical inconsistencies. Descriptive statistics (frequencies, percentages, means, standard deviations) were calculated to summarize sample characteristics and the outcome of interest (late ANC initiation). Bivariate analyses (chi-square tests, t-tests as appropriate) were performed to test associations between independent variables and the outcome. Variables showing significance at the bivariate level were entered into a multivariable binary logistic regression model to identify independent predictors of late ANC initiation, controlling for potential confounders. Adjusted odds ratios (AORs) with 95 % confidence intervals (CIs) and p-values ( $\leq 0.05$ ) were reported. This analytic approach is consistent with recent cross-sectional health services research in Rwanda and beyond (e.g., studies on vaccine acceptance, service-utilization) (Dusingizimana et al., 2023). Analytic outputs were presented in tables and figures, and interpretation was guided by the conceptual framework.

### Ethical Considerations

Ethical oversight and participant protection were integral to the study's design and conduct. Ethical clearance was obtained from the relevant Institutional Review Board (IRB) and permissions were secured from health-facility and district authorities prior to data collection. The study adhered to the principles outlined in the Declaration of Helsinki (World Medical Association, 2013) and Rwanda's Data Protection Law No. 058/2021 of 13 October 2021.

Access to site: Formal letters of introduction and ethical clearance were submitted to the management of Masaka District hospital offices to obtain permission to conduct the research. Informed consent: Participants received full information about the study purpose, procedures, risks and benefits, confidentiality, voluntary participation and withdrawal rights. Consent forms (in English and Kinyarwanda) were signed prior to interview. Confidentiality and anonymity: No personally identifying data (names, addresses) were recorded. Data were coded and stored securely in encrypted password-protected devices and servers; physical records were kept in locked cabinets. Voluntary participation and freedom from coercion: Participation was entirely voluntary, no incentives were provided, and participants could decline or withdraw at any time without penalty. Data storage, legal compliance and disposal: In line with Rwanda's data protection regulations, physical data were stored securely; digital data were encrypted and access restricted to the principal investigator; data will be destroyed upon completion of the research. Intellectual ownership and plagiarism prevention: All sources and ideas not produced by the researcher were properly cited; the final report will be subject to plagiarism check to ensure academic integrity.

## 3. RESEARCH FINDINGS AND DISCUSSION

### Introduction

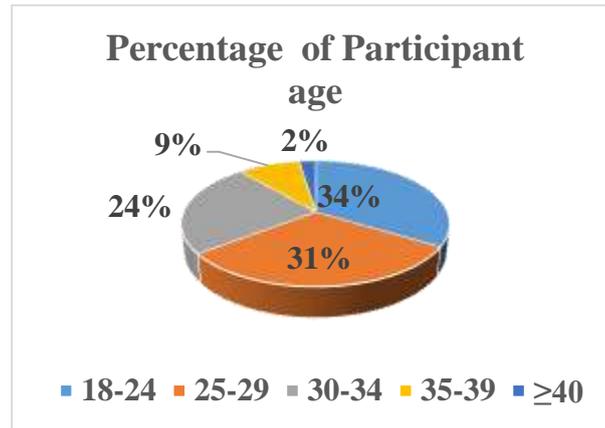
This chapter presents and discusses the findings of the study on factors influencing late utilization of first antenatal care (ANC) services among pregnant women in Kicukiro District, Rwanda. The analysis focuses on participants' socio-demographic characteristics, knowledge, attitudes, and predictors influencing ANC initiation. The results are discussed in relation to existing literature and contextual realities to deepen understanding of the determinants of delayed ANC attendance.

### Response Rate

The study recorded a response rate of 95%, with 380 pregnant women completing the survey. Such a high participation rate ensures data reliability and representativeness. This success can be attributed to effective community mobilization, strong collaboration with local health centers, and clear communication about the study objectives. A high response rate minimizes non-response bias and enhances the validity of findings (Sammut et al., 2021).

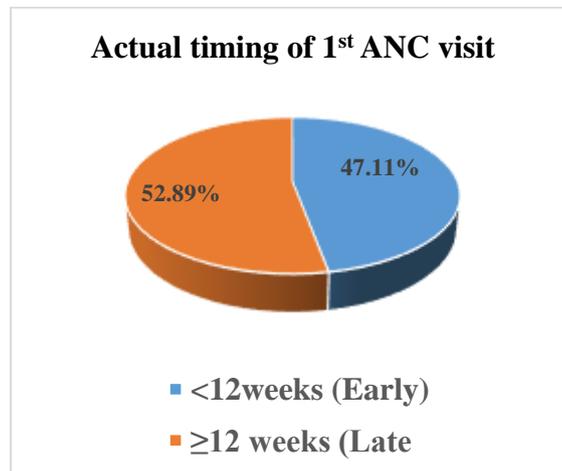
### Demographic Characteristics of Respondents

The socio-demographic profile indicates that most participants were young, with 64.5% aged 18-29 years. The majority were married (88.7%), had secondary education (50.3%), and health insurance coverage (94.2%), reflecting Rwanda's progress in promoting universal health access (Rwanda Demographic and Health Survey [RDHS], 2020).



**Figure 1: Proportion of Participants Age**

Most respondents lived in urban areas (65.5%) and were employed (57.1%), suggesting good healthcare access. However, despite these favorable factors, 52.9% initiated ANC late ( $\geq 12$  weeks). This indicates that socio-economic advantages alone do not guarantee early ANC attendance.



**Figure 2: Actual Timing of first antenatal care visit**

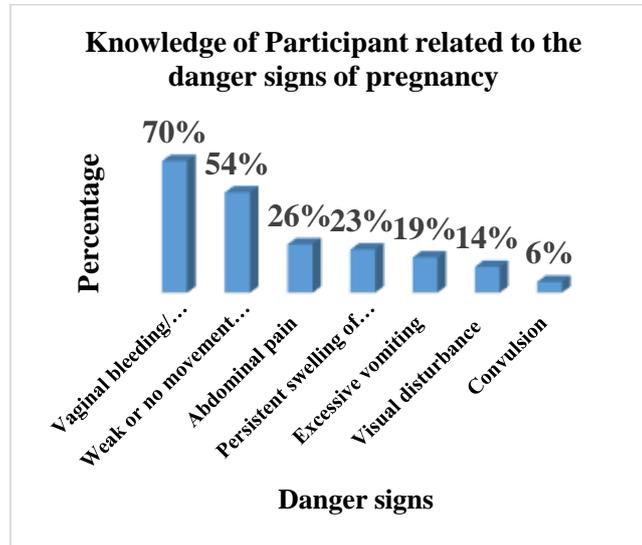
These results are consistent with studies in Ethiopia and Uganda, where unplanned pregnancies and multigravidity were major predictors of delayed ANC despite improvements in education and health access (Phiri et al., 2025) (Redi et al., 2022) (Tekelab et al., 2019); (Uwimana et al., 2023)). In this study, unplanned pregnancies (52.4%) and multigravidity (72.6%) were highly prevalent. Such trends suggest that reproductive and behavioral determinants outweigh socio-economic status in influencing ANC timing.

Moreover, the high rate of joint decision-making (79.2%) between partners aligns with findings by (Bhutada et al., 2024a; Redi et al., 2022), who emphasized that male involvement in maternal health decisions improves ANC utilization. Nonetheless, the persistence of late ANC initiation implies the need for intensified education targeting both women and partners on the benefits of early visits.

#### Knowledge on Factors Influencing Late Initiation of ANC

Knowledge levels among respondents were generally high. Most participants (95.8%) understood that the first ANC visit should occur within three months of pregnancy, and 93.2% agreed that at least five checkups are necessary. High awareness of essential screenings such as **HIV (97.4%)**, **blood pressure (97.9%)**, and **hepatitis B (87.9%)** reflects successful public health messaging. Likewise, nearly all participants recognized the importance of increased dietary intake of fruits, milk, and vegetables.

However, gaps were noted regarding **tetanus toxoid (TT) vaccination**, where **40.8%** of respondents were unaware of its purpose, and **61.3%** did not know the required number of doses. Similar gaps have been documented in Uganda and Nigeria, where insufficient understanding of ANC components hindered full service uptake (Sserwanja et al., 2022). Additionally, while **70.2%** recognized vaginal bleeding as a pregnancy danger sign, only **5.7%** identified convulsions, revealing selective knowledge about complications.



**Figure 3: Knowledge of Participant related to the danger signs of pregnancy**

These findings suggest that although awareness of ANC importance is high, detailed knowledge on specific components remains inadequate. Bridging this gap requires continuous community-based health education, especially on vaccination schedules and danger signs. Such interventions could strengthen compliance with World Health Organization (WHO) recommendations on focused ANC (WHO, 2022).

#### Attitudes Toward Antenatal Care

The study revealed overwhelmingly positive attitudes toward ANC. A significant majority (82.6%) strongly agreed that ANC is essential, while 71.8% recognized its importance for monitoring maternal and fetal health. Likewise, 69.5% believed ANC should begin before the third month of pregnancy, and 80.8% supported blood screening during checkups. These results mirror findings from (Yihune Teshale et al., 2025), who reported that positive attitudes significantly enhance ANC utilization.

Regarding preventive practices, 75.8% strongly supported ultrasound use, and over 90% agreed on dietary changes and iron/folic acid supplementation benefits. Notably, 88.2% strongly disagreed that home delivery is safer than hospital delivery, and over 80% rejected the belief that smoking or alcohol benefits the fetus. These perceptions reflect improved maternal health literacy following Rwanda's continuous maternal health education programs (MOH, 2023).

However, some inconsistencies emerged. Around one-third (32.4%) of women occasionally missed iron and folic acid tablets, indicating adherence challenges. Similar findings from Kenya and Tanzania attributed non-adherence to side effects, forgetfulness, or misconceptions about supplements (Jemutai & Impwii, 2024). Encouragingly, nearly all respondents (97.9%) reported they would seek medical help at a health center in case of complications, underscoring a strong health-seeking culture.

#### Predictors of Late Initiation of First Antenatal Care

The logistic regression analysis identified key predictors influencing the timing of first ANC visits. Maternal age, partner's education, and pregnancy planning were statistically significant. Women aged 30-34 years were less likely to initiate ANC late (AOR=0.377,  $p=0.021$ ) compared to younger women. Older mothers may have better health awareness and experience, consistent with findings from (Tekelab et al., 2019).

**Table 1: Predictors of Late First Antenatal Care Initiation Among Pregnant Women in Kicukiro District**

Variables	Category	ANC initiation		COR (95%CI)	AOR (95% CI)	P-Value
		Early Initiation	Late Initiation			
Maternal Age	18-24	55 (42.97)	73 (57.03)	1	1	
	25-29	56 (47.86)	61 (52.14)	0.820(0.495-1.358)	0.919(0.428-1.970)	0.829
	30-34	61 (66.30)	31 (33.70)	0.382(0.219-0.667)	0.377(0.165-0.861)	<b>0.021*</b>
	35-39	22 (64.71)	12 (35.29)	0.410(0.187-0.901)	0.351(0.113-1.093)	0.071
	≥40	7 (77.78)	2 (22.22)	0.215(0.043-1.076)	0.168(0.183-1.306)	0.086
Religion	Catholic	62 (49.60)	63 (50.40)	1	1	
	Muslim	28 (68.29)	13 (31.71)	0.456(0.216-0.962)	0.497(0.178-1.387)	0.182
	Others	86 (58.11)	62 (41.89)	0.709(0.439-1.145)	1.235(0.651-2.343)	0.517
	Protestant	25 (37.88)	41 (62.12)	1.613(0.878-2.965)	1.643(0.762-3.542)	0.205
Marital Status	Divorced	3 (100.00)	0 (0.00)	1	1	
	Married	169 (50.30)	167 (49.70)	2.305(1.134-4.686)	1.371(0.524-3.582)	0.520
	Unmarried	28 (70.00)	12(30.00)	1(0.217-0.842)	1	
Women education level	No education	14(73.68)	5 (26.32)	1	1	
	Primary	79 (58.52)	56 (41.48)	1.984(0.676-5.827)	0.905(0.229-3.577)	0.888
	Secondary	95 (49.74)	96 (50.26)	2.829(0.980-8.165)	0.803(0.194-3.321)	0.765
	Tertiary	13 (37.14)	22 (62.86)	4.738(1.385-16.210)	0.766(0.129-4.543)	0.769
Husband/partner's education level	I do not Know	54 (62.79)	32 (37.21)	1	1	
	No education	19 (82.61)	4 (17.39)	0.355(0.110-1.137)	0.256(0.058-1.122)	0.071
	Primary	43 (51.19)	41 (48.81)	1.609(0.872-2.966)	1.459(0.658-3.234)	0.352
	Secondary	68 (55.28)	55 (44.72)	1.364(0.776-2.397)	0.952(0.455-1.994)	0.898
	Tertiary	17 (26.56)	47 (73.44)	4.665(2.302-9.454)	3.470(1.154-10.43)	<b>0.027*</b>
Woman's Place of Residence	Rural	78 (59.54)	53 (40.46)	1	1	
	Urban	123 (49.40)	126 (50.60)	1.507(0.982-2.313)	1.272(0.730-2.214)	0.395
Women Current working status	No	89 (54.60)	74 (45.40)	1	1	
	Yes	112 (51.61)	105 (48.39)	1.127(0.750-1.694)	0.813(0.456-1.448)	0.482
Contraceptive Use	No	68 (55.28)	55 (44.72)	1	1	

	Yes	133 (51.75)	124 (48.25)	1.152(0.748-1.774)	1.967(0.916-4.221)	0.082
Gravidity	Multigravida	159 (57.61)	117 (42.39)	1	1	
	Primigravida	42 (40.38)	62 (59.62)	2.00(1.268-3.173)	1.612(0.679-3.825)	0.278
Getting money needed for treatment	No Problem	156 (50.16)	155 (49.84)	1	1	
	Problem	45 (65.22)	24 (34.78)	0.536(0.311-0.923)	1.612(0.679-3.825)	0.673
Distance to health Facility	Problem	40 (61.54)	25(38.46)	1	1	
	No Problem	161 (51.11)	154 (48.89)	1.530(0.886-2.642)	1.387(0.635-3.029)	0.411
Living with a partner	Living with Partner	149(51.03)	143 (48.97)	1	1	
	Staying elsewhere	52 (59.61)	36(40.91)	0.721(0.445-1.169)	1.633(0.808-3.300)	0.171
Heath Insurance coverage	No	14 (63.64)	8 (36.36)	1	1	
	Yes	187 (52.23)	171 (47.77)	1.600(0.655-3.908)	1.119(0.332-3.770)	0.856
Husband/partner's Occupation	Not Working	56 (62.22)	34 (37.78)	1	1	
	Self Employed	37 (54.41)	31 (45.59)	1.379(0.727-2.616)	1.006(0.425-2.379)	0.988
	Working For others	108 (48.65)	114 (51.35)	1.738(1.053-2.868)	1.219(0.614-2.418)	0.570
The Desire for more Child	Have another	92 (54.12)	78 (45.88)	1	1	
	No more	69 (47.92)	75 (52,08)	1.282(0.821-2.000)	1.721(0.953-3.106)	0.071
	Need of Sterilized	7 (70.00)	3 (30.00)	0.505(0.126-2.020)	1.639(0.240-11.17)	0.614
	Undecided	33 (58.93)	23(41.07)	0.822(0.445-1.515)	1.586(0.709-3.545)	0.261
Decision on respondent's health care	Joint	154 (51.16)	147 (48.84)	1	1	
	Other	12 (70.59)	5 (29.41)	0.436(0.150-1.269)	0.545(0.135-2.192)	0.393
	Respondent	35 (56.45)	27 (43.55)	0.808(0.466-1.401)	1.246(0.586-2.648)	0.566
Planning of Pregnancy	No	153(76.88)	46 (23.12)	1	1	
	Yes	48(26.52)	133(73.48)	9.21(5.780-14.692)	8.451(4.714-15.14)	0.000*

**AOR Adjusted Odds Ratio. \*Statistically significant association with  $P < 0.05$ .**

Conversely, partners with tertiary education were paradoxically associated with late ANC initiation (AOR=3.470,  $p=0.027$ ). This contradicts the assumption that higher education automatically leads to better health behavior and suggests that decision-making dynamics or work-related time constraints among educated partners may delay healthcare-seeking (Redi et al., 2022).

The most influential factor was pregnancy planning. Women with unplanned pregnancies were 8.4 times more likely to initiate ANC late ( $p<0.001$ ). This finding aligns with global and regional studies indicating that unintended pregnancies reduce motivation for early ANC due to psychological unpreparedness, stigma, or denial (Tsegaye & Ayalew, 2020)(Bhutada et al., 2024b).

Other factors such as religion, occupation, residence, and health insurance were not statistically significant, possibly due to uniformity in access within Kicukiro's urban setting. These results imply that interventions promoting family planning and reproductive counseling could substantially improve timely ANC initiation.

#### 4. DISCUSSION OF RESEARCH FINDINGS

The study titled “*Factors Influencing Late Initiation of First Antenatal Care Services Among Pregnant Women in Kicukiro District, Rwanda*” sought to identify determinants influencing delayed first antenatal care (ANC) attendance among women of reproductive age. Findings revealed that maternal age, unplanned pregnancies, education level, and financial challenges were significant predictors of late ANC initiation, despite participants exhibiting positive knowledge and attitudes toward ANC services. This discussion elaborates on these findings in relation to global, regional, and national evidence.

##### **Socio-Demographic and Socioeconomic Factors**

The socio-demographic profile revealed that most respondents were young women aged 18–29 years. Younger women are more likely to delay ANC initiation due to inexperience, limited knowledge, and reduced autonomy in health decision-making (Mbarushimana & Nsanzabera, 2024). Similar findings were reported in Ethiopia and Nigeria, where younger mothers often lacked awareness of the benefits of early ANC visits. Moreover, unmarried women in this study were more likely to delay ANC, a trend consistent with evidence showing that stigma, limited partner support, and fear of judgment hinder early ANC attendance among single mothers (Ishimwe et al., 2022; Blay, 2023).

Education level was another important determinant. Women with secondary or higher education were more likely to seek ANC earlier, corroborating findings from Rwamagana District Hospital that highlighted education as a key enabler of early ANC uptake (Wabwire et al., 2024). However, a small group of women without formal education remained vulnerable to late ANC attendance, emphasizing persistent health literacy inequalities (WHO, 2022).

Socioeconomic status also shaped ANC utilization. Employed women and those from middle or higher wealth quintiles initiated ANC earlier compared to unemployed or low-income counterparts. Financial constraints were reported by 18.2% of respondents as a barrier to early ANC attendance. This aligns with studies in Musanze District (Dusingizimana et al., 2023) and Uganda (Bhutada et al., 2024b), where lack of financial resources delayed maternal healthcare utilization. Although Rwanda's Community-Based Health Insurance (CBHI) scheme has improved access, indirect costs such as transportation and lost wages still limit timely attendance (Wilson et al., 2023).

Residence played a partial role. Most participants lived in urban areas, with fewer reporting distance as a barrier. Yet, for those in peri-urban zones, distance remained a significant determinant, consistent with RDHS (2020), which emphasizes geographical disparities in healthcare accessibility. Overall, the interaction of youth, marital status, education, and financial capacity significantly affects ANC timing, reaffirming similar patterns in sub-Saharan Africa (Tekelab et al., 2019, (Uwimana et al., 2023)).

##### **Knowledge of ANC Services**

Knowledge about ANC importance and components was generally high among Kicukiro women. The majority correctly identified that the first ANC should occur within 12 weeks and that at least five visits are recommended, reflecting successful public health messaging (RDHS, 2020; Twagirumukiza et al., 2024). High awareness of maternal screenings HIV testing (97.4%), blood pressure monitoring (97.9%), and blood sugar testing (90.8%) demonstrates alignment with WHO's focused ANC model (WHO, 2022).

However, notable gaps existed in awareness of maternal immunization, with over 60% of respondents unable to state the correct number of tetanus toxoid (TT) doses. (Biracyaza et al., 2022) similarly found that immunization knowledge remains weak despite overall ANC awareness. Such deficiencies highlight the need for intensified health education, particularly about preventive interventions that safeguard both mother and fetus. Nutrition-related knowledge was strong, with over 90% reporting increased intake of fruits, vegetables, and dairy products, consistent with findings from Kenya and Tanzania that link nutritional awareness to improved pregnancy outcomes (Jemutai & Impwii, 2024).

##### **Attitudes Toward ANC Services**

The study revealed overwhelmingly positive attitudes toward ANC services. Nearly all respondents (100%) supported institutional delivery and recognized the dangers of smoking, alcohol consumption, and self-medication during pregnancy. This reflects growing health literacy and confidence in Rwanda's healthcare system, similar to findings by (Salus & Gedeon,

2024). The majority (98.7%) indicated they would report pregnancy complications to health centers, reinforcing the positive impact of the CBHI scheme and community sensitization (Wilson et al., 2023).

Nevertheless, recognition of certain danger signs was limited only 5.7% identified convulsions and 13.8% visual disturbances as warning signs. This mirrors results from Uganda and Ethiopia, where selective awareness of danger signs hindered timely response to complications (Sserwanja et al., 2022). Addressing these gaps through continuous community education and integration of maternal health messages into primary care could strengthen preventive practices and reduce maternal morbidity.

### Predictors of Late ANC Initiation

Regression analysis revealed that maternal age, partner's education, and pregnancy planning were key predictors. Women aged 30-34 years were less likely to delay ANC, possibly due to greater reproductive experience and awareness (Jeannette & Cecile, 2022). Conversely, women whose partners had tertiary education were more likely to delay ANC (AOR=3.470,  $p=0.027$ ). Similar paradoxical findings in other Rwandan studies suggest that highly educated partners may prioritize work over family health commitments, delaying decision-making regarding ANC attendance (Tengera et al., 2024). The strongest determinant was pregnancy planning women with unplanned pregnancies were over eight times more likely to delay ANC, corroborating results from regional studies that link unintended pregnancy with psychological unpreparedness and stigma (Bhutada et al., 2024b; Redi et al., 2022).

Overall, these findings emphasize that socio-demographic and reproductive factors interact to influence ANC initiation. Strengthening family planning services, promoting partner involvement, and providing targeted education to younger and economically disadvantaged women are essential strategies to enhance early ANC attendance in Rwanda.

## 5. CONCLUSION

In conclusion, this study provides crucial insights into the multifaceted factors influencing the late initiation of first antenatal care (ANC) services among pregnant women in Kicukiro District, Rwanda. The findings confirm that demographic and socioeconomic determinants particularly young maternal age, low educational attainment, unemployment, low income, and unmarried status remain key predictors of delayed ANC attendance. Although knowledge and attitudes toward ANC were generally positive, indicating awareness of its importance, structural and economic challenges continue to hinder timely utilization. These results underscore that improving maternal health outcomes requires more than awareness it demands targeted, equity-focused interventions. Empowering vulnerable groups through education, financial support, and community engagement is vital. Furthermore, strengthening the health system's responsiveness through accessible, youth-friendly, and affordable ANC services will enhance early attendance. Ultimately, addressing these barriers will accelerate progress toward Rwanda's maternal and newborn health goals and Sustainable Development Goal 3 on improving maternal health.

## REFERENCES

- [1] Berg-Schlosser, D., Badie, B., & Morlino, L. (2020). *The SAGE Handbook of Political Science*. SAGE.
- [2] Bhutada, K., Venkateswaran, M., Atim, M., Munabi-Babigumira, S., Nankabirwa, V., Namagembe, F., Frøen, J. F., & Papadopoulou, E. (2024a). Factors influencing the uptake of antenatal care in Uganda: A mixed methods systematic review. *BMC Pregnancy and Childbirth*, 24(1), 730. <https://doi.org/10.1186/s12884-024-06938-6>
- [3] Bhutada, K., Venkateswaran, M., Atim, M., Munabi-Babigumira, S., Nankabirwa, V., Namagembe, F., Frøen, J. F., & Papadopoulou, E. (2024b). Factors influencing the uptake of antenatal care in Uganda: A mixed methods systematic review. *BMC Pregnancy and Childbirth*, 24(1), 730. <https://doi.org/10.1186/s12884-024-06938-6>
- [4] Biracyaza, E., Habimana, S., Rusengamihigo, D., & Evans, H. (2022). Regular antenatal care visits were associated with low risk of low birth weight among newborns in Rwanda: Evidence from the 2014/2015 Rwanda Demographic Health Survey (RDHS) Data. *F1000Research*, 10, 402. <https://doi.org/10.12688/f1000research.51969.2>
- [5] Coleman, P. (2022). Validity and Reliability within Qualitative Research for the Caring Sciences. *International Journal of Caring Sciences*, 14(3), 2041–2045.
- [6] Debelo, B. T., & Danusa, K. T. (2022). Level of Late Initiation of Antenatal Care Visit and Associated Factors Amongst Antenatal Care Attendant Mothers in Gedo General Hospital, West Shoa Zone, Oromia Region, Ethiopia. *Frontiers in Public Health*, 10. <https://doi.org/10.3389/fpubh.2022.866030>

- [7] Dusingizimana, T., Ramilan, T., Weber, J. L., Iversen, P. O., Mugabowindekwe, M., Ahishakiye, J., & Brough, L. (2023). Predictors for achieving adequate antenatal care visits during pregnancy: A cross-sectional study in rural Northwest Rwanda. *BMC Pregnancy and Childbirth*, 23(1), 69. <https://doi.org/10.1186/s12884-023-05384-0>
- [8] Jemutai, F., & Impwii, D. K. (2024). Determinants of Early Antenatal Care Booking among Pregnant Women attending Embu Teaching and Referral Hospital, Kenya: A Cross-sectional Survey. *International Journal of Health Sciences and Research*, 14(1), 275–282. <https://doi.org/10.52403/ijhsr.20240135>
- [9] Koell, B., Orban, M., Weimann, J., Kassar, M., Karam, N., Neuss, M., Petrescu, A., Iliadis, C., Unterhuber, M., Adamo, M., Giannini, C., Melica, B., Ludwig, S., Massberg, S., Praz, F., Pfister, R., Thiele, H., von Bardeleben, R. S., Baldus, S., ... EuroSMR Investigators. (2021). Outcomes Stratified by Adapted Inclusion Criteria After Mitral Edge-to-Edge Repair. *JACC*, 78(24), 2408–2421. <https://doi.org/10.1016/j.jacc.2021.10.011>
- [10] Mbarushimana, V., & Nsanjabera, C. (2024). Prevalence and Factors Associated with the Fourth Standard Antenatal Care Utilization among Pregnant Women Attending Ruli District Hospital, Rwanda. *Global Journal of Health Sciences*, 9(5), 1–16. <https://doi.org/10.47604/gjhs.3072>
- [11] Mgata, S., & Maluka, S. O. (2019). Factors for late initiation of antenatal care in Dar es Salaam, Tanzania: A qualitative study. *BMC Pregnancy and Childbirth*, 19(1), 415. <https://doi.org/10.1186/s12884-019-2576-0>
- [12] Naing, L., Nordin, R. B., Abdul Rahman, H., & Naing, Y. T. (2022). Sample size calculation for prevalence studies using Scalex and ScalaR calculators. *BMC Medical Research Methodology*, 22(1), 209. <https://doi.org/10.1186/s12874-022-01694-7>
- [13] Onambele, L., Guillen-Aguinaga, S., Guillen-Aguinaga, L., Ortega-Leon, W., Montejo, R., Alas-Brun, R., Aguinaga-Ontoso, E., Aguinaga-Ontoso, I., & Guillen-Grima, F. (2023). Trends, Projections, and Regional Disparities of Maternal Mortality in Africa (1990–2030): An ARIMA Forecasting Approach. *Epidemiologia*, 4(3), 322–351. <https://doi.org/10.3390/epidemiologia4030032>
- [14] Palich, R., Arias-Rodríguez, A., Duracinsky, M., Le Talec, J.-Y., Rousset Torrente, O., Lascoux-Combe, C., Lacombe, K., Ghosn, J., Viard, J.-P., Pialoux, G., Ohayon, M., Duvivier, C., Velter, A., Ben Mechlia, M., Beniguel, L., Grabar, S., Melchior, M., Assoumou, L., Supervie, V., ... LENNES, K. (2024). High proportion of post-migration HIV acquisition in migrant men who have sex with men receiving HIV care in the Paris region, and associations with social disadvantage and sexual behaviours: Results of the ANRS-MIE GANYMEDE study, France, 2021 to 2022. *Eurosurveillance*, 29(11), 2300445. <https://doi.org/10.2807/1560-7917.ES.2024.29.11.2300445>
- [15] Phiri, M., Mwanza, J., Mwiche, A., Lemba, M., & Malungo, J. R. S. (2025). Delay in timing of first antenatal care utilisation among women of reproductive age in sub-Saharan Africa: A multilevel mixed effect analysis. *Journal of Health, Population and Nutrition*, 44(1), 139. <https://doi.org/10.1186/s41043-025-00857-8>
- [16] Rahman, M. M. (2023). Sample Size Determination for Survey Research and Non-Probability Sampling Techniques: A Review and Set of Recommendations. *Journal of Entrepreneurship, Business and Economics*, 11(1), 42–62.
- [17] Redi, T., Seid, O., Bazie, G. W., Amsalu, E. T., Cherie, N., & Yalew, M. (2022). Timely initiation of antenatal care and associated factors among pregnant women attending antenatal care in Southwest Ethiopia. *PLOS ONE*, 17(8), e0273152. <https://doi.org/10.1371/journal.pone.0273152>
- [18] Rudolph, J. E., Zhong, Y., Duggal, P., Mehta, S. H., & Lau, B. (2023). Defining representativeness of study samples in medical and population health research. *BMJ Medicine*, 2(1), e000399. <https://doi.org/10.1136/bmjmed-2022-000399>
- [19] Salus, D. D., & Gedeon, M. (2024). ASSESSMENT OF FACTORS INFLUENCING POOR USE OF ANTENATAL CARE ATTENDANCE AMONG TEENAGE MOTHERS AT KIBOGORA HEALTH CENTER IN RWANDA. [Thesis, KIBOGORA POLYTECHNIC]. <https://repository.kp.ac.rw/xmlui/handle/123456789/200>
- [20] Sammut, R., Griscti, O., & Norman, I. J. (2021). Strategies to improve response rates to web surveys: A literature review. *International Journal of Nursing Studies*, 123, 104058. <https://doi.org/10.1016/j.ijnurstu.2021.104058>
- [21] Sharma, D. N. K. (2022). Instruments Used in the Collection of Data in Research (SSRN Scholarly Paper No. 4138751). *Social Science Research Network*. <https://doi.org/10.2139/ssrn.4138751>

- [22] Souza, J. P., Day, L. T., Rezende-Gomes, A. C., Zhang, J., Mori, R., Baguiya, A., Jayaratne, K., Osoti, A., Vogel, J. P., Campbell, O., Mugerwa, K. Y., Lumbiganon, P., Tunçalp, Ö., Cresswell, J., Say, L., Moran, A. C., & Oladapo, O. T. (2024). A global analysis of the determinants of maternal health and transitions in maternal mortality. *The Lancet Global Health*, 12(2), e306–e316. [https://doi.org/10.1016/S2214-109X\(23\)00468-0](https://doi.org/10.1016/S2214-109X(23)00468-0)
- [23] Sserwanja, Q., Nuwabaine, L., Gatasi, G., Wandabwa, J. N., & Musaba, M. W. (2022). Factors associated with utilization of quality antenatal care: A secondary data analysis of Rwandan Demographic Health Survey 2020. *BMC Health Services Research*, 22(1), 812. <https://doi.org/10.1186/s12913-022-08169-x>
- [24] Tekelab, T., Chojenta, C., Smith, R., & Loxton, D. (2019). Factors affecting utilization of antenatal care in Ethiopia: A systematic review and meta-analysis. *PLOS ONE*, 14(4), e0214848. <https://doi.org/10.1371/journal.pone.0214848>
- [25] Tengera, O., Meharry, P., Nkurunziza, A., Rugema, J., Babenko-Mould, Y., Rulisa, S., & Nyirazinyoye, L. (2024). Exploring Perceptions about Enablers of Women’s Attendance and Adherence to the Recommended Antenatal Care Visits in Rwanda: A Qualitative Study. *Rwanda Journal of Medicine and Health Sciences*, 7(1), 101–115. <https://doi.org/10.4314/rjmhs.v7i1.8>
- [26] Tsegaye, B., & Ayalew, M. (2020). Prevalence and factors associated with antenatal care utilization in Ethiopia: An evidence from demographic health survey 2016. *BMC Pregnancy and Childbirth*, 20(1), 528. <https://doi.org/10.1186/s12884-020-03236-9>
- [27] Uwimana, G., Elhoumed, M., Gebremedhin, M. A., Nan, L., & Zeng, L. (2023). Determinants of timing, adequacy and quality of antenatal care in Rwanda: A cross-sectional study using demographic and health surveys data. *BMC Health Services Research*, 23(1), 217. <https://doi.org/10.1186/s12913-023-09231-y>
- [28] Wabwire, P. F., Bushaija, E., Uwase, M., Iranzi, S., Iranzi, D., Munezero, E., Munezero, B., Mulindwa, V., & Ayodeji, O. A. (2024). Utilization of Antenatal Care among Women in Rwamagana District, Rwanda: A Cross-sectional Study Conducted at Health Centers in 2023. *Rwanda Public Health Bulletin*, 5(2), 7–22. <https://doi.org/10.4314/rphb.v5i2.5>
- [29] Walliman, N., & Walliman, N. (2021). *Research Methods: The Basics* (3rd ed.). Routledge. <https://doi.org/10.4324/9781003141693>
- [30] Wilson, D. R., Haas, S., Van Gelder, S., & Hitimana, R. (2023). Digital financial services for health in support of universal health coverage: Qualitative programmatic case studies from Kenya and Rwanda. *BMC Health Services Research*, 23(1), 1036. <https://doi.org/10.1186/s12913-023-09893-8>
- [31] Yihune Teshale, M., Bante, A., Gedefaw Belete, A., Crutzen, R., Spigt, M., & Stutterheim, S. E. (2025). Barriers and facilitators to maternal healthcare in East Africa: A systematic review and qualitative synthesis of perspectives from women, their families, healthcare providers, and key stakeholders. *BMC Pregnancy and Childbirth*, 25(1), 111. <https://doi.org/10.1186/s12884-025-07225-8>