

As depicted in the table 3, there was a significant relationship between postpartum mothers' ANC attendance and their parity (p 0.001), marital status (p 0.001), maternal education (p 0.001), and partner's education (p=0.001), according to the association between socio-demographic characteristics and recommended ANC attendance.

Comparing frequencies and percent, it was found that attending ≥ 4 visits was elevated to 64 (37.2%) among participants who were between 25 and 35 years with respondents aged between 36-45 years recording relatively low attendance of about 13 (35.1%). The respondents with one delivery had higher number 64 (54.7%) in attending ≥ 4 visits. Furthermore, the study revealed that, the majority 60 (29.1%) of the respondents who were single attended ≥ 4 ANC visits during their last gestation. Regarding maternal education, the majority of respondents 54 (34.2%) who attended recommended ANC visits attained primary education. It was also indicated that 46 (33.1%) partners who attained primary with their wives attended ≥ 4 visits. Looking at religion, 106 (35.9%) participants who were Christians attended ≥ 4 visits. Finally, 65 (40.1%) of the participants who lived in rural areas attended recommended ANC visits.

Table 3: Bivariate analysis of demographic characteristics associated with recommended ANC attendance

Variables	Recommended ANC attendance				Chi-square value	p value
	Yes		No			
	n	%	n	%		
Age group					0.23	0.891
17-24	33	30.4	63	65.6		
25-35	64	37.2	108	62.8		
36-45	13	35.1	24	64.9		
Parity					31.64	<0.001
One	64	54.7	53	45.3		
Two	17	18.3	76	81.7		
Three and above	29	30.5	66	69.5		
Marital status						
Married	50	50.5	49	49.5	13.25	<0.001
Single/divorced/widowed	60	29.1	146	70.9		
Maternal education						

No education	1	6.3	15	93.8	17.80	<0.001
Primary education	54	34.2	104	65.8		
Secondary education	40	34.4	70	66.6		
Tertiary education	15	71.4	6	28.6		
Partner's education						
No education	2	9.5	19	90.5	23.373	<0.001
Primary education	46	33.1	93	66.9		
Secondary education	40	35.1	74	64.9		
Tertiary education	22	71	9	29		
Religion						
Christians	106	35.9	189	64.1	0.069	0.792
Muslums	4	40	6	60		
Residence area						
Urban	65	40.1	97	59.9	2.467	0.116
Rural	45	31.5	98	68.5		

Source: Primary data (2022)

The results in table 4 regarding the association between socio-economic factors and recommended ANC attendance indicated that the following variables: maternal occupation (p=0.044), health insurance use (p=0.003), cost of all ANC services and laboratory tests (p=0.001) were significantly associated with recommended ANC attendance and other variables like partner's occupation (p-value=0.441), family wealth index category (p-value =0.232), perception of transport and services' cost related to ANC (p-value= 0.761) were not statistically significant. Compared to frequencies and percentages, it was found ≥ 4 visits was the highest 53 (35.3%) among respondents who were housewives. Considering the partner's education, the majority 54 (34.2%) of partner's respondents who were daily labourers recorded relatively high attendance of ≥ 4 visits. The respondents counted among wealth index category two had higher number 55 (33.5%) in attending ≥ 4 visits. It was discovered that, the majority 94 (34.1%) of the respondents who possessed community based health insurance attended ≥ 4 ANC visits during their last pregnancy preceding the study. Regarding perception of transport and services cost related to ANC, the majority of respondents 82 (36.9%) who attended recommended ANC visits perceived the

cost as moderate. It was also revealed that 80 (32.4%) participants who paid 5,000Rwf attended ≥ 4 visits.

Table 4: Association between socio-economic factors and recommended ANC attendance

Variables	Recommended ANC attendance				Chi-square value	p value
	Yes		No			
	n	%	n	%		
Maternal occupation					9.80	0.044
Housewives	53	35.3	97	64.7		
Daily labourers	15	41.7	21	58.3		
Employed	9	75	3	25		
Merchants	16	32.7	33	67.3		
Farmers	17	29.3	41	70.7		
Partner's occupation					3.74	0.441
No occupation	3	33.3	6	66.7		
Daily labourers	54	34.2	104	65.8		
Employed	28	46.7	32	53.3		
Merchants	12	32.4	25	67.6		
Farmers	13	31.7	28	68.3		
Family wealth index category					4.28	0.232
Category one	8	26.7	22	73.3		
Category two	55	33.5	109	66.5		
Category three	47	42.7	63	57.3		
Category four	0	0.00	1	100		
Health insurance use					11.76	0.003
Community based health insurance	94	34.1	182	65.9		
Other health insurances	15	68.2	7	31.8		
No health insurance	1	14.3	6	85.7		
Perception of transport and services cost related to ANC					0.54	0.761
Low	11	30.6	25	69.4		
Moderate	82	36.9	140	63.1		
High	17	36.2	30	63.8		
Cost of all ANC services and laboratory tests					13.87	0.001
<5,000Rwf	80	32.4	167	67.6		
5,0000-10,0000Rwf	12	37.5	20	62.5		
>10,000Rwf	18	69.2	8	30.8		

Source: Primary data, (2022)

Regression analysis illustrated in table 5 revealed that parity, marital status, health insurance use and cost of ANC services and laboratory tests remained statistically significant. The following

variables: maternal education, partner education and maternal occupation lost their significance in logistic regression analysis.

The result from this study found that postpartum mothers were 6 times (AOR= 6.445, 95% CI: [3.137-13.240], $p<0.001$) and 3 times (AOR=3.603, 95% CI: [1.776-7.306], $p<0.001$) more likely to attend recommended ANC visits during their first and second pregnancy respectively compared to those who were having third pregnancy and more. Respondents who were married were 2 times more likely to attend 4+ visits compared to those who were single, divorced and widowed (AOR=2.240,95%CI:[1.213-4.139], $p=0.008$). Postpartum mothers who used other health insurances were 3 times more likely to attend recommended ANC visits compared to those without health insurances (AOR=3.683, 95% CI: [1.805-6.675], $p=0.048$). Finally, respondents who paid <5,000Rwf as cost of ANC services and laboratory tests were 9 times more likely to attend recommended ANC visits compared to those who paid more than 10,000Rwf (AOR=9.699, 95% CI: [2.425-38.789], $p=0.001$).

Table 5: Multivariate analysis of factors associated with recommended ANC attendance

Variables	AOR	95% CI		P value
		Lower	Upper	
Parity				
One	6.44	3.13	13.24	<0.001
Two	3.60	1.77	7.30	<0.001
Three and above	REF			
Marital status				
Married	2.24	1.21	4.13	0.010
Single/divorced/separated/widowed	Ref			
Maternal education				
No education	2.74	0.03	45.41	0.480
Primary education	0.78	0.03	4.18	0.779
Secondary education	1.03	0.01	5.12	0.964
Tertiary education	Ref			
Partner education				
No education	7.38	0.07	2.31	0.061
Primary education	3.41	0.07	2.36	0.062

Secondary education	3.10	0.01	1.10	0.075
Tertiary education	Ref			
Maternal occupation				
Housewife	1.54	0.69	3.40	0.286
Daily labourer	0.80	0.30	2.17	0.675
Employed	0.34	0.06	1.79	0.208
Merchant	1.22	0.44	3.35	0.696
Farmer	Ref			
Health insurance use				
Community based health insurance	2.06	1.26	4.00	0.017
Other health insurances	3.68	1.80	6.67	0.048
No health insurance	Ref			
Cost of ANC services and lab tests				
<5,000Rwf	9.69	2.42	38.78	0.001
5,000-10,000Rwf	7.67	1.61	36.56	0.010
>10,000Rwf	Ref			

AOR= Adjusted Odds Ratio; **CI**= Confidence Interval

Source: Primary data, (2022)



Discussion

The study aimed at assessing factors associated with recommended antenatal care attendance among postpartum mothers at selected health facilities in Kicukiro District. Particular attention was paid to determining the prevalence of recommended ANC attendance, assessing the socio-demographic factors, examining the socio-economic factors, and establishing the health facility characteristics associated with recommended ANC attendance among postpartum mothers at selected health facilities in Kicukiro District.

This study revealed that mothers aged 25–35 had a high percentage compared with other age groups because it is the most productive age in Rwanda. Considering parity, the majority of women had one delivery. Regarding marital status, a high percentage of participants reported being either single, separated, divorced, or widowed. Considering the level of education, a large

number of mothers had primary education. A high percentage of participants reported that their partners were educated up to the primary level. The low education level of participants and their partners could explain how they were not knowledgeable and, hence, they could not take into account the requirements to attend the recommended ANC visit. Considering religion, the majority of participants were Christians. Finally, the majority of participants lived in urban area.

The findings of this study revealed that the recommended ANC prevalence among postpartum mothers was critically low. This prevalence is lower than the ones reported by different studies [8-12]. This discrepancy could be due to their different sample sizes, sampling designs, age of participants, and recall bias or respondents' misunderstanding of some questions as Rwanda Demographic and Health Survey collected data on past use of antenatal care. Rwanda Demographic and Health Survey had a large sample size, used mixed sampling design first as it used a two stage sampling design where all available women were eligible to be interviewed and considered all women from 15-49 years old. In addition, this could be explained by the reason that the present study was conducted in only one district while others were conducted countrywide.

The findings of the present study revealed that initiation of first ANC visit in the first trimester was a little bit higher than average. Similar results were found in the studies done by Billings & Shebl and National Institute of Statistic of Rwanda [4,8]. In this regards, this may be due to the fact that pregnant women had low levels of education and though antenatal care services were made available they could not go to seek them as they felt well together with their unborn babies. Contrary findings were found in the study done by Noh et al [12]. This could be due to the large sample size used compared to the present study.

The findings regarding socio-demographic factors indicated that parity and marital status were significant predictors of recommended antenatal attendance. For marital status, mothers who were married were 2 times more likely to attend recommended ANC attendance compared to

those who were either single, divorced, separated, or widowed. Similar findings were found in the studies done by Omar et al and Muchie [13,14].

The reason for married mothers' attending 4+ antenatal care visits could be justified by the support married women in Rwanda get from their partners and other extended family members as a result of ANC attendance sensitization campaign, which equally targets men and encourages them to go with their wives or partners to the clinic. Contrary findings were found in the study done by Nuamah [15].

The present study found that maternal education and maternal age were not significantly associated with attending 4+ antenatal care visits in Kicukiro District. In contrast, studies done by Adedokun & Yya and Afaya et al [16, 17] revealed that maternal education and maternal age were factors associated with recommended antenatal care attendance.

The finding regarding socio-economic factors in the present study found that health insurance use and cost of ANC services were significant factors associated with recommended ANC attendance. Similar results to this study were found in the studies done by Afya et al and Okedo-Alex et al [16, 18].

Conclusion

The majority of women who delivered during the data collection period in Kicukiro District failed to attend recommended prenatal care checkups during their previous pregnancy, according to the findings. In terms of early initiation, the majority of women attended during the first 12 weeks of their pregnancy. According to the research, the majority of socio-demographic characteristics affected recommended ANC attendance. The research also showed that parity and married status were shown to have a statistically significant relationship with suggested ANC visits. The findings of the study revealed that most socioeconomic criteria influenced respondents' attendance at ANC visits.

Acknowledgement

Authors highly appreciated the mothers who participated in this study and selected health facilities for granting of data collection permission.

Limitations of the study

This study could not be generalized, as it was cross-sectional study conducted only in Kicukiro District.

References

1. Lerebo, W., Kidanu, A., & Tsadik, M. (2015). Magnitude and Associated Factors of Late Booking for Antenatal Care in Public Health Centers of Adigrat Town, Tigray, Ethiopia. *Clinics in Mother and Child Health*, 12(1), 1–8. <https://doi.org/10.4172/2090-7214.1000171>
2. Kahasse, Gebrekidan and Alemayehu, W. (2017). *Factors associated with late ANC initiation among pregnant women in select public health centers of Addis Ababa , Ethiopia : unmatched case – control study design.* 223–230.case–control
3. Hu, W., Hu, H., Zhao, W., Huang, A., Yang, Q., & Di, J. (2021). Current status of antenatal care of pregnant women—8 provinces in China, 2018. *BMC Public Health*, 21(1), 1–11. <https://doi.org/10.1186/s12889-021-11154-4>
4. Billings, H., & Shebl, N. A. (2021). Factors contributing towards women booking late for antenatal care in the UK. *Evidence Based Midwifery*.
5. Acharya, D., Singh, J. K., Kadel, R., Yoo, S. J., Park, J. H., & Lee, K. (2018). Maternal factors and utilization of the antenatal care services during pregnancy associated with low birth weight in rural Nepal: Analyses of the antenatal care and birth weight records of the matri-suman trial. *International Journal of Environmental Research and Public Health*, 15(11), 1–14. <https://doi.org/10.3390/ijerph15112450>
6. Mekonnen, T., Dune, T., Perz, J., & Ogbo, F. A. (2019). Trends and determinants of antenatal care service use in ethiopia between 2000 and 2016. *International Journal of*

Environmental Research and Public Health, 16(5).

<https://doi.org/10.3390/ijerph16050748>

7. Tessema, Z. T., & Minyihun, A. (2021). Utilization and Determinants of Antenatal Care Visits in East African Countries: A Multicountry Analysis of Demographic and Health Surveys. *Advances in Public Health*, 2021, 1–9. <https://doi.org/10.1155/2021/6623009>
8. NISR. (2021). *Rwanda DHS 2019-20 Final Report*. National Institute of Statistics of Rwanda (NISR) [Rwanda], Ministry of Health (MOH) [Rwanda], and ICF. 2021. Rwanda Demographic and Health Survey 2019-20 Final Report. Kigali, Rwanda, and Rockville, Maryland, USA: NISR and ICF.
9. Rurangirwa, A. A., Mogren, I., Nyirazinyoye, L., Ntaganira, J., & Krantz, G. (2017). Determinants of poor utilization of antenatal care services among recently delivered women in Rwanda; a population based study. *BMC Pregnancy and Childbirth*, 17(1), 1–10. <https://doi.org/10.1186/s12884-017-1328-2>
10. Tessema, Z. T., Teshale, A. B., Tesema, G. A., & Tamirat, K. S. (2021). Determinants of completing recommended antenatal care utilization in sub-Saharan from 2006 to 2018: evidence from 36 countries using Demographic and Health Surveys. *BMC Pregnancy and Childbirth*, 21(1), 1–12. <https://doi.org/10.1186/s12884-021-03669-w>
11. Ogbo, F. A., Dhimi, M. V., Ude, E. M., Senanayake, P., Osuagwu, U. L., Awosemo, A. O., Ogeleka, P., Akombi, B. J., Ezeh, O. K., & Agho, K. E. (2019). Enablers and barriers to the utilization of antenatal care services in India. *International Journal of Environmental Research and Public Health*, 16(17), 1–14. <https://doi.org/10.3390/ijerph16173152>
12. Noh, J. W., Kim, Y. mi, Lee, L. J., Akram, N., Shahid, F., Kwon, Y. D., & Stekelenburg, J. (2019). Factors associated with the use of antenatal care in Sindh province, Pakistan: A population-based study. *PLoS ONE*, 14(4), 1–11.

<https://doi.org/10.1371/journal.pone.0213987>

13. Omar, F., Musili, F., & Kodhiambo, O. (2020). Socio-Demographic and Economic Factors Associated With antenatal care attendance Among Women of Reproductive Age. *Journal of Health, Medicine and Nursing*, 5(1), 48–59.
14. Muchie, K. F. (2017). Quality of antenatal care services and completion of four or more antenatal care visits in Ethiopia: A finding based on a demographic and health survey. *BMC Pregnancy and Childbirth*, 17(1), 1–7. <https://doi.org/10.1186/s12884-017-1488-0>
15. Nuamah, G. B., Agyei-baffour, P., Mensah, K. A., Boateng, D., Quansah, D. Y., Dobin, D., & Addai-donkor, K. (2019). *Access and utilization of maternal healthcare in a rural district in the forest belt of Ghana*. 5, 1–11.
16. Adedokun, S. T., & Yaya, S. (2020). Correlates of antenatal care utilization among women of reproductive age in sub-Saharan Africa: evidence from multinomial analysis of demographic and health surveys (2010–2018) from 31 countries. *Archives of Public Health*, 78(1), 1–10. <https://doi.org/10.1186/s13690-020-00516-w>
17. Afaya, A., Azongo, T. B., Dzomeku, V. M., Afaya, R. A., Salia, S. M., Adatar, P., Alhassan, R. K., Amponsah, A. K., Atakro, C. A., Adadem, D., Asiedu, E. O., Amuna, P., & Ayanore, M. A. (2020). Women’s knowledge and its associated factors regarding optimum utilisation of antenatal care in rural Ghana: A crosssectional study. *PLoS ONE*, 15(7 July), 1–19. <https://doi.org/10.1371/journal.pone.0234575>
18. Okedo-Alex, I. N., Akamike, I. C., Ezeanosike, O. B., & Uneke, C. J. (2019). Determinants of antenatal care utilization in sub-Saharan Africa: A systematic review. *BMJ Open*, 9(10), 1–14. <https://doi.org/10.1136/bmjopen-2019-031890>