Original Article

Factors Influencing the Utilisation of Antenatal Care Services among Women of Reproductive Age (15 – 49 Years) in Garowe, Puntland State of Somalia

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ABSTRACT

Despite governments' and international development partners' efforts, maternal deaths remain prevalent in Somalia, with approximately 621 deaths per 10,000 live births. Most complications resulting in these deaths are amenable to the use of quality obstetric care services, especially antenatal care (ANC) services. While the prevalence and correlates of prenatal care use are well documented, limited studies have focused on antenatal care uptake in Garowe, Puntland state of Somalia. This study aims to highlight factors associated with antenatal care services use among women aged 15–49 in Garowe, Nugaal Region, Somalia. We used a descriptive cross-sectional design. A cluster sampling technique was used to select 384 participants for the study. Logistic regression was computed to identify independent factors associated with four ANC visits. Respondents' average age was 30.2 years, with a range of 16 to 48 years. More than half (56.8%, n=218) of the respondents did not complete four ANC visits. Multivariable analysis established that those who lack insurance, (adjusted odds ratio (aOR)= 6.07, 95%CI: 3.41 – 10.80, p<0.00), used public transport (aOR = 3.68, 95%CI: 1.31 – 10.32, p =0.013), walk to the health facility (aOR =4.0, 95%CI: 1.80 – 8.77, p =0.001), agreed that women discourage ANC attendance in the community (aOR = 3.72, 95%CI: 1.63 – 8.49, p =0.002) and had used TBAs (aOR =13.13, 95%CI: 6.81 – 25.29, p<0.001 were likely to not complete four ANC visits compared to their counterparts. While the WHO now recommends eight antenatal care visits, most pregnant women in the study setting did not complete the previously recommended four antenatal care visits, largely due to social and economic factors. There is a need to provide support to women in the community through financial support and ensure that ANC services are affordable and accessible to increase uptake.

INTRODUCTION

Globally, 786 women die each day in 2020 from preventable pregnancy or childbirth-related complications. Almost 95 percent of these deaths occurred in Low and Middle-Income Countries (LMIC) . Also, the lifetime risk of death due to pregnancy or childbirth-related complications is far higher in LMICs compared to high-income countries. Even though there has been a decline in maternal mortality around the world, the number of deaths continues to be unacceptably high in African countries. The majority of deaths and disabilities that occur in women of reproductive age are a result of complications that arise during pregnancy and childbirth .

Most maternal complications and deaths are preventable through the use of quality and affordable maternal healthcare services such as antenatal care (ANC), trained delivery attendants, and postnatal care. Antenatal care is important for the timely identification and prevention of complications during pregnancy. Through the screening of high-risk mothers for problems and fast identification and care for life-threatening obstetric morbidities, ANC can lower the maternal mortality rate (MMR). During ANC visits, women receive nutritional advice, information about warning signs indicating possible problems during pregnancy, and additional resources to help prepare for a safe delivery (Belay et al., 2022). It is one of the "four pillars" of safe motherhood initiatives to promote and establish good health during pregnancy and the early postpartum period (Adedokun & Yaya, 2020).

The World Health Organization (WHO) recommends that all women should initiate their first antenatal care in the first trimester of pregnancy and should have at least eight antenatal visits to avoid health risks during pregnancy (WHO, 2018). This was done since there was an elevated risk of fetal mortality associated with a reduced number of ANC visits. Although there has been a significant increase in the utilisation of ANC in poor countries, only a small percentage of pregnant women attend a total of four ANC appointments, with 72% beginning their first visit after the 12-week mark of their pregnancy (Ahinkorah et al., 2021). For instance, in a study carried out in Kenya, 62.7 percent of women reported having at least four ANC visits (Mutai & Otieno, 2021). In Somalia, on the other hand, just 28 percent of pregnant women made their first visit during the fourth month of their pregnancy (Omar Haji Elmi et al., 2021). Due to the low uptake of ANC, the World Health Organization stresses how important it is to direct attention toward mothers who start the ANC late or with fewer visits than usual.

Utilisation of ANC varies across different parts of the world, as well as associated factors. In Pakistan, 86.6% of married women attended ANC (Aziz Ali et al., 2020). In Ghana, 87% of mothers attended at least one antenatal care visit, while 77.1% attended four or more visits. ANC knowledge was found to be significantly

associated with ANC attendance. In Ethiopia, 65% of women of childbearing age had at least one ANC visit. Several factors influence antenatal care attendance in African countries. Socioeconomic status plays a significant role, with women of higher economic status more likely to attend regularly due to better access to healthcare services. Education also plays a crucial role, as educated women tend to have better awareness of the importance of antenatal care and are more likely to seek it. Cultural beliefs and practices can either encourage or hinder attendance, depending on the community's perception of pregnancy and healthcare. Additionally, geographical accessibility and the availability of healthcare facilities and trained personnel can greatly impact antenatal care attendance rates in African countries (Mutai & Otieno, 2021)

Access to health care services is improving in Somalia. However, the country has faced challenges in increasing healthcare utilisation and the proportion of women who give birth with the assistance of skilled attendants (Mouhoumed & Mehmet, 2021a). Somalia has one of the highest maternal mortality rates at 621 per 100,000 live births, which is among the highest in the world (WHO et al., 2023). In addition, according to UNICEF, the chance of a woman in Somalia dying from complications related to pregnancy and childbirth is one in seven throughout her lifetime compared to one in 2,100 women in the United States (UNICEF, 2011).

Antenatal care utilisation in the Somali community has not been fully investigated, with most of the studies conducted focusing on hospital settings. Hospital data are limited compared to population/household data. In a recent study based on data from the Somali Demographic and Health Survey (SDHS), 6% of women aged 15-49 had at least four ANC visits (SDHS, 2020). Only twenty-nine percent of women make their first antenatal care visit before the fourth month of pregnancy (SDHS, 2020). A larger percentage of urban women delay ANC to the last trimester— four percent made their first ANC visit in or after the eighth month, as compared to three and one

percent among women in rural and nomadic areas, respectively (Health & Survey, 2020). However, factors influencing the utilisation of ANC services in the region have not been investigated. The magnitude of ANC uptake in Garowe has not been documented, which prompts the need to understand the level of ANC uptake and associated factors within the community. District-level data are important for the planning and development of context-specific interventions to address low uptake of ANC. This study therefore aims to determine the factors associated with antenatal care utilisation among women aged 15–49 years in Garowe, Nugaal region, Somalia.

METHODS

Research Design

This study adopted a descriptive cross-sectional study design to describe characteristics, behaviours, or conditions of a population at a single point in time. In this study, the objective was likely to observe and record the prevalence, patterns, or relationships of specific variables without manipulating the environment or variables. The cross-sectional nature allows for the efficient collection of data from a large number of participants within a relatively short period. Additionally, since no follow-up over time was necessary, a cross-sectional approach was both practical and methodologically sound for capturing a "snapshot" of the phenomena under investigation.

Study Setting

This study was conducted in Garowe, Puntland, in Somalia. Garowe is located in the Nugaal Valley, which is surrounded on the north, west, and south by gently climbing high plateaus that often reach elevations of between 500 and 1,000 meters (1,600 and 3,300 feet) above sea level. Garowe itself is situated at an elevation of 1,600 feet above sea level. The city of Garowe is found in the middle of the Puntland area in the northwestern part of Somalia. Access to antenatal care in Somalia remains a challenge, with availability of services being a major burden. Economic factors have had a major influence on access to care in

Somalia, with 69 percent of the population living in poverty . This has been significant in influencing access to care, with available income being channelled toward other basic needs. Garowe was selected for this study because the availability and accessibility of antenatal care services are good, but DHS2 data from health facilities show the coverage of antenatal care services is low. That is why it is important to examine the factors influencing the utilisation of antenatal care services among women of reproductive age (15-49) in Garowe, Puntland state of Somalia.

Study Population

The study population was women of reproductive age (15 – 49 years) who had given birth in the last year. The total number of women who gave birth within the last 12 months was 2,940. The distribution across the regions is shown in *Table 1*. Those who gave birth in the last 12 months and consented to participate in the study were recruited, while those who declined consent or those who were mentally incapable of responding to study questions were excluded.

Table 1: Distribution of Women Who Gave Birth in the Garowe Region in the Last 12 Months

Sub-Region	Total number
1da August	301
Hantiwadaag	418
Hilaac	371
Hodan	311
Horseed	389
Israac	352
Waaberi	431
Wadajir	367
Total	2940

Source: Primary Data

Sample Size Determination

The sample size was calculated using Fisher's formulae (Kholmatova et al., 2016). The formula is as shown:

$$n = \frac{Z^2 * p * q}{d^2}$$

Where, n = sample population, z = standard normal at 95% (1.96), p = is the population with the characteristic, q = is the population without characteristics, and d= is the margin of error.

According to a study conducted in Borama, Somaliland, 51.7% of patients attended at least four ANC visits (Mouhoumed & Mehmet, 2021b).

$$n = \frac{1.96^2 * 0.517 * 0.483}{0.05^2} = 384$$

Sampling Technique

A cluster sampling technique was utilised in selecting study participants. Garowe was grouped into eight groups, where the participants were randomly selected. Cluster sampling was efficient in this case, considering that this is a community-based study where the whole Garowe region was taken into consideration. The number of women who had given birth in the last 24 months in each sub-region was documented from the sub-region office, which showed that there was a total of 2,940. The sample selected per sub-region is proportionate to the population of women who gave birth in the past year there as shown in *Table 2*.

Table 2: Sample Distribution per Region in Garowe

Sub-Region	Total number	Sample size
1da August	301	= (301/2940)*384 =39
Hantiwadaag	418	55
Hilaac	371	48
Hodan	311	41
Horseed	389	51
Israac	352	46
Waaberi	431	56
Wadajir	367	48
Total	2940	384

Data Collection

A structured questionnaire was used in data collection. A structured questionnaire was developed based on the study objectives and drawing on measures of ANC in the DHS questionnaire. Section A included information about household and caregiver characteristics, Section B included socio-economic factors, Section C information on ANC uptake, and Section D included information on cultural factors. The researcher, with the help of two research assistants, engaged community elders in each of the regions of study. Community elders were engaged because they had information about households in their areas of jurisdiction. The households of individuals who met the inclusion criteria were identified and targeted. A written informed consent was administered to the study participants, and only those who consented were recruited. In case the household head declines to consent, the researcher randomly chooses another household. If there is more than one eligible woman in a household, the researcher randomly chooses one eligible woman.

A household head was in charge of their household and was predominantly the decision-maker in Somali societies. The data collection processes began after approval from the Ministry of Health, Puntland state of Somalia (MOH/PL/DGO/0168/2022) and permission from the Garowe administrative to conduct the study within its borders. A structured questionnaire was used to collect relevant information. The questionnaires were interviewer-administered electronically using Google Forms.

Measures

Our dependent variable was ANC utilisation. The respondents were asked whether they attended ANC services with a skilled health provider during the last pregnancy and, if yes, to indicate the number of ANC attended. This was then categorised into <4 or ≥4 visits. Even though the WHO now recommends eight visits, four ANC visits were the guideline in the local Somali context in 2022 and 2023 when the women who took part in this study attended ANC and gave birth.

Our independent variables included individual, cultural, and health facility factors, which are consistent with variable selection in previous studies (Alibhai et al., 2022; Joshi et al., 2014; Odusina et al., 2021). The individual factors include age, marital status, employment status, education level, household income, and having health insurance. The respondents were asked about their age, which was obtained as a continuous variable and categorised into three groups, including ≤24 years, 25 – 35 years, and above 35 years. Marital status was categorised variable into married, divorced, and widowed. Education level was categorised as no education, primary education, secondary education, and tertiary education. Employment status was categorised into employed, housewife, self-employed, and unemployed. Monthly household income was also estimated as a continuous variable and categorised into less than $300 or

≥$300. Ownership of health insurance was also assessed using a Yes or No response. Means of transport to the health facility were investigated with categories including personal vehicle, public transportation, and walking.

The cultural factors included women discouraging ANC attendance in the community, people discriminating against ANC attendance, ANC being privileged and using traditional birth attendants previously. These factors were nominal variables.

The health system factors included knowledge of ANC, waiting time for ANC services, duration of receiving ANC services, distance to the facility, time taken to reach a health facility and means of transport. These were categorical variables.

Data Analysis

The statistical package for social sciences (SPSS version 28) was used for the quantitative data analysis. The level of significance was assessed at P<0.05. Descriptive data were analysed using frequencies, percentages, and mean (SD). The prevalence of ANC uptake was analysed as a proportion of the total sample size and expressed as a percentage. Chi chi-square test for association was used to determine the association between independent and dependent variables included in the study. Binary logistic regression was used to identify independent factors associated with ANC uptake. Multivariable logistic regression was conducted to control for possible confounding variables.

Ethical Consideration

The researcher sought approval from the Ministry of Health, Puntland state of Somalia (MOH/PL/DGO/0168/2022), which evaluated the protection of human subjects and the level of research integrity. Permission was also sought from the Garowe region administration. Confidentiality and anonymity were observed when collecting, storing, processing data, and handling the results.

RESULTS

A total of 395 households were approached, 11 declined and were replaced to achieve a sample size of 384. All questionnaires were filled and returned for analysis, representing a 100% response rate.

Demographic Factors of Study Participants

Participants' average age was 30.2 years, with a range of 16 to 48 years. Half of the respondents (n=195; 50.8%) were aged 25 to 35 years. The majority of the respondents were married (n=325; 84.6%), and more than one in three of them (n=137; 35.7%) had no formal education. Most of the respondents were housewives (n=235; 61.2%), and their average monthly income was USD 343.5 with a range of between 0 to 2,000. About two-thirds of the respondents used public transport (n=256; 66.7%) on their way to a health facility, as shown *in Table 3*.

Table 3: Demographic and Socio-economic Factors of Study Participants

		Frequency	Percent
Age	(Mean, range)	30.2(16 - 48)	
	Less than or equal to 24 years	73	19
	25 to 35 years	195	50.8
	Above 35 years	116	30.2
Marital status	Divorced	53	13.8
	Married	325	84.6
	Widowed	6	1.6
Highest education level	No formal education	137	35.7
	Primary	98	25.5
	Secondary	82	21.4
	Tertiary	67	17.4
Number of children	(Mean, range)	5(1 - 15)	
	Less than 4	162	42.2

		Frequency	Percent
	4 and above	222	57.8
Employment status	Employed	39	10.2
	Housewife	235	61.2
	Self-employed	81	21.1
	Unemployed	29	7.6
Monthly income	(Mean, range)	343.5(0 - 2000)	
	Less than 300	171	44.5
	300 or more	213	55.5
The presence of health insurance	Yes	147	38.3
	No	237	61.7
Means of transport to the health facility	Personal vehicle	53	13.8
	Public transportation	256	66.7
	Walking	75	19.5

ANC Uptake Among Women of Reproductive Age in Garowe, Nugaal, Somalia

Figure 1 clarifies the uptake of antenatal care (ANC) among women in Garowe, Nugaal, Somalia. It shows that 57% did not complete the recommended four ANC visits, while 43% did. This aligns with the finding that a majority (218 respondents, or 56.8%) failed to attend all four visits.
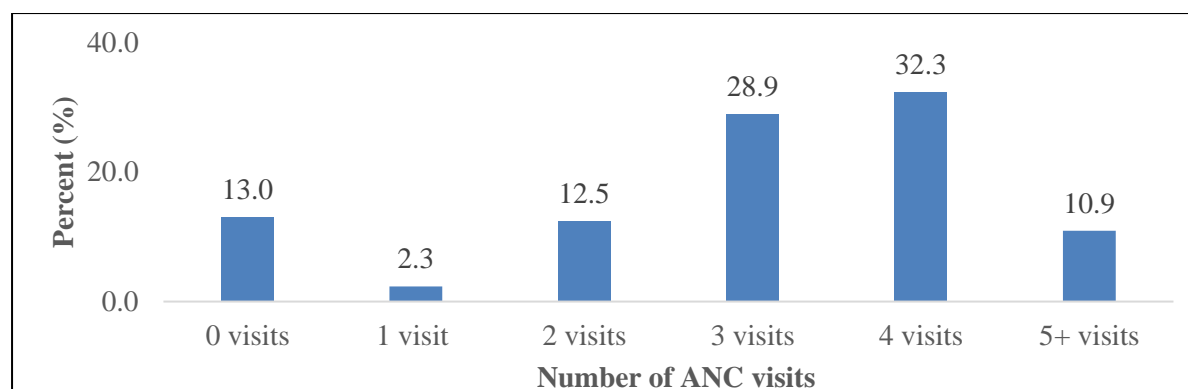
Figure 1: ANC Uptake Among Women in Garowe, Nugaal, Somalia.
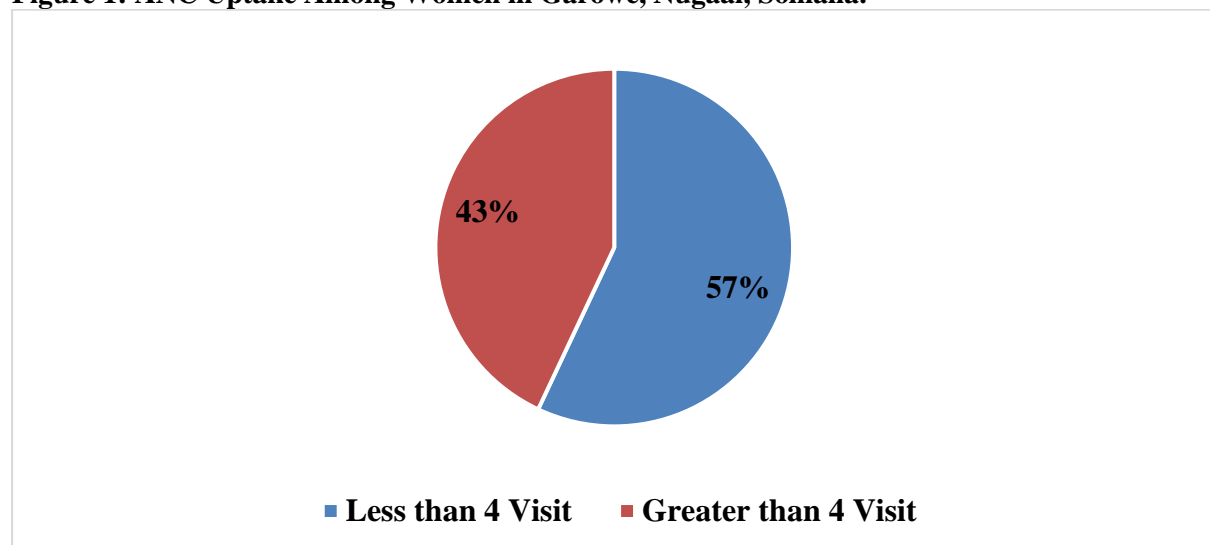
Number of ANC Visits in the Last Pregnancy (n =384)

The findings showed that 50 (13%) of the respondents did not attend any ANC visit, 111 (28.9%) had three visits, and 42 (10.9%) attended five or more visits, as shown in *Figure 2*.

Figure 2: Number of ANC Visits in the Last Pregnancy (n =384)

Factors Influencing the Utilisation of Antenatal Care

Bivariable analysis was estimated using unadjusted logistic regression, where the findings revealed that those who were separated/divorced were three times more likely to not complete ANC visits compared to those who were married (Crude Odds Ratio [COR] =3.06, 95% CI: 1.59 – 5.89). Those who had primary level education (COR =0.16, 95%CI: 0.08 – 0.31), a secondary education level (COR =0.16, 95%CI: 0.08 – 0.33) and those with tertiary level education (COR =0.18, 95%CI: 0.09 – 0.36) were less likely not to complete four ANC visits compared to those without formal education.

The findings revealed that those who were unemployed were 1.5 times more likely not to complete four ANC visits compared to those who were employed (COR =1.53, 95% CI: 1.1 – 2.33). Women who did not have health insurance were 10 times more likely to not complete four ANC visits compared to those with insurance (COR = 9.61, 95% CI: 5.96 – 15.50), as shown in Table 4.

The findings showed that those who were using public transport (COR =4.46, 95% CI: 2.06 – 9.65) and those who were walking (COR =3.30, 95% CI: 1.81 – 6.05) were likely to not complete four ANC visits compared to those who used private means of transportation. The results showed that those who asserted that women discourage ANC attendance were five times likely to have low ANC utilisation (OR =4.92, 95% CI: 2.65 – 9.13). Those who had used traditional birth attendants before were 19 times more likely to have low ANC utilisation (COR =19.01, 95% CI: 10.56 – 34.22).

Table 4: Un-adjusted Regression Model Showing the Factors Influencing Antenatal Care Utilisation Among Women of Reproductive Age in Garowe, Nugaal, Somalia.

		<4 visits n(%)	≥4visits	COR (95% CI)	P-value
Demographic factors					
Age	Less than or equal to 24 years	37(50.7)	36(49.3)	Ref	
	Less than 35 years	120(61.5)	75(38.5)	1.08(0.60 - 1.94)	0.799
	35 years and above	61(52.6)	55(47.4)	0.69(0.44 - 1.10)	0.122
Number of children in the household	Less than 4	85(52.5)	77(47.5)	Ref	
	4 and above	133(59.9)	89(40.1)	1.35 (0.90 - 2.04)	0.146
Marital status	Married	173(58.4)	153(41.6)	Ref	
	Separated/divorced	45(77.6)	13(22.4)	3.06(1.59 - 5.89)	0.001
Highest level of education	No formal education	89(65.0)	48(35.0)	Ref	
	Primary	63(64.3)	35(35.7)	0.16(0.08 - 0.31)	<0.001
	Secondary	51(62.2)	31(37.8)	0.16(0.08 - 0.33)	<0.001
	Tertiary	15(22.3)	52(87.7)	0.18(0.09 - 0.36)	<0.001
Economic factors					
Employment status	Employed	67(50)	67(50)	Ref	
	Unemployed	151(60.4)	99(39.6)	1.53(1.1 - 2.33)	0.005
Monthly income	Less than 300	98(57.3)	73(42.7)	1.04(0.69 - 1.56)	0.917
	300 or more	120(56.3)	93(43.7)	Ref	
Presence of insurance	Yes	8(5.4)	139(94.6)	Ref	
	No	210(88.6)	27(11.4)	9.61(5.96 - 15.50)	<0.001
Health factors					
Knowledge of ANC	No	23(69.7)	10(20.3)	1.84(0.85 - 3.98)	0.142
	Yes	195(55.6)	156(44.4)	Ref	
Waiting time for ANC services	30 minutes to 1 hour	51(53.1)	45(46.9)	0.82(0.52 - 1.31)	0.408
	Less than 30 minutes	167(58.0)	121(42.0)	Ref	
Duration of receiving ANC services	Less than 15 minutes	116(53.0)	103(47.0)	Ref	
	15 - 25 minutes	92(60.9)	59(39.1)	2.22(0.68 - 7.29)	0.189
	More than 25 minutes	10(71.4)	4(28.6)	1.60(0.48 - 5.35)	0.443
Approximate distance to facility	Less than 1km	124(56.9)	89(53.6)	1.14(0.76 - 1.71)	0.536
	More than 5km	94(43.1)	77(46.4)	Ref	
Time taken to reach a health facility	Less than 30 minutes	124(54.9)	102(55.1)	Ref	
	30 - 60 minutes	91(60.7)	59(39.3)	1.32(0.18 - 4.29)	0.431

Means of transport to a health facility	More than 60 minutes	3(37.5)	5(62.5)	1.63(0.33 - 3.35)	0.633
	Personal vehicle	24(45.3)	29(54.7)	Ref	
	Public transport	135(52.7)	121(47.3)	4.46(2.06 - 9.65)	<0.001
	Walking	59(78.7)	16(21.3)	3.30(1.81 - 6.05)	<0.001
Cultural factors					
Women discourage ANC attendance	Yes	68(82.9)	14(17.1)	4.92(2.65 - 9.13)	<0.001
	No	150(49.7)	152(50.3)	Ref	
People discriminate against ANC attendance	Yes	12(52.2)	11(47.8)	0.82(0.35 - 1.91)	0.669
	No	206(57.1)	155(42.9)	Ref	
ANC is for the privileged	Yes	72(56.7)	55(43.3)	1.0(0.65 - 1.53)	0.534
	No	146(56.8)	111(43.2)	Ref	
Used a Traditional birth attendant previously	Yes	146(90.1)	16(9.9)	19.01(10.56 - 34.22)	<0.001
	No	72(32.4)	150(77.6)	Ref	

COR: *Crude Odds Ratio,* ***CI:*** *Confidence interval*

Multivariable Analysis of Factors Influencing Antenatal Care Utilisation

Variables that were significant from bivariate analysis (p<0.05) were subjected to multivariable analysis as shown in Table 5. The findings established that lack of insurance, (adjusted odds ratio (aOR)= 6.07, 95%CI: 3.41 – 10.80, p<0.00), those who used public transport (aOR = 3.68, 95%CI: 1.31 – 10.32, p =0.013), walking to the health facility (aOR =4.0, 95%CI: 1.80 – 8.77, p =0.001), those who agreed that women discourage ANC attendance in the community (aOR = 3.72, 95%CI: 1.63 – 8.49, p =0.002) and those who had used TBAs (aOR =13.13, 95%CI: 6.81 – 25.29, p<0.001 were associated with a higher odds of not completing four ANC visits compared to their counterparts.

Table 5: Multivariable Analysis of Factors Influencing Antenatal Care Utilisation Among Women Aged 15–49 Years in Garowe, Nugaal Region, Somalia.

		aOR(95%CI)	P-value
Marital status	Married	Ref	
	Separated/divorced	1.82(0.70 - 4.72)	0.221
Highest level of education	No formal education	Ref	
	Primary	0.31(0.11 - 2.11)	0.451
	Secondary	0.12(0.08 - 4.33)	0.331
	Tertiary	0.18(0.09 - 0.36)	0.291
Employment status	Employed	Ref	
	Unemployed	1.10(0.59 - 2.05)	0.754
The presence of insurance	Yes	Ref	
	No	6.07(3.41 - 10.80)	<0.001
Means of transport to a health facility	Personal vehicle	Ref	
	Public transport	3.68(1.31 - 10.32)	0.013
	Walking	4.0(1.80 - 8.77)	0.001
Women discourage ANC attendance	Yes	3.72(1.63 - 8.49)	0.002
	No	Ref	
Used a Traditional birth attendant previously	Yes	13.13(6.81 - 25.29)	<0.001
	No	Ref	

DISCUSSION

The study examined factors associated with the use of antenatal care services among women of reproductive age in Garowe, Puntland, Somalia. The present study showed that approximately three out of every five mothers did not complete the nationally recommended four ANC visits. This finding is comparable to those from a study in Ethiopia, which found that 64.5% of mothers had three ANC visits or fewer (Fenta et al., 2021). However, the level of ANC use found in our study is far higher than the national average of 6%. The increasing ANC uptake in Somalia is a promising sign of progress in maternal healthcare. Improved healthcare infrastructure, awareness campaigns, community outreach programs, skilled healthcare professionals, government initiatives, and partnerships with international organisations have all played vital roles in this positive development. However, it is crucial to continue these efforts and implement evidence-based strategies to sustain and further improve maternal and child health outcomes in the country. By prioritising maternal health and ensuring equitable access to ANC services, Somalia can continue its journey toward a healthier and more prosperous future for its mothers and children.

Our study also established that those who were unemployed were more likely to not complete four

ANC visits compared to those who were employed. This finding is consistent with those from a systematic review including studies from Africa, which established that employment status was a significant factor associated with ANC use (Okedo-Alex et al., 2019). Similarly, Alkaabi M.S. (2014) also affirmed that those who are employed were more likely to utilise ANC. Employment status plays a multifaceted role in ANC utilisation. Women with stable employment and access to healthcare benefits are more likely to seek and access ANC services due to financial security and reduced barriers. On the other hand, women in precarious employment situations may face challenges related to financial constraints, work schedules, and social stigma, impacting their ANC utilisation.

Another important finding of our study is that those who walked to health facilities were less likely to complete four ANC visits compared to those who used personal vehicles. While proximity to health facilities is essential for ANC utilisation, the mode of transportation to reach these facilities also plays a significant role in determining whether pregnant women will seek and utilise ANC services. Women who have to walk long distances to reach health facilities may face physical barriers that discourage them from seeking ANC. Walking long distances, especially during pregnancy, can be tiring and physically challenging, making it less likely for some pregnant women to prioritise ANC visits (Finlayson & Downe, 2013). In addition, pregnant women who walk to health facilities may lack social support from family or community members (Sserwanja et al., 2022). Positive social support can encourage and motivate pregnant women to seek ANC services. Living far away from healthcare facilities can result in delayed initiation of ANC, potentially hindering the timely detection and management of complications. Regular ANC visits facilitate the identification of risk factors and complications early in pregnancy. Implementing outreach programs, mobile clinics, or telehealth services can help overcome geographical barriers,

ensuring that pregnant women receive timely care regardless of their distance from healthcare facilities. The distance between residences and healthcare facilities can lead to irregular ANC attendance, as women may find it challenging to make the journey regularly. Consistent ANC attendance is vital for monitoring the progress of the pregnancy and ensuring that any emerging issues are addressed promptly. Creating awareness campaigns emphasising the importance of consistent ANC attendance, coupled with providing transportation support or local ANC services, can encourage women to overcome geographical barriers and prioritise regular prenatal care (Tsegay et al., 2013).

The findings from our present study found that the use of traditional birth attendants was associated with a reduced likelihood of attending antenatal care visits. These findings align with those from Ethiopia established that women who have ANC follow-up were 89% less likely to use TBA services during birth (Taye et al., 2022). In both resource-constrained settings and regions with deep-rooted cultural traditions, the use of TBAs is often associated with lower rates of ANC utilisation. The association between TBA utilisation and reduced ANC attendance highlights the need for comprehensive maternal healthcare interventions that address socio-cultural barriers and promote evidence-based practices. Efforts to improve ANC utilisation should focus on enhancing access to ANC services, increasing community awareness of the importance of ANC, and fostering collaboration between TBAs and formal healthcare providers to ensure safe and effective maternal healthcare delivery.

Our current study also found that women who stated that women discouraged the use of ANC in the community were more likely not to complete four ANC visits. These findings are comparable to those from a study in a Sub-Saharan setting, which found that community-level literacy was negatively associated with noncompliance with 8+ ANC visits

(Odusina et al., 2021). This finding underscores the influence of women's perceptions and beliefs on health-seeking behaviours during pregnancy. Women who hold negative attitudes toward ANC may be less inclined to seek ANC services, leading to suboptimal maternal health outcomes and increased risk of pregnancy complications.

Study Strengths and Limitations

This study's strength centres on its focus on investigating the factors associated with antenatal care visits in Somalia, which has been a largely under-researched area. The findings are important to inform ongoing efforts to improve maternal and perinatal health and well-being in the country. However, the study is not without some limitations. Due to the cross-sectional nature of the design, we cannot establish causality between the factors identified and antenatal care services use. Also, the use of antenatal care was self-reported, which is prone to recall bias. However, we limited the sample to women who gave birth in the past year to minimise the effect of recall bias on the level of use reported.

CONCLUSIONS

While the WHO now recommends eight antenatal care visits, most pregnant women in the study setting did not complete the previously recommended four antenatal care visits, largely due to social and economic factors. This indicates a concerning gap in accessing essential maternal healthcare services, which may have implications for maternal and child health outcomes. Addressing the multifaceted barriers to ANC utilisation requires a comprehensive and tailored approach that encompasses socio-economic, cultural, and healthcare system factors. By addressing these barriers and leveraging facilitators, we can enhance ANC uptake, improve maternal and child health outcomes, and promote overall well-being among women of reproductive age.

REFERENCES

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*.

Ahinkorah, B. O., Seidu, A.-A., Agbaglo, E., Adu, C., Budu, E., Jr, J. H., . . . Yaya, S. (2022). Factors impacting antenatal care utilization: A systematic review of 37 fragile and conflict-affected situations. *Conflict and Health, 16*(1), 33.

Alamneh, Y., Adane, F., Yirga, T., & Desta, M. (2020). Essential newborn care utilization and associated factors in Ethiopia: A systematic review and meta-analysis. *In BMC Pregnancy and Childbirth*.

Ali, S. A., Ali, S. A., Feroz, A., Saleem, S., Fatmai, Z., & Kadir , M. M. (2020). Factors affecting the utilization of antenatal care among married women of reproductive age in the rural Thatta, Pakistan: findings from a community-based case-control study. *BMC pregnancy and childbirth, 20*.

Ali, S. A., Ali, S. A., Feroz, A., Saleem, S., Fatmai, Z., & Kadir, M. M. (2020). Factors affecting the utilization of antenatal care among married women of reproductive age in the rural Thatta, Pakistan: Findings from a community-based case-control study. *BMC Pregnancy and Childbirth*.

Alibhai, K. M., Ziegler, B. R., Meddings, L., Batung, E., & Luginaah, I. (2022). Factors impacting antenatal care utilization: A systematic review of 37 fragile and conflict-affected situations. *Conflict and Health, 16*(1), 33. doi:. https://doi.org/10.1186/s13031-022-00459-9

Belay, A., Astatkie, T., Abebaw, S., Gebreamanule, B., & Enbeyle, W. (2022). Prevalence and factors affecting the utilization of antenatal care in rural areas of Southwestern Ethiopia. *BMC pregnancy and childbirth, 22*(1), 30.

Elmi, O. H., Hussein, N. A., Hassan, A. M., Ismail, A. M., Abdulrahman, A. A., & Muse, A. M. (2021). Antenatal Care: Utilization Rate and Barriers in Bosaso-Somalia, 2019. *European Journal of Preventive Medicine*.

Fenta, S. M., Ayenew, G. M., & Getahun, B. E. (2021). Magnitude of antenatal care service uptake and associated factors among pregnant women: Analysis of the 2016 Ethiopia Demographic and Health Survey. *BMJ Open*.

Finlayson, K., & Downe, S. (2013). Why do women not use antenatal services in low- and middle-income countries? A meta-synthesis of qualitative studies. *PLoS medicine, 10*(1).

Joshi, C., Torvaldsen, S., Hodgson, R., & Hayen, A. (2014). Factors associated with the use and quality of antenatal care in Nepal: A population-based study using the demographic and health survey data. *BMC Pregnancy and Childbirth, 14*(1), 94. doi:https://doi.org/10.1186/1471-2393-14-94

Khamidovna, K. K., Alexandrovna, G. M., Alexandrovna, K. O., & Mikhailovich, G. A. (2016). Cross-sectional studies: Planning, sample size, data analysis. *Ekologiya Cheloveka (Human Ecology)*. doi:https://doi.org/10.33396/1728-0869-2016-2-49-56

Mouhoumed, H. M., & Mehmet, N. (2021). Utilization pattern of antenatal care and determining factors among reproductive-age women in Borama, Somaliland. *Journal of Preventive Medicine and Hygiene*.

Mutai, K. T., & Otieno, G. O. (2021). Utilization of focused antenatal care among expectant women in Murang'a County, Kenya. *Pan African Medical Journal*.

Odusina, E. K., Ahinkorah, B. O., Ameyaw, E. K., Seidu, A.-A., Budu, E., Zegeye, B., & Yaya, S. (2021). Noncompliance with the WHO's Recommended Eight Antenatal Care Visits among Pregnant Women in Sub-Saharan Africa: A Multilevel Analysis. *BioMed Research International*.

Okedo-Alex, I. N., Akamike, I. C., Ezeanosike, O. B., & Uneke, C. J. (2019). Determinants of antenatal care utilisation in sub-Saharan Africa: A systematic review. *BMJ Open, 9*(10), 1–14.

Puntland Ministry of Health. (2020). Puntland Report 2020. *Somali health and demographic survey, PLHDS*.

Roro, M., Deressa, W., & Lindtjørn , B. (2018). WHO Global recommendations for routine antenatal care. *Geneva World Heal Organ, 10*, 1-10.

Seidu , A.-A., Ahinkorah, B. O., Agbaglo , E., Adu , C., Budu, E., Hagan Jr, J. E., Yaya , S. (2021). Determinants of antenatal care and skilled birth attendance services utilization among childbearing women in Guinea: evidence from the 2018 Guinea Demographic and Health Survey data. *BMC Pregnancy and Childbirth, 21*, 1-11.

Sserwanja, Q., Mukunya, D., Musaba, M. W., Kawuki, J., & Kitutu, F. E. (2021). Factors associated with health facility utilization during childbirth among 15 to 49-year-old women in Uganda: Evidence from the Uganda Demographic Health Survey 2016. *BMC Health Services Research*.

Taye, B. T., Zerihun, M. S., Kitaw, T. M., Demisse, T. L., Worku, S. A., Fitie, G. W., Kebede, A. A. (2022). Women's traditional birth attendant utilization at birth and its associated factors in

Angolella Tara, Ethiopia. *Plos One, 17*(11). doi:e0277504.

Tsegay, Y., Gebrehiwot, T., Goicolea, I., Edin, K., Lemma, H., & Sebastian, M. (2013). Determinants of antenatal and delivery care utilization in Tigray region, Ethiopia: A cross-sectional study. *International Journal for Equity in Health*.

WHO. (2021). World Health Organization. Maternal mortality rates in the United States, 2020. *National Center Health Statistics*.

World Health Organization. (2019). *Trends in maternal mortality 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division: executive summary.* World Health Organization. Retrieved from https://www.who.int/publications/i/item/97892 41516488

World Health Organization. (2023). *Trends in maternal mortality 2000 to 2020: estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA/Population Division.* World Health Organization.