Original Article

Exploring factors associated with first antenatal care booking among pregnant women in Northwestern Tanzania

Sued Yassin Zuberi[1], Regan Zenas Shayo[2], Gerald Samson Muniko[3], Oswald Thomas Lyapa[4], Zakaria Khamis Kombo[4], Osimund January Dyegura[5], Emanuel Alfred Mkonyi[6], Brian Caesar Mawalla[7]

[1]Department of Research, Training and Consultancy, Chato Zonal Referral Hospital, Geita, [2]Department of Diagnostics, Central TB Reference Laboratory, Dar es Salaam, [3]Department of Medical Services, Chato Zonal Referral Hospital, [4]Department of Obstetrics and Gynaecology, Chato Zonal Referral Hospital, Geita, [5]Department of Surgical Services, Musoma Regional Referral Hospital, Musoma, [6]Department of HIV/AIDS Care, International Center for AIDS Care and Treatment Programs, Mwanza, [7]Department of Surgical Services, Chato Zonal Referral Hospital, Geita, Tanzania.

*Corresponding author:
Sued Yassin Zuberi,
Department of Research,
Training and Consultancy,
Chato Zonal Referral Hospital,
Geita, Tanzania.

suedmtula@gmail.com

ABSTRACT

Objectives: Pregnant women are advised to schedule their initial antenatal care (ANC) visit during the first trimester to detect and treat any medical issues as well as screen for risk factors that may affect the course and outcome of their pregnancy. Nonetheless, delayed first ANC presentation is typical, especially in Sub-Saharan Africa. This study sought to determine the timing of the first ANC booking and identify factors that influence the first ANC booking among pregnant women.

Material and Methods: This was a cross-sectional study which was carried out from June–August 2023. Data were collected using a structured questionnaire. Data analysis was done using Epi Info 7.2 and STATA version 15.0 software. Independent factors for the first ANC booking were determined by multivariate logistic regression analysis using odds ratios, 95% confidence intervals, and a *P*-value cut-off of ≤0.05.

Results: A total of 402 pregnant women were recruited for the study. The bulk of participants, 189 (47.0%), were between 25 and 34 years. More than half 279/402(69.4%) of the pregnant women booked their first ANC appointment beyond 12 weeks of gestation. The married pregnant women had almost four-fold booking ANC earlier compared to single women (adjusted odds ratio [AOR] = 3.9, 95% confidence interval [CI] = 1.1–14.4, *P* = 0.036). Similarly, employed pregnant women were 2.8 times more likely to book their first ANC visits earlier as compared to self-employed women (AOR = 2.8, 95% CI = 1.3–5.8, *P* = 0.006). In addition, women receiving support from their family or partner were more likely to book their first ANC as recommended compared to those lacking such support (AOR = 0.5, 95% CI = 0.3–0.9, *P* = 0.022). Finally, those who planned pregnancy were 2 times more likely to book their first ANC visit within the recommended time, unlike those who did not (AOR = 2.3, 95% CI = 1.3–2.1, *P* = 0.03).

Conclusion: Despite the known benefits of early antenatal appointments, many pregnant women delay their first visit, highlighting the need for targeted policies to address socioeconomic barriers and improve health-care access, thus encouraging timely ANC bookings and better maternal health outcomes.

Keywords: First antenatal care booking, Pregnant women, Late first antenatal care booking

INTRODUCTION

Antenatal care (ANC) is the term for the care given to pregnant women by qualified medical personnel. It comprises risk assessment and management, treatment of illnesses brought on by or connected to pregnancy, health promotion, and education.[1] According to the World Health

Organization, ANC should begin during the first trimester of pregnancy and should involve at least four and, ideally, eight visits.[1] In 2002, Tanzania's Ministry of Adopted Focused Antenatal Care (FANC) required pregnant women to attend at least four ANC visits during the course of pregnancy – the first visit before 12 weeks, the second at 26 weeks, the third at 32 weeks, and the fourth between 36 and 38 weeks.[2] The FANC model integrates care through health promotion, prevention, detection and treatment of existing diseases, and birth preparation with four visits throughout pregnancy. The model also consolidates ANC with care and counseling for several other conditions, even though providing high-quality ANC is its top priority. For many women, the antenatal period is a crucial point of entry into the health system.[2]

ANC is crucial in the examination of socioeconomic, medical, and obstetrical aspects to identify high-risk pregnancies. In addition, ANC programs are used to offer treatment and information that are not specifically related to pregnancy but can lower the risk factors for maternal mortality, such as promoting healthy lifestyles, addressing malnutrition, or educating about gender-based violence.[3,4] Nevertheless, late initial ANC presentation is common in sub-Saharan Africa, with geographical disparities in the time of ANC presentation between urban and rural settings noted within nations.[5,6] The result of arriving late for ANC is a missed opportunity to prevent negative pregnancy outcomes for the mother and the unborn child.[7,8] Thus, all expectant mothers must undergo their initial antenatal examination during the first trimester to detect and treat any medical complications as well as to screen them for any risk factors that might affect the course and outcome of their pregnancy.[9] The pregnant women are advised to schedule the initial appointment early, which will be used to diagnose, treat, and check for risk factors and illnesses that are best treated early in pregnancy and start prophylaxis if necessary.[10] The latter will contribute to the early detection of pregnancy risks, prevention of pregnancy and labor difficulties, and safe delivery of mother and child and, therefore, improve the well-being of the mother and fetus.[11]

Despite all the benefits, recommendations, and efforts to stimulate attendance, the majority of pregnant women do not book their first ANC timely.[6,7,12] The prevalence of scheduling prenatal care appointments early was 43%, according to the available evidence globally.[13] However, there is a significant disparity between the regions, with the sub-Saharan region having <25%, developing countries below 45%, and developed countries at 85%.[13] Studies done in South Africa and Tanzania found a seemingly lower prevalence, ranging from 25% to 30%.[5,7] In addition, in Tanzania, over 98% of pregnant women attend at least one antenatal clinic visit, few attend early (before 12 weeks), and the number of those who complete at least four visits remains very low.[14] Other data from a review of the district annual health profile in Chato district in Tanzania revealed that nearly half of pregnant booked ANC attendance above the recommended period.[12]

Several studies conducted in the past have found that lack of education, attitudes and knowledge about pregnancy, being unmarried, parity, a history of obstetric complications, healthcare service availability, distance to the healthcare facility, and cultural beliefs are all risk factors for late first ANC presentation.[8,15,16] For instance, a recent study in Tanzania found that gender norms discourage men from participating in pregnancy and childbirth. Men as decision-makers and controllers of economic resources in households impact the timing of ANC attendance and influence women's decisions and access to maternal and child health services.[17] The same study reported that the implementation of the prevention of mother-to-child transmission policy discourages men from attending ANC, primarily due to their fear of HIV screening. As a result, women postponed or skipped ANC altogether due to a lack of support from their partners.[17] Available data have revealed that mothers who did not receive information about when to begin ANC were nearly twice as likely not to book than those who did.[18] Likewise, nulliparous mothers were twice as likely as primiparous and multiparous women to begin ANC early. In addition, mothers who could reach an ANC facility within 30 min were more likely to attend ANC early than those who had to travel for more than an hour.[19] These studies have resulted in several interventions, including but not limited to sensitization through community healthcare workers, mass media campaigns, outreach services, and creating registers by village leaders to follow-up on ANC attendance and visits.[12,20] Despite the implementation of these interventions, the number of pregnant women commencing their first ANC booking within 12 weeks of gestation has remained low.[5-7] This current study aimed to determine the timing of the first ANC booking and identify factors influencing the first ANC booking among pregnant women.

MATERIAL AND METHODS

Study design

This was an analytical cross-sectional study.

Study settings

Chato district is one of the five districts in the Geita Region of northwestern Tanzania. Its administrative center is the town of Chato. The district is divided into 23 wards. There were predicted to be 533,595 people living in Chato District Council in 2021, with 261,510 men and 272,085 women. Consequently, there were roughly 109,135 females in the population who were of reproductive age. The data for 2022 indicate that the maternal mortality for the district is

5.4/100,000, which is higher compared to the district target (3/100,000). Furthermore, the first ANC booking below 12 weeks of gestation is still low (54%) as compared to the district target.[12] The main ethnic group in the district is the Sukuma. Furthermore, the major economic activities include fishing and agriculture. The same year's data reveal that there are 47 healthcare facilities (2 hospitals, 8 health centers, and 37 dispensaries).[12] The hospitals include Chato Zonal Referral Hospital (CZRH) and Chato District Hospital (CDH). The study was conducted at CDH and CZRH. The CDH serves as the district hospital for the Chato District Council, whereas the CZRH serves as a Zonal Referral Hospital. The CDH has a Reproductive and Child Health (RCH) clinic from Monday to Friday, serving around 50 women a day, whereas CZRH serves around 35 pregnant women daily. Thus, these two healthcare facilities serve a significant proportion of the population in Chato District Council.

Sampling

A total of 402 pregnant women aged 15–49 years who are dwellers of Chato District Council and attending RCH Clinics of CDH and CZRH between June and August, 2023 who assented and/or consented and had met the inclusion criteria were recruited. The sample size was estimated using Kish Leslie utilizing a prevalence of 54% for the first ANC booking below 12 weeks that was adopted from the Chato District Health Profile data for 2021.[12] The number of pregnant women enrolled from each facility was calculated based on probability proportional to size sampling. As a result, 314 participants were recruited from CDH and 88 participants from CZRH. At the study site, upon consent and/or assent and meeting the inclusion criteria, the study participants were recruited until the desired sample size was achieved.

Data collection

Data regarding sociodemographic, clinical, and previous exposures and experiences were collected using a structured questionnaire. The data regarding ANC visits were abstracted from the RCH cards.

Data analysis

Data were thoroughly cleaned and assessed for completeness and consistency before analysis. The analysis was conducted using Epi Info 7.2 and STATA version 15.0 software (College Station, Texas, USA). Descriptive statistics such as frequencies and percentages were calculated, and data were presented using tables. Univariate logistic regression analysis was done on all variables, but only variables with a $P < 0.2$ were subjected to multivariate logistic regression analysis. Independent factors/determinants for the first ANC booking were determined by multivariate logistic regression analysis

using odds ratios, 95% confidence intervals, and a *P*-value cut-off of less than 0.05.

Ethical considerations

Ethical clearance (NIMR/HQ/R.8a/Vol.IX/4394) was obtained from the Institutional Review Board, National Institute for Medical Research (NIMR), Tanzania and authorization to conduct the study was requested and granted by the hospital management. The pregnant women were given the consent/assent forms to read and consent before enrollment into the study. In addition, any incident noted during the study that would benefit or otherwise alter the course of management of the study participants was communicated to the attending healthcare personnel, participants, or any relevant stakeholder.

RESULTS

Sociodemographic and clinical characteristics

A total of 402 pregnant women were recruited for the study. The bulk of participants, 189 (47.0%), were between the ages of 25 and 34. Furthermore, the majority of pregnant women were married 371 (92%), self-employed 332 (82.6%), had a primary education (50%), and 343 (85.3%) commuted to clinics in 15–30 min [Table 1].

Proportion of ANC booking

A total of 279/402(69.4%) booked their first ANC appointment late. In addition, pregnant women aged between 25 and 34 years accounted for nearly half 129/279 (46.2%) of the study participants who booked their first ANC booking beyond 12 weeks of gestation [Table 2].

Risk factor analysis

This study has found that marital status, occupation, pregnancy planning, and the presence of partner or family support are significantly associated with first ANC booking among pregnant women. It was revealed that married pregnant women had almost four-fold of booking an ANC visit early as compared to women who were single (adjusted odds ratio [AOR] = 3.9, 95% confidence interval [CI] = 1.1–14.4, $P = 0.036$). Similarly, employed pregnant women were 2.8 times more likely to book their first ANC visits early compared to self-employed women (AOR = 2.8, 95% CI = 1.33–5.82, $P = 0.006$). In addition, women receiving support from their family or partner were more likely to book their first ANC as recommended compared to those lacking such support (AOR = 0.5, 95% CI = 0.29–0.90, $P = 0.022$). Finally, those who planned pregnancy were 2 times more likely to book their first ANC visit within the recommended time, unlike those who did not (AOR = 2.3, 95% CI = 1.3–2.1, $P = 0.06$) [Table 3].

Table 1: Sociodemographic and clinical characteristics of the study participants in Chato DC - Tanzania.

Variable	Frequency {*n* (%)}		*n*=402
	≤12 Weeks (*n*=123)	>12 weeks (*n*=279)	Total (*n* %)
Age (years)			
15–24	54 (30.7)	122 (69.3)	176 (43.8)
25–34	60 (31.8)	129 (68.2)	189 (47.0)
35+	9 (24.3)	28 (75.7)	37 (9.2)
Marital status			
Single	3 (10.7)	25 (89.3)	28 (7.0)
Married	120 (32.3)	251 (67.7)	371 (92.2)
Divorced/widowed	0 (0)	3 (100)	3 (0.8)
Occupation			
Employed	19 (55.9)	15 (44.1)	34 (8.5)
Self-employed	88 (26.5)	244 (73.5)	332 (82.6)
Jobless	16 (44.4)	20 (55.6)	36 (8.9)
Level of education			
None	12 (30.0)	28 (70)	40 (10.0)
Primary	60 (29.9)	141 (70.1)	201 (50.0)
Secondary	34 (26.8)	93 (73.2)	127 (31.6)
College	17 (50)	17 (50)	34 (8.4)
Time to get to clinic			
15–30 min	100 (29.2)	243 (70.8)	343 (85.3)
30 min–1 h	18 (37.5)	30 (62.5)	48 (11.9)
1 h+	5 (45.5)	6 (54.5)	11 (2.8)
Time taken all medical services during clinics			
≤1 h	1 (25)	3 (75)	4 (1.0)
>1 h	122 (30.7)	276 (69.1)	398 (99.0)
Amount of money used to get to clinic			
≤1000 Tshs	64 (26.6)	177 (73.4)	241 (60.0)
>1000 Tshs	59 (36.6)	102 (63.4)	161 (40.0)
Parity			
Nulliparous	39 (37.5)	65 (62.5)	104 (25.9)
1 or more children	84 (28.2)	214 (71.8)	298 (74.1)
Gravidity			
1	31 (34.4)	59 (65.6)	90 (22.4)
2	28 (33.3)	56 (66.7)	84 (20.9)
3+	64 (28.1)	164 (71.9)	228 (56.7)
Age of youngest child			
<2	27 (25.2)	80 (74.8)	107 (26.6)
2–5	38 (28.8)	94 (71.2)	132 (32.8)
5+	19 (32.8)	40 (67.2)	59 (14.4)
No child	39 (37.1)	65 (62.9)	104 (26.1)
Received health education in the past 12 months			
Yes	102 (30.3)	235 (69.7)	337 (83.8)
No	21 (32.3)	44 (67.7)	65 (16.2)
Substance use during current pregnancy			
Yes	2 (28.6)	5 (71.4)	7 (1.7)
No	121 (30.6)	274 (69.4)	395 (98.3)
Planned pregnancy			
Yes	85 (34.1)	164 (65.9)	249 (61.9)
No	38 (24.8)	115 (75.2)	153 (38.1)
Worried if partner or family knew you are pregnant			
Yes	6 (25)	18 (75)	24 (6.0)
No	117 (31)	261 (69)	378 (94.0)
Partner/family support			
Yes	119 (31.5)	259 (68.5)	378 (94.0)
No	4 (16.7)	20 (83.3)	24 (6.0)
Complications during any of the pregnancies			
Yes	30 (43.5)	39 (56.5)	69 (17.2)
No	93 (27.9)	240 (72.1)	333 (82.8)
GBV/VAC			
Yes	7 (41.2)	10 (58.8)	17 (4.2)
No	116 (30.1)	269 (69.9)	385 (95.8)

GBV: Gender-based violence, VAC: Violence against children

DISCUSSION

There is still an alarming trend of delayed first ANC visits among pregnant women, highlighting a crucial gap in maternal health care. This delay, which is influenced by factors such as occupation, marital status, pregnancy planning, family/partner support, and complications during pregnancy, reveals systemic hurdles that limit timely access to essential prenatal services.

Table 2: Proportion and timing of first ANC booking among pregnant women in Chato DC - Tanzania.

Variable	Frequency, *n* (%)		Total (*n* %)
	Gestation age		
	≤12 Weeks	>12 weeks	
Age (years)			
15–24	54 (30.7)	122 (69.3)	176 (43.8)
25–34	60 (31.8)	129 (68.2)	189 (47.0)
35+	9 (24.3)	28 (75.7)	37 (9.2)
Total	123 (30.6)	279 (69.4)	402 (100)

ANC: Antenatal care

Our study has revealed that nearly three-quarters of pregnant women do not book their first ANC visit within the recommended time. These findings are higher compared to the data obtained in the same district 2 years ago.[12] Likewise, the proportion obtained in our study is higher compared to several previous studies done in Ethiopia,[18,21,22] Nigeria,[23] and the United Arab Emirates.[24] However, the proportion obtained in this study is comparatively lower when compared to other previous studies done in Nigeria[25] and Zambia.[6]

Several factors could have contributed to the differences in the proportion of first ANC booking observed; these include but are not limited to disparities in healthcare access, socioeconomic factors, cultural and religious beliefs, health policies and programs, information and awareness, quality of care, and financial barriers.[1] The differences could also be attributed to variability in ANC policies or practices across countries. For instance, in Tanzania, these practices include male engagement in ANC, which warrants male partners to escort their pregnant couples to clinics during their first ANC visit. Despite the benefits, this policy and/or practice could impact women's first visit.[26]

Table 3: Factors influencing first ANC booking among the pregnant women in Chato DC - Tanzania.

Variable	Gestation age		OR	95% CI	*P*-value	AOR	95% CI	*P*-value
	≤12 Weeks (*n*=123)	>12 weeks (*n*=279)						
Age (years)								
15–24	54	122	1.0	0.66–1.54	0.974			
25–49	69	157						
Marital status								
Married	120	251	4.5	1.3–15.0	0.015	3.9	1.1–14.4	0.036
Single	3	28						
Occupation								
Salaried job	19	15	3.2	1.6–6.6	0.001	2.8	1.3–5.8	0.006
Self-employed	104	264						
Level of education								
More than secondary	51	110	0.9	0.56–1.45	0.701			
Less than secondary	72	169						
Time to get to clinic								
≤1 h	118	273	0.5	0.16–1.73	0.278			
1 h+	5	6						
Amount of money used to get to clinic								
≤1000 Tshs	98	230	0.8	0.49–1.42	0.510			
>1000 Tshs	25	49						
Gravidity								
1	31	59	1.3	0.76–2.07	0.369			
2+	92	220						
Age of youngest child								
≤2	66	146	1.1	0.69–1.61	0.806			
2+	57	133						
Planned pregnancy								
Yes	88	164	1.8	1.11–2.79	0.015	0.6	1.3–2.1	0.06
No	35	115						

Table 3: *(Continued).*

Variable	Gestation age		OR	95% CI	*P*-value	AOR	95% CI	*P*-value
	≤12 Weeks (*n*=123)	>12 weeks (*n*=279)						
Partner/family support								
Yes	119	259	2.3	0.77–6.87	0.127	0.5	0.3–0.9	0.022
No	4	20						
Complications in this/other pregnancies								
Yes	30	39	2.0	1.17–3.38	0.012	0.86	0.3–2.9	0.81
No	93	140						
GBV/VAC								
Yes	11	34	1.6	0.69–2.89	0.344			
No	112	245						

GBV: Gender-based violence, VAC: Violence against children, CI: Confidence interval, AOR: Adjusted odds ratio, ANC: Antenatal care, h: Hour, OR: Odds ratio

This current study has found that pregnant women who were married, had a salaried job, planned pregnancy, and had familial or partner support had an increased likelihood of booking their first ANC appointment within the recommended time. These findings are somewhat similar to a previous study done in Zambia.[6] On the other hand, the first ANC booking was not associated with the education level of the pregnant woman or spouse, distance to the health-care clinics, money spent to get to clinics, gravidity, gender-based violence (GBV), etc. The findings contradict similar studies conducted in the past across different countries and regions, which found significant associations.[19,22,25] The observed disparities between these studies could be attributable to the time difference between this current study and the previous studies. Again, changes in policies/practices throughout time and socioeconomic developments could have contributed to the observed disparities.

Although, we found no significant relationships between GBV and the first ANC appointment, pregnant women do encounter violence. More than a decade ago, a survey in Tanzania revealed that almost one-third and nearly a quarter of women had experienced physical and sexual violence, respectively. Furthermore, more than one-third of these women did not inform anyone or seek help.[27] GBV can have a major impact on maternal health, especially during the first prenatal visit. In addition, survivors may find challenges in obtaining ANC care because of fear, stigma, or a lack of support. Healthcare providers should be trained to recognize indicators of violence, create a safe environment for disclosure during an ANC, and provide necessary support services. Addressing GBV is critical for improving a mother's health and providing comprehensive prenatal care.

CONCLUSION

This study explored the factors that influence pregnant women's first ANC visits in Northwestern Tanzania. Despite the benefits of scheduling an antenatal appointment early, a significant proportion of pregnant women do not schedule their first visit within the suggested time frame. This underscores the need for targeted policies to address socioeconomic barriers and enhance healthcare accessibility, thereby promoting earlier ANC bookings and improving maternal health outcomes. In addition, our study is limited to two institutions, which could have affected the generalizability of the findings. However, the choice of these sites was deliberate and intended to capture the diversity of ANC booking behaviors across different socioeconomic groups within Chato District. Nonetheless, we recommend studies involving more health-care facilities across the Chato district to be conducted to enhance generalizability.

Availability of data and materials

The datasets used in this study are accessible and can be obtained by contacting the corresponding author.

Author's contributions

SYZ, RZS, GSM, OTL, ZKK, OJD, EAM, and BCM contributed to the study's design, analysis, and interpretation of data. SYZ, GSM, ZKK, and OTL collected the data. SYZ drafted the manuscript while BCM, RZS, EAM, and OJD, critically reviewed the manuscript. All authors read and approved the manuscript.

Ethical approval

The research/study was approved by the Institutional Review Board at the National Institute of Medical Research - Tanzania, number NIMR/HQ/R.8a/Vol.IX/4394, dated 18th August 2023.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

This study received financial support from the Chato Zonal Referral Hospital. However, the hospital had no influence on the study's design, data collection, analysis, interpretation, or the decision to publish the results.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

REFERENCES

1. Tunçalp O, Pena-Rosas JP, Lawrie T, Bucagu M, Oladapo OT, Portela A, *et al.* WHO recommendations on antenatal care for a positive pregnancy experience-going beyond survival. BJOG Int J Obstet Gynaecol 2017;124:860-2.
2. Kearns A, Hurst T, Caglia J, Langer A. Focused antenatal care in Tanzania: Delivering individualized, targeted, high-quality care; 2014. Available from: https://www.hsph.harvard.edu/wp-content/uploads/sites/2413/2014/09/HSPH-Tanzania5.pdf [Last accessed on 2024 Jul 02].
3. Imdad A, Bhutta ZA. Effects of calcium supplementation during pregnancy on maternal, fetal and birth outcomes. Paediatr Perinat Epidemiol 2012;26(Suppl 1):138-52.
4. Chen XK, Wen SW, Yang Q, Walker MC. Adequacy of prenatal care and neonatal mortality in infants born to mothers with and without antenatal high-risk conditions. Aust N Z J Obstet Gynaecol 2007;47:122-7.
5. Sibeko S, Moodley J. Healthcare attendance patterns by pregnant women in Durban, South Africa. S Afr Fam Pract 2006;48:17.
6. Banda I, Michelo C, Hazemba A. Factors associated with late antenatal care attendance in selected rural and urban communities of the Copperbelt province, Zambia. Med J Zambia 2012;39:29-36.
7. Kisaka L, Leshabari S. Factors associated with first antenatal care booking among pregnant women at a reproductive health clinic in Tanzania: A cross sectional study. EC Gynaecol 2020;9:1-12.
8. Ebonwu J, Mumbauer A, Uys M, Wainberg ML, Medina-Marino A. Determinants of late antenatal care presentation in rural and peri-urban communities in South Africa: A cross-sectional study. PLoS One 2018;13:e0191903.
9. Rosliza AM, Muhamad HJ. Knowledge, attitude and practice on antenatal care among Orang Asli women in Jempol, Negeri Sembilan. Malaysian J Public Health Med 2011;11:13-21.
10. Ketting E. Poverty and reproductive health: Global overview. Plan Parent Chall 1997;1-2:18-21.
11. Babalola S, Fatusi A. Determinants of use of maternal health services in Nigeria-looking beyond individual and household factors. BMC Pregnancy Childbirth 2009;9:43.
12. Council health management team for Chato DC. Chato District Council annual health profile; 2021.
13. Moller AB, Petzold M, Chou D, Say L. Early antenatal care visit: A systematic analysis of regional and global levels and trends of coverage from 1990 to 2013. Lancet Glob Health 2017;5:e977-83.
14. Ministry of Health - Tanzania. Malaria indicator survey (MIS); 2017.
15. Kristoamani J, Mahiti GR. Perceptions of pregnant women contributing to late initiation in antenatal care during the first trimester in the Ubungo Municipal Council in Tanzania. Eur J Med Health Sci 2020;2:595.
16. Ali SA, Dero AA, Ali SA, Ali GB. Factors affecting the utilization of antenatal care among pregnant women in Moba Lga of Ekiti State, Nigeria. Int J Tradit Complement Med 2016;2:41-5.
17. Maluka SO, Joseph C, Fitzgerald S, Salim R, Kamuzora P. Why do pregnant women in Iringa region in Tanzania start antenatal care late? A qualitative analysis. BMC Pregnancy Childbirth 2020;20:126.
18. Gudayu TW. Gudayu late entry at ANC. Afr J Reprod Health 2015;19:93.
19. Alene AG, Olayemi OO, Berhane Y. Timing and factors associated with early antenatal visits among pregnant women in west Gojjam, northwest Ethiopia. Afr J Midwifery Womens Health 2021;15:1-11.
20. Mkumbo E, Abdallah G. Quality improvement at district scale (QUADS) project - community intervention implementation and process monitoring prepared by QUADS team. Tanzania: Ifakara Health Institute; 2020: Available from: https://ihi.or.tz/projects [Last accessed on 2024 Jul 02].
21. Arega A, Amlaku T, Aweke M, Belay G. Factors associated with timely initiation of antenatal care among pregnant women in Bahir Dar city, Northwest Ethiopia: Sectional study. Nurs Open 2022;9:1210-7.
22. Tufa G, Tsegaye R, Seyoum D. Factors associated with timely antenatal care booking among pregnant women in remote area of Bule Hora district, Southern Ethiopia. Int J Womens Health 2020;12:657-66.
23. Nmani CP, Onwusulu DN, Offor CC, Ekwebene O. Clinical images and medical case reports timing and associated factors of antenatal booking among pregnant women at a tertiary health institution in Nigeria: A cross-sectional study. J Clin Images Med Case Reports 2022;3:1646.
24. Ali N, Elbarazi I, Alabboud S, Al-Maskari F, Loney T. Antenatal care initiation among pregnant women in the United Arab

Emirates: The Mutaba'ah study. Front Public Health 2020;8:211.

25. Olayinka TO, Bello IS, Olajubu TO, Oyegbade OO, Olajubu AO. Factors influencing the booking gestational age among antenatal clinic attendees at primary health centers in South West, Nigeria: A cross-sectional study. SAGE Open Nurs 2022;8.

26. Osaki H, Sao SS, Kisigo GA, Coleman JN, Mwamba RN, Renju J, *et al*. Male engagement guidelines in antenatal care: Unintended consequences for pregnant women in Tanzania.

BMC Pregnancy Childbirth 2021;21:720.

27. TDHS. 2010 Tanzania demographic and health survey. United Repub Tanzania; 2010.