COLLEGE OF HEALTH SCIENCE SCHOOL OF NURSING

DEPARTMENT OF MATERNITY AND REPRODUCTIVE HEALTH NURSING

UTILIZATION AND FACTORS ASSOCIATED WITH MINIMUM EIGHT CONTACT ANTENATAL CARE AMONG MOTHERS WHO DELIVERED IN PUBLIC HOSPITALS OF CENTRAL ZONE, TIGRAY, NORTH ETHIOPIA, 2024.

BY: ADISU TESFU (BSc)

A THESIS SUBMITTED TO THE DEPARTMENT OF MATERNITY AND REPRODUCTIVE HEALTH NURSING, COLLEGE OF HEALTH SCIENCE, MEKELLE UNIVERSITY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE MASTERS OF SCIENCE IN MATERNITY AND REPRODUCTIVE HEALTH NURSING.

April 2025

MEKELLE, ETHIOPIA

MEKELLE UNIVERSITY

DEPARTMENT OF MATERNITY AND REPRODUCTIVE HEALTH NURSING

COLLEGE OF HEALTH

NAME OF PRINCIPAL INVESTIGATOR	ADISU TESFU
NAME OF PRIMARY SUPERVISOR	PROFESSOR HAFTU BERHE(PHD IN PUBLIC HEALTH)
NAME OF CO-SUPERVISOR	Mr KIBROM BERHANU(ASSISSTANCE PROFESSOR OF MRH NURSING)
FULL TITLE OF THESIS	UTILIZATION AND FACTORS ASSOCIATED WITH MINIMUM EIGHT CONTACT ANTENATAL CARE MODEL AMONG MOTHERS WHO DELIVERED AT PUBLIC HOSPITALS, CENTRAL ZONE TIGRAY, NORTH ETHIOPIA
DURATION OF MPH RESEARCH (FULLY MPH PROJECT LIFE)	8 MONTH
STUDY AREA	PUBLIC HOSPITALS OF CENTRAL ZONE, TIGRAY, ETHIOPIA
ADDRESS OF INVESTIGATOR (EMAILAND MOBILE)	adisut70@gmail.com0904875685/0921884436

MEKELLE UNIVERSITY COLLEGE OF HEALTH SCIENCE

SCHOOL OF NURSING DEPARTMENT OF MATERNITY AND REPRODUCTIVE HEALTH NURSING

Examiners' Approval Sheet

We, the undersigned, members of the Board of Examiners of the final open defense by "**Adisu Tesfu ID No: CHS/PR169140/12**" have read and evaluated his thesis "utilization and factors associated with minimum eight contact antenatal care among mothers who delivered in public hospitals of central zone, tigray, north Ethiopia, 2024" and evaluated the candidate. This is therefore to certify that the thesis has been accepted in partial fulfilment of the requirements for the Masters Degree in "Maternity and Reproductive health nursing".

Name of Chairperson	Signature	Date
Name of Major Advisor	Signature	Date
Name of Internal Examiner	Signature	Date
Name of External Examiner	Signature	Date

Final approval and acceptance of the thesis is contingent upon the submission of the final copy of the thesis to the candidate's Department through the office of the Department Graduate Program Coordinator.

Thesis Approved by

Graduate Program Coordinator	Signature	Date

Certification of the Final Thesis

I hereby certify that all the corrections and recommendations suggested by the Board of Examiners are incorporated into the final thesis entitled “utilization and factors associated with minimum eight contact antenatal care among mothers who delivered in public hospitals of central zone, tigray, north Ethiopia, 2024” by **Adisu Tesfu ID No: CHS/PR169140/12**”.

_____	_____	_____
Department Head	Signature	Date

Acknowledgment

First of all, I would like to acknowledge Mekelle University College of Health Science, and the School of Nursing for giving me an opportunity to perform this research thesis. I also thank my advisors, Professor Haftu Berhe (PhD) and Mr. Kibrom Berhanu (assistant professor), for sharing their knowledge, information, encouragement to prepare this research thesis. Finally, my thanks go to study participant, and data collectors, for their support to accomplishment this final thesis.

Contents

List of Figures

List of Table

Acronym and abbreviation

ANC	Antenatal Care,
ANC8+	Minimum of 8 contact Antenatal Care
AOR	Adjusted Odds
CI	Confidence Interval
DHS	Demographic Health Survey
EDHS	Ethiopian Demographic Health Survey
MMR	Maternal Mortality Rate
SDG	Sustainable Development Goal
WHO	World Health Organization

Abstract

Background: Maternal mortality, a largely preventable global health concern, remains high, particularly in sub-Saharan Africa. The WHO recommends eight or more antenatal care (ANC) contacts, yet only 65% of women globally achieve this, with lower rates in high-mortality regions. In Ethiopia, only 43% receive four or more ANC visits, and 32% receive none. Data on eight+ ANC utilization in central Tigray, Ethiopia, was previously lacking.

Objective: To assess utilization and factors associated with eight+ ANC contacts among mothers who delivered in public hospitals in central Tigray, Ethiopia, in 2024.

Methods: A hospital-based cross-sectional study was conducted among 614 mothers from November 15 to December 15, 2024. A systematic sampling method was used, with proportional allocation to each hospital. Ethical clearance was obtained from Mekelle University, and permissions were secured from the Tigray Regional Health Bureau and hospitals. Data were entered into Epi Data and analyzed using SPSS version 27, with statistical significance set at $p < 0.05$.

Results: The magnitude of eight+ ANC utilization was 36.2%. Factors significantly associated with eight+ ANC utilization included having a trader partner [AOR = 1.755, 95% CI: 1.097–2.807], presence of danger signs [AOR = 2.131, 95% CI: 1.362–3.333], planned pregnancy [AOR = 2.287, 95% CI: 1.394–3.751], ANC initiation within 12 weeks [AOR = 3.275, 95% CI: 2.204–4.868], living <30 minutes [AOR = 3.683, 95% CI: 1.777–7.632] or 30–60 minutes [AOR = 2.099, 95% CI: 1.055–4.174] from a health facility, and positive attitude toward ANC [AOR = 2.364, 95% CI: 1.039–5.379].

Conclusion and Recommendation: Utilization of eight+ ANC contacts in central Tigray remains low. Key factors include partner occupation, presence of danger signs, pregnancy planning, ANC initiation timing, distance to health facilities, and maternal attitudes. Targeted interventions, such as community education, improved accessibility, and strengthened healthcare systems, are needed to increase ANC8+ utilization.

Keywords: eight+ ANC utilization, cross-sectional study, central zone, Tigray, Ethiopia

1 INTRODUCTION

1.1 Background

Women often die due to complications that arise during and after pregnancy and childbirth. Most of these complications develop during pregnancy and are largely preventable or treatable with proper antenatal care and skilled birth attendance, ideally with eight or more antenatal care visits(1).

Maternal deaths around the world are tragically common, with many occurring in low- and middle-income countries. Sub-Saharan Africa carries a particularly heavy burden. Ethiopia, for instance, faces a significant challenge in reducing its maternal mortality rate. Recognizing this global crisis, the Sustainable Development Goals (SDGs) aim to dramatically decrease maternal and newborn deaths by 2030. Specifically, SDG target 3 focuses on bringing the global maternal mortality rate below 70 per 100,000 live births and the neonatal mortality rate to 12 per 1,000 live births. This ambitious goal requires significant reductions by all countries, with the overall target aiming for MMR of less than 70 and no country exceeding 140 deaths per 100,000 live births by 2030(2, 3).

Antenatal care (ANC) is the care provided by skilled health professionals to pregnant women to ensure the health of the mother and child during pregnancy and childbirth. A quality ANC check-up consists of risk identification, management, and prevention of pregnancy-related risk factors and concurrent diseases, as well as health counseling(4). It is also the gateway to integrated care, promoting healthy practice, and ensuring referral linkage to high-risk pregnancies(1).

ANC focuses on promoting well-being for both mother and baby throughout pregnancy. This includes education on healthy habits, identifying and managing complications, preparing for birth, and supporting mothers after birth. By providing preventive care and early intervention, antenatal care aims to decrease pregnancy-related problems (5-7).

The World Health Organization (WHO) recommended that pregnant women should attend at least eight antenatal care (ANC) visits with a trained healthcare provider. This strategy is aimed at promoting the health of pregnant women. WHO expects that each country will adapt this model to fit its specific context, based on the country's established core package of ANC services and a consensus on the care provided at each visit. This care should be delivered by

practitioners with strong clinical and interpersonal skills within a well-functioning health system. Evidence indicates that perinatal deaths increase when only four ANC visits are made and that increasing the number of ANC contacts, regardless of the country, improves maternal satisfaction(4). Therefore, WHO recommends a minimum of eight ANC contacts: one in the first trimester, one in the second trimester, and five in the third trimester (8). Even though the ANC8 + recommendation was launched in 2016, Ethiopia accepted the model recently and developed the ANC guideline under the WHO 2016 recommendation(9).

1.2 Statement of the problem

Maternal mortality rates worldwide remain unacceptably high, with approximately 287,000 women dying from pregnancy and childbirth-related complications in 2020. Nearly 95% of these deaths occurred in low and lower-middle-income countries, and the majority were preventable. Sub-Saharan Africa and Southern Asia together represented about 87% (253,000) of the global maternal deaths that year. Sub-Saharan Africa alone accounted for around 70% (202,000) of the deaths, while Southern Asia contributed around 47,000 (16%) (3, 10).

Besides, Sub-Saharan Africa had the highest neonatal mortality rate in 2022 at 27 deaths per 1000 live births(11). The high number of maternal deaths in some areas of the world reflects inequalities in access to quality health services and highlights the gap between rich and poor. The MMR in low-income countries in 2020 was 430 per 100,000 live births versus 13 per 100,000 live births in high-income countries(1).

Since maternal and perinatal morbidity and mortality are still a concern, the new global agenda that is called be Sustainable Development Goal (SDG) is endorsed to be effective till 2030. Especially, SDG target 3 aims to reduce the global maternal mortality ratio (MMR) to less than 70 per 100,000 live births and as low as the neonatal mortality to 12 per 1000 live births). By 2030, all countries should reduce MMR by at least two-thirds of their 2010 baseline level(12). Ethiopia is one of the countries facing a very high burden of perinatal death in the world. As of the 2019 Mini Ethiopian Demographic and Health Survey (EDHS), the maternal mortality ratio (MMR) in Ethiopia was reported to be 401 deaths per 100,000 live births(13). The Ethiopian Federal Ministry of Health had set a target to reduce maternal mortality to 250 per 100,000 live births by 2020, which is not achieved and is currently stacked with 412(14).

The World Health Organization (WHO) has updated its recommendations from a minimum of four antenatal care contacts to a minimum of eight contacts to reduce perinatal mortality and to improve women's experience of care(4). However, most data reporting at the global, regional, and country levels are currently available mostly for a minimum of four visits, aligned with the previous recommendation(15).

Globally, while 86% of pregnant women have access to at least one antenatal care visit by a skilled health worker, only 65% of women who have access to ANC receive at least four antenatal visits. In regions with the highest maternal mortality rates, such as sub-Saharan Africa, as few women as 52% receive at least four antenatal visits. This percentage can be lower in humanitarian contexts, with 21% in Afghanistan, 25% in Somalia, and 38% in

Niger(15). Results From Multi-Country Nationally Representative Data on Africa showed that a pooled prevalence of only 13.0% of ANC contacts had eight or more contacts(16).

ANC coverage in Ethiopia varies across studies and regions. According to the mini-EDHS 2019, when four or more ANC visits were in effect at the time of data collection, only 43% of the population completed four ANC visits(17). another study found 62% crude coverage nationally(18).Recent research in rural Amhara found only 28.8% attended four or more visits in addition, no women in the study attended the recommended eight contact(19).

According to a Sub-Saharan Africa study conducted from 2006 to 2018, Ethiopia had the lowest prevalence of recommended ANC(four or more) utilization, at 31.88% (20). another systematic review study revealed that The overall pooled prevalence of ANC in Ethiopia was found to be 41.37% (21). This value is below the average rate of Sub-Saharan Africa which is 76% (22).

A cross-sectional study in Tigray has shown improvement, with 54-58.2% of women receiving four or more ANC visits (23, 24).

Although maternal health care utilization, including ANC, has improved in Ethiopia, the majority of women do not attend the minimum recommended number of ANC visits required by the World Health Organization (2).

Factors such as age, educational status of women and the husband, employment, parity, timing of ANC initiation exposure to media, marriage type, and place of residence are associated with utilization of ANC service(16, 25-27).

There is no study done on utilization and factors associated with a minimum of eight contact ANC models in the study area. Therefore this study aims to assess the utilization of the 8+ANC model and factors associated, which are crucial for designing locally feasible, contextually appropriate, and practically sound interventions to increase ANC8+ utilization. Hence, this study was designed to determine the utilization of the 8+ANC model and factors associated with mothers who give birth in public hospitals in the central zone Tigray region of north Ethiopia.

1.3 Significance of the study

Even though WHO launched the eight-contact ANC model in 2016 Ethiopia adopted the model in 2020, utilization and acceptance are not still known since there is no study done in the central zone of Tigray region north Ethiopia yet. By understanding what factors influence women's use of the 8+ ANC model, healthcare professionals and policymakers can develop strategies to increase utilization and improve maternal and child health.

Studies have shown that adequate ANC, including at least eight visits, can significantly reduce maternal mortality rates, especially in low- and middle-income countries(28). This research can help identify areas where interventions are most needed to address gaps in ANC access and utilization.

The study can help identify specific factors that influence ANC use. By understanding these factors, policymakers and healthcare providers can design targeted interventions to address them and increase the number of women receiving the recommended level of ANC.

Overall, the study on 8+ ANC model utilization and associated factors is crucial for promoting better maternal and child health by identifying ways to increase access to and utilization of essential prenatal care services. The research study will contribute to policymakers, and hospital administration by stating the current status of the service and making recommendation for improving the service. This study will also help other researchers as a base line data.

2 Literature review

2.1 Prevalence

The prevalence of eight or more ANC visits varied widely among the countries, ranging from as low as 1% in Senegal, Uganda, and Zambia to as high as 74.0% in Jordan. Jordan had the highest rate at 74.0%, followed by Ghana at 43.0% and Albania at 30.0%. Conversely, countries like Senegal, Uganda, Zambia, Mozambique, Mali, Guinea, Cameroon, and Benin had very low rates of eight or more ANC visits. Overall, 49.9% of women with at least one ANC visit and 44.3% of all women began ANC early. However, only 11.3% completed the recommended eight or more visits, while 11.2% did not receive any ANC at all(29)

According to another study in low and middle-income country the overall prevalence of ANC8+ was 35.6%, ranging from 1.7% in Madagascar to 99.4% in Belarus(28).

A study done in sub-Saharan countries showed that the pooled magnitude of eight or more ANC visits in sub-Saharan African countries was 6.8%(20). Another Sub-national analysis in Nigeria found that 25 % of the women had no ANC contact, 58 % had at least 4 contacts and only 20 % had 8 or more ANC contacts. The highest rate of 8 or more ANC contacts was in Osun (80.2 %), Lagos (76.8 %), and Imo (72.0 %) while the lowest rates were in Kebbi (0.2 %), Zamfara (1.1 %) and Yobe (1.3 %)(30).

DHS data analysis in Nigeria stated that there are Insufficient ANC visits with a prevalence of 46.7%(31). A research study in Ghana showed a weighted prevalence of eight or more ANC contacts was 41.9% (95% CI: 37.9–45.9%)(32).

A cross-sectional study conducted in Saudi Arabia found that the proportion of inadequate and late antenatal care was 34% and 25%(33). Another study in Nigeria found the prevalence of eight or more ANC contacts in Nigeria was approximately 17.4% (95% CI: 16.1%-18.7%)(34). A study conducted in Benin in 2020 obtained the coverage of ≥ 8 ANC contacts was 8.0%; 95%CI 6.5%, 9.7 % (35). Another study showed the magnitude of optimal antenatal care utilization was 59% (95% CI; 54.20, 63.65)(36).in southern Ethiopia The magnitude of adequate antenatal care utilization was found to be 23.13% (37).

A Hospital study done in Arbaminch found that 41% of the participants have utilized WHO-recommended ANC service(38). Another finding from STP, and Saudi, showed a prevalence of 47.9%, 34%respectively(26, 33).

2.2 Factors associated with utilization of eight contact ANC model

2.2.1 Socio-demographic related factors:

A study from Afghanistan showed women's educational status (adjusted odds ratio (AOR) = 2.0, 95% CI: 1.0–4.3), and place of residence (AOR = 1.7, 95% CI: 1.1–2.6)were the factors associated with ANC utilization(39).

A hospital-based cross-sectional study done in Sao Tome and Principe showed that mothers in age group (20–34) year (AOR 2.28; 95% CI: 1.28–4.04) and those 35 years old or above (AOR 2.51; 95% CI: 1.21– 5.20), and living in urban areas (AOR 1.98; 95% CI: 1.28–3.06; p=0.002) continued to have an association with adequate ANC service utilization(26).

Further analysis of Benin DHS showed that women with medium or high enlightenment were 4.55 and 5.49 times as likely to have ≥ 8 ANC contacts, compared with women having low enlightenment (AOR = 4.55; 95% CI 1.41, 14.69 and AOR = 5.49; 95% CI 1.77, 17.00)(35).

A facility based cross sectional study conducted in eastern Uganda revealed that Paternal occupation, was associated with compliance to the WHO recommended 8+ ANC contact's schedule. Mothers who had unemployed partners had 1.71 times the odds of being compliant to the WHO recommended 8+ ANC contacts schedule [AOR: 1.71; 95% CI: (0.53–1.08)(40).

According to a study from sub-Saharan Africa Sociodemographic factors like Residence, maternal education, husband's education, maternal occupation, and media exposure, are positively associated with eight or more ANC visits, whereas birth order was negatively associated with eight or more ANC visits(20).

A study in Nigeria stated Respondents with higher education were twelve times (adjusted relative risk (aRR): 12.46, 95 % CI: 7.33–21.2), having secondary education was thrice (aRR: 2.91, 95 % CI: 2.35–3.60), and having primary education was twice (aRR: 2.17, 95 % CI: 1.77–2.66) more likely to make at least 8 contacts than those with no education. Other significant variables were spouse education, health media access, and religion(30).

Demographic and health surveys in Nigeria revealed the type of residency, educational level, household size, , distance to health service, exposure to the media and total number of children were found to be significantly associated with both late and insufficient ANC attendance(31).

A study from Liberia stated that the uptake of eight or more ANC contacts increased steadily by increasing women's level of education. Women with higher educational attainment had a prevalence of 49.0 and those in the richest households had an estimated prevalence of 31.4

respectively. Furthermore, the urban dwellers had a weighted eight or more ANC contacts prevalence of 29.0% the key finding is increased marginal interaction effects for higher education and early booking (48.4%), and urban residential status and early booking (36.2%) respectively. Overall, the prevalence of eight or more ANC contacts was low (41).

A population-based study in Ghana showed that 33.0%, 37.7%, and 42.6% prevalence of eight or more ANC contacts were estimated among women with no formal education, primary, secondary, or higher, respectively. Educated women had greater coverage of eight or more ANC contacts in Ghana (32).

A hospital-based study from Saudi revealed that inadequate antenatal care was independently associated with employed mothers (OR 1.91, 95% CI 1.13–3.22) and high parity (three or more) (OR 2.21, 95% CI 1.17–4.16) (33).

Population-based study from Nigeria stated Women with at least secondary education were 2.46 times as likely to have eight or more ANC contacts, when compared with women with no formal education. Women who use media were 2.37 times as likely to have eight or more ANC contacts, when compared with women who do not use media. Rural women had 60% reduction in the odds of eight or more ANC contacts, when compared with their urban counterparts(34). A study from Benin found that women with medium or high enlightenment were 4.55 and 5.49 as more likely to have ≥ 8 ANC contacts, compared with women having low enlightenment (AOR = 4.55; 95% CI 1.41, 14.69 and (AOR = 5.49; 95% CI 1.77, 17.00)(35).

According to a cross-sectional study conducted in Wollega, Those who were above grade eight were three times more likely to use ANC service (AOR 2.8 95% CI1.4-5.5), those who were grade one to four were two times more likely to use ANC service (AOR2.3 95% CI1.5-3.5) those who were grade five to eight were two times more likely to use ANC service (AOR2.1-95%CI1.2-2.9)as compared to those unable to read and write. Those women whose husbands' occupations "other than farming" were nearly twice as likely to use ANC service [AOR=1.8; 95% CI (1.2- 2.9)] as compared to those farmer's wives(42).

Another cross-sectional study done in south Gonder, north Ethiopia zone showed that mothers who completed their secondary school (AOR = 8.205; 95% CI: 3.406, 19.767), women who completed their tertiary school (AOR = 6.406; 95% CI: 2.229, 18.416), women whose husbands' level of education is secondary school (AOR = 5.967; 95% CI: 2.753, 12.936), those not being exposed to the media (AOR = 0.520; 95% CI: 0.345, 0.783), and rural women (AOR = 0.267; 95% CI: 0.164, 0.435) were significantly associated with ANC utilization(36).

A study from southern Ethiopia revealed that mothers with Tertiary and above education were 4 times more likely to utilize ANC service (AOR,4.15;95% CI: 1.95, 8.83)(37).

2.2.2 Reproductive history, Health Service related factors:

Studies from low and middle-income countries showed Timely ANC initiation had 5.2 and 4.7 times higher odds of receiving four and eight ANC contacts, respectively, and were more likely to receive a higher content of ANC than women with delayed ANC initiation. Timely ANC initiation is likely to be a major driving force towards meeting the 2016 WHO guidelines for a positive pregnancy experience(29).

A hospital-based cross-sectional study done in Sao Tome and Principe showed that Pregnancy type of planning continued to have an association with adequate ANC service utilization. With a planned pregnancy (AOR 2.59; 95% CI: 1.60–4.18)(26).

A study conducted from Benin showed timing to antenatal care initiation showed that women who had late booking (after 1st trimester) had 97% reduction in ≥ 8 ANC contacts compared with women who initiated ANC contacts within the first trimester (AOR = 0.03; 95% CI 0.00, 0.21)(35).

A facility-based cross-sectional study conducted in eastern Uganda showed that Multiparous (2 to 4) women were less likely less be compliant with the WHO-recommended 8+ ANC contacts schedule [AOR: 0.65; 95% CI: (0.44–0.94)]. Grand multiparous women (>5) had 63% fewer odds of being compliant with the WHO-recommended 8+ ANC contacts schedule [AOR: 0.37; 95% CI: (0.19–0.71)]. Mothers who had their first ANC contact within the first trimester had 6.42 times the odds of being compliant with the WHO recommended 8+ ANC contacts schedule [AOR: 6.42; 95% CI: (4.43–9.33)](40).

A study in Cameroon stated that women who had their first contact later in the second or third trimester were less likely to receive the full set of ANC contacts(27).

A hospital-based cross-sectional study from Saudi Inadequate antenatal care was independently associated with employed mothers (OR 1.91, 95% CI 1.13–3.22) and high parity (three or more) (OR 2.21, 95% CI 1.17–4.16) (33).

A study conducted in the south Gonder zone showed that those with a planned pregnancy had almost twice(AOR = 1.912; 95% CI: 1.117, 3.271)were twice more likely to utilize the service compared to mothers with unplanned pregnancy (36).

A study from south Ethiopia showed having a history of risky pregnancy (AOR,2.59; 95%CI: 1.55, 4.35), and planned pregnancy (AOR,2.60;95% CI: 1.35, 4.99) were significant determinants of overall adequate ANC service utilization(37).

A cross-sectional study done in Arbaminch showed Bad obstetric history, and pregnancy danger signs, had a statistically significant association with the outcome variable, optimal ANC. Furthermore, mothers who did have a BOH were four times more likely to receive optimal ANC contact compared to those who did not have a BOH, such as stillbirth, congenital anomaly, neonatal death, and recurrent abortion (AOR = 3.90, 95% CI: 1.94–7.83). Mothers who did experience any danger signs during this pregnancy were four times more likely to obtain full ANC than those who did not (AOR = 4.1, 95% CI: 1.87–8.82)(38).

A study from Africa showed number of ANC contacts was significantly lower among mothers who initiated ANC after 12 weeks of gestation and healthcare access was a big problem(43).

studies in Ethiopia and other African countries have also shown an association between ANC utilization and proximity to a health facility(44, 45).

Another study showed that Planned pregnancies often reflect higher levels of awareness and preparedness, leading to better adherence to ANC guidelines(46). Pregnant women with a planned pregnancy are much more cautious and eager to know their pregnancy progress than those who had unplanned (47, 48). Planned pregnancies are safer for the mother and deliver healthier babies, hence, intention and desire to become pregnant must be a positive factor (48-50).

2.2.3 Health Service related factors:

Different studies from Africa revealed Desired pregnancy to be positively associated with eight or more ANC visits, whereas birth order and long distance was negatively associated with eight or more ANC visits(20, 31).

A cross-sectional study conducted in Welega showed that those who were located at a walking time of<30min to the nearest health facility were nearly two times more likely to use ANC service (AOR 1.7 95%CI 1.1-2.5) as compared to those located at a waking time of>60min(42).

A mixed study designs conducted in bahirdar zuria woreda showed Being far distance, and not developing a danger sign have negative impact on ANC adherence(51).

2.2.4 Personal related factors:

Findings from different studies showed that those mothers with a good knowledge of ANC were about twice as likely to receive more ANC visits compared to those with a poor knowledge of ANC(52-54).

A cross-sectional study from rural Sehala Seyemit showed Women with a favorable attitude toward maternal healthcare demonstrated greater odds of using maternal health services. Similarly, a study in rural Ethiopia revealed that women's attitudes toward maternal health services were significantly associated with their intentions to use maternal health services(55). In Bangladesh, women's attitudes toward maternal health services played a crucial role in their utilization, with positive attitudes associated with increased attendance at antenatal care visits (56). Finding from in Kenya found that women with positive attitudes toward maternal health services were more likely to utilize antenatal, delivery(57).

A study conducted in Arbaminch, southern Ethiopia revealed knowledgeable mothers were found to consume ANC services. Those with good knowledge were twice as likely to receive an ANC follow-up compared to their counterparts (AOR = 2.26, 95% CI: 1.15–4.44). Mothers with high decision-making power were 3.9 times more likely to have utilized ANC contacts according to schedules (AOR = 3.9, 95% CI: 1.2–7.63)(38).

2.3 Conceptual framework

This conceptual framework was developed after reviewing different literature. According to the literature review, the main risk factors identified are classified as Socio-demographic factors, Reproductive history, maternal health Service related factors, and personal related factors(26, 36, 38, 40).

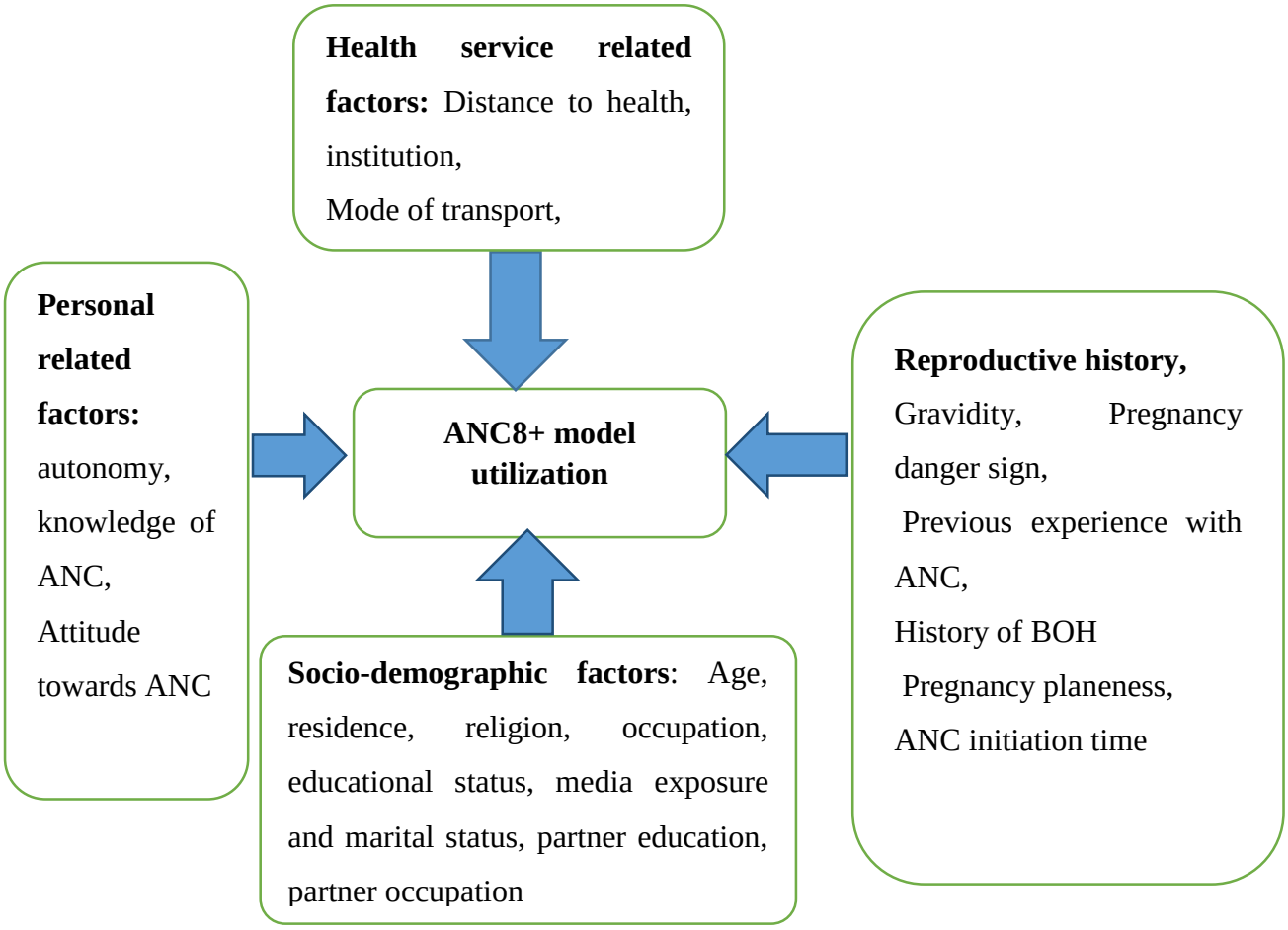

Figure 1: Conceptual framework representing, factors associated with utilizationANC8+ model 2024.

3 OBJECTIVE

3.1 GENERAL OBJECTIVE

- To assess the utilization and factors associated with the minimum eight contact ANC model among mothers who delivered in public hospitals of central zone Tigray, north Ethiopia 2024.

3.2 SPECIFIC OBJECTIVE

- To assess utilization of minimum eight contact ANC model utilization among mothers who delivered in public hospitals, central zone, Tigray, north Ethiopia 2024.
- To determine factors associated with the minimum eight contact ANC model among mothers who delivered in public hospitals, central zone, Tigray, north Ethiopia 2024.

4 Method and Materials

4.1 Study area

The study was conducted in public hospitals of the central zone of the Tigray Region. The central zone is one of the seven zones found in the Tigray region, Ethiopia which is 1024 km from Addis Ababa (Capital city of Ethiopia) and encompasses nine districts and three towns. Based on the 2007 census, this zone has a total population of 1,245,824, of whom 613,797 are men and 632,027 are women(58). The central zone has 3 general hospitals (Sent Marry General Hospital, Adwa General Hospital, Abiadi General Hospital) 1 comprehensive specialized hospital(Aksum University Comprehensive Specialized Hospital), and six primary hospitals(59).

4.2 Study period

- The study was conducted from November 15- December 15, 2024 G.C.

4.3 Study design

- Hospital-based Cross-sectional study was conducted.

4.4 Source Population

- All mothers who gave birth in public hospitals of central zone Tigray region.

4.5 Study population

- Mothers who gave birth in selected public hospitals of central zone Tigray region during the study period.

4.6 Eligibility Criteria

4.6.1 Inclusion Criteria

- Mothers who are residents(who have lived at least six months) in the zone
- Mothers who give birth at the study area during the data collection period

4.6.2 Exclusion criteria

- A mother who came out of the zone.
- Mothers who are not volunteers
- Mothers who are seriously ill

4.7 Sample size determination

The sample size for the prevalence was determined using the formula for single population proportion considering a 95% confidence level, 5% margin of error, and proportion of 41%(38). These assumptions are substituted in the formula below:

$$n = \frac{(Z\alpha/2)^2\, p\,(1-p)}{d^2} = \frac{(1.96)^2\, 0.041(1-0.041)}{(0.05)^2} = 372$$

Where:

n = sample size

Zα/2= significance level at α= 0.05

P = Proportion of mothers who have optimal utilization of ANC8+ 41%(38).

d= the margin of error of 0.05

Therefore the required sample size for this study was 372, using 1.5 of design effect and adding a 10% of the samples to compensate the non-response rate, the minimum required sample size will be = 614.

The required sample size which is calculated by using double population proportion will be:-

Table 1: Factor analysis to determine sample size using different associated factors of utilization of ANC8+ among mothers admitted to public hospitals of central zone Tigray Ethiopia 2024 G.C

Variable	Ref.	% of outcome in an unexposed group	AOR	Design effect	Sample size	Total sample size with a 10% none response rate
ANC initiation timing	(40)	37.2	6.64	1.5	75	83
Planned pregnancy	(26)	40.9	2.67	1.5	225	248
BOH	(38)	31.7	3.9	1.5	126	139

The sample size in the table is calculated using a power of 80% and a confidence level of 95%

Therefore the minimum required sample size for this study was obtained from a single population proportion that is 614.

4.8 Sampling technique and procedure

In this study, there are a total of ten public hospitals in central zone of tigray region, north Ethiopia of representative sample, a subset of four hospitals has been selected using the lottery method. The calculated sample was allocated proportional to the selected hospitals based on a number of clients flow in each hospital during one month reporting period.

To select study participants from selected hospitals, a systematic random sampling technique was employed. The sampling interval was every two clients. Starting with the first client. The first client was determined using the lottery method, which involves a random selection process

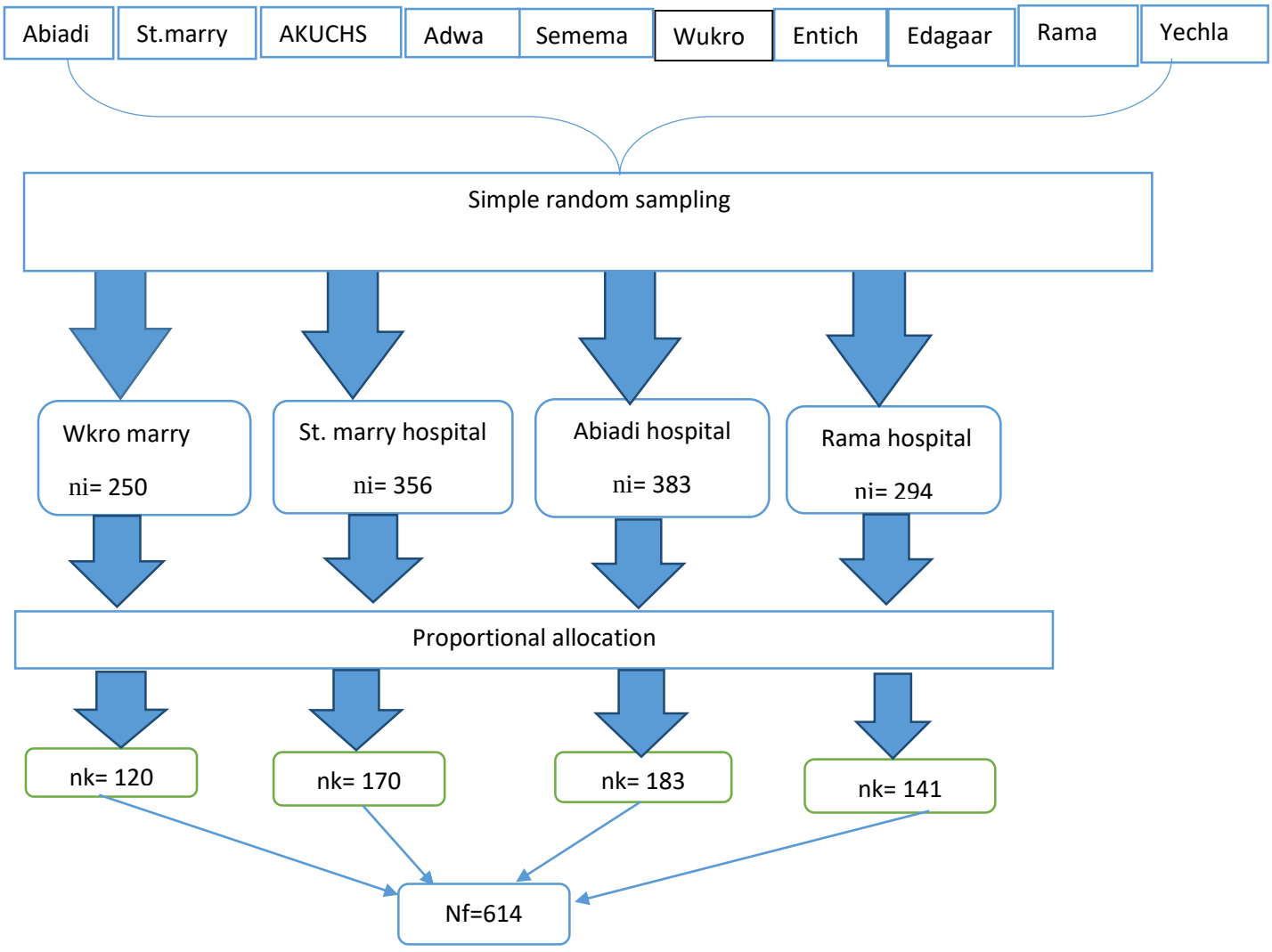

Figure 2: Schematic representation of the sampling procedure for assessing utilization and factors associated with the ANC8+ model among mothers who delivered in public hospitals of the central zone tigray region, north Ethiopia.

4.9 Data collection tools and measurements

The data were collected using a semi-structured, pre-tested, and interviewer-guided questionnaire supplemented by chart review which is adapted from reviewing several literature (26, 36, 38, 40). The questionnaire consists of socio-demographic, reproductive history and health service-related factors, and personal-related factors. The questionnaire is prepared originally in English and then translated local language (Tigrigna). It was pre-tested on 5% of women Aksum university comprehensive and specialized hospital, which is out of the study sample unit, but with similar characteristics of women with the study subjects.

Data were collected by four midwives. The principal investigator (PI) was participating in the data collection process as supervisor. Data collectors were trained for one day by the principal investigator on the issues of data collection process, use of data collection instrument, importance of consent and how to maintain confidentiality.

4.10 Study variables

4.10.1 Dependent variable

Utilization of eight contact ANC model

4.10.2 Independent Variables:

Socio-demographic factors: Age, residence, occupation, educational status, media exposure and marital status partner occupation, and partner educational status

Reproductive history and maternal health Service related factors: gravida, pregnancy danger sign, previous experience to ANC, history of BOH, pregnancy planning, ANC initiation time.

Maternal health Service related factors: Distance to health, institution, means of transport,

Personal Related Factors: autonomy, knowledge of ANC, and attitude towards ANC

4.11 Operational definition

ANC8+ model utilization

ANC8+ model utilization is categorized into two (yes) utilized and (no) not utilized. This was defined as having received the recommended ANC contacts as per the gestational age at childbirth according to the current ANC for a positive pregnancy experience WHO guidelines(4).

Exposure to media

Respondents were asked if they listen to general media messages radio, watch television, or read magazines. Those who respond At least once a week were considered to be regularly exposed to that form of media(60).

Decision-making power

Decision making power was measured by eight household and health care related questions (2 = for women who were able to decide independently, 1 = for joint decision and 0 = otherwise). The total score ranged from 0 to 16 and a woman who scored equal or above the mean were considered to have higher decision-making power while those who scored below the mean was considered to have low household decision-making power relative to this particular population (61).

Knowledge of ANC:

The level of antenatal care knowledge was evaluated by scoring responses that measured participants' knowledge of ANC: a score of 1 was assigned if the participant had knowledge and a score of 0 if they did not. A total score and a mean score were computed, with a score less than the mean indicating poor knowledge and a score equal to or higher than the mean indicating good knowledge(52).

Attitude toward ANC

The attitude was measured using a 4-point Likert scale (1 = strongly agree, 2 = agree, 3 = disagree 4 strongly disagree). Positive attitude was assigned for those who scored equal to or above the mean and negative attitude was assigned if they scored below the mean(62).

4.12 Data quality assurance

To assure the quality of data the following measures were undertaken.5% of the questionnaire was pre-tested to see the reliability of the tool and the questionnaire was initially prepared in English and was translated into the local language (Tigrigna) and it was checked for its consistency by back translation to English by language experts. Information was given on the objective of the studies, the data collection process, and the relevance of the study to data collectors before starting the data collection. The supervisor were actively involved in supervision during the data collection & the completed questionnaire was cross-checked for competencies and consistency.

4.13 Data analysis, processing, and interpretation

After data collection, data were coded and checked for completeness, and then -entered into Epi data version 4.7, and then exported to SPSS version 27 for analysis. Descriptive analysis was performed on all study variables. Multicollinearity was checked using a cut-off variance inflation factor (VIF) <10. Model fitness was checked by using the Hosmer-Lemeshow goodness (0.98) of fit test at p-value> 0.05. To determine the association between dependent and independent variables data was entered into Bi-variable logistic regression and variables with a p-value of less than 0.25 were entered into the multivariable logistic regression model. The OR and 95% confidence level were used to assess the strength of the association between dependent and independent variables. Lastly, predictor variables with a p-value of less than 0.05 in the multivariable logistic regression model were considered statistically important determinants for the utilization of the eight-contact ANC model and were presented in the form of text and tables.

4.14 Ethical clearance

Initially, Ethical clearance was obtained from the Institutional Review Board (IRB) of Mekelle University Research and Community Engagement Office (MU-IRB2307/2024). Permission was obtained from the Tigray Regional Health Bureau. Official letters of cooperation and a brief explanation about the purpose of the study were given to each hospital to get permission from the hospital administrative. After getting permission from hospitals, each participant's written informed consent and assent were secured from each participant after an explanation of the purpose of this study, the right to refuse participation, and the liberty to refuse or to leave the study at any time and why they are taking part in the research study. To maintain confidentiality, the name of the client was not written in the questionnaire. Anyone not willing to take part in the study was given the full right not to participate.

4.15 Dissemination plan

The result of this study will be presented to Mekelle University scientific community as part of partial fulfilment of postgraduate program. The report will be provided to each departments as well as Postgraduate, research coordinating office, Tigray regional health bureau and respective hospitals. Finally efforts will be made to publish results in national and international journal.

5 Result

5.1 Socio-demographic characteristics of study participants

All participants (n = 614) were successfully interviewed, achieving a 100% response rate, and all provided accurate information. The majority of participants (64.5%, n = 396) were between 20 and 34 years of age. In terms of religion, 93.6% (n = 575) identified as Orthodox Christians, while 75.6% (n = 464) were married. Regarding educational attainment, 42.8% (n = 263) had completed primary school, and 33.6% (n = 206) were housewives. Additionally, 92.5% (n = 568) of the participants reported having media exposure (*Table 2*).

Table 2 socio-demographic characteristics of respondents for the assessment utilization and factors associated with the ANC8+ model among mothers who delivered in public hospitals of the central zone, Tigray, North Ethiopia 2024 G.C (N=614).

variable	category	Utilization status Cross tabulation		frequency	Percentage (%)
		Not utilized n(%)	Utilized n (%)		
age	15-19	19(73.1)	7(26.9)	26	4.2
	20-34	251(63.4)	145(36.6)	396	64.5
	>=35	122(63.5)	70(36.5)	192	31.3
residency	Urban	240(62.3	145(37.7)	385	62.7
	Rural	152(66.45	77(33.6)	229	37.3
religion	orthodox	364(63.3)	211(36.7)	575	93.6
	Muslim	28(71.8)	11(28.2)	39	6.4
marital status	married	302(65.1)	162(34.9)	464	75.6
	Others	90(60)	60(40)	150	24.4
Maternal occupation	housewife	133(64.6)	73(35.4)	206	33.6
	Trader	127(64.5)	70(35.5)	197	32.1
	farmer	32(78)	9(220	41	6.7
	employed	100(58.8)	70(41.2)	170	27.7
Maternal education	No formal education	34(72.3)	13(27.7)	47	7.7
	primary education	181(68.8)	82(31.2)	263	42.8
	secondary education	145(62.5)	87(37.5)	232	37.8
	Diploma and above	32(44.4)	40(55.6)	72	11.7
media exposure	Yes	361(63.6)	207(36.4)	568	92.5
	No	31(67.4)	15(32.6)	46	7.5
partner education	No formal education	37(67.3)	18(32.7)	55	9
	primary	163(63.2)	95(36.8)	258	42
	secondary	111(60.7)	72(39.3)	183	29.8
	Diploma and above	81(68.6)	37(31.4)	118	19.2
partner occupation	employed	176(73)	65(27)	241	39.3
	trader	101(52.1)	93(47.9)	194	31.6
	farmer	64(64.6)	36(35.4)	99	16.1
	others	51(63.7)	29(36.3)	80	13

5.2 Reproductive history related factors:

Among the participants 444 (72.3%) were multigravida, and 455 (74.1%) mothers said the pregnancy was planned. Among the participant 133 (21.7 %) had a history of bad obstetrics, such as stillbirth, congenital anomalies, abortion, and neonatal death. Of the participant, 150 (24.4%) had a history of pregnancy danger signs. Regarding ANC history 415 (67.6%) had a previous history of antenatal care. Of the participant, 192 (31.3%) said that they traveled<30 minutes, and 90(14.1%) said that they traveled more than 1 h to reach the health institution. Among the participant 354 (57.7%) traveled to the health institution on foot and 260 (42.3%) were transported by car (Table 3).

Table 3: Reproductive history related factors- of respondents for the assessment utilization and factors associated with ANC8+ model among mothers who delivered in public hospitals of central zone, Tigray, North Ethiopia 2024 G.C *(N=614).*

variable	category	**Utilization status**		frequency	Percentage (%)
		Not utilized n (%)	utilized n (%)		
gravidity	primigravida	108(63.5)	62(36.5)	170	27.7
	multigravida	284(64)	160(36)	444	72.3
previous experience with ANC	yes	259(62.4)	156(37.6)	415	67.6
	no	133(66.8)	66(33.2)	199	32.4
history of BOH	yes	68(51.1)	65(48.9)	133	21.7
	no	324(67.4)	157(32.6)	481	78.3
Pregnancy danger sign	yes	82(54.7)	68(45.3)	150	24.4
	no	310(66.8)	154(33.2)	464	75.6
ANC initiation time	Within the first 12 weeks	117(44.3)	147(55.7)	264	43
	After 12 weeks	275(78.6)	75(21.4)	350	57
pregnancy planning	yes	263(57.8)	192(42.2)	455	74.1
	no	129(81.1)	30(18.9)	159	25.9

5.3 Health Service related factors:

Among the participants 192(31.3%) travel <30 min to reach the nearest health facility, and 332(14.7%) travel between 30-60 min to reach the nearest health facility. Three hundred fifty four mothers travel on foot to reach the nearest health facility (*Table 4*)

Table 4 maternal health service related factors of respondents for the assessment utilization and factors associated with ANC8+ model among mothers who delivered in public hospitals of central zone, Tigray, North Ethiopia 2024 G.C (N=614).

variable	category	**Utilization status**		frequency	Percentage (%)
		Not utilized n (%)	utilized n (%)		
Distance to health institution	<30 min	87(45.3)	105(54.7)	192	31.3
	30-60 min	228(68.7)	104(31.3)	332	54.1
	>60 min	77(85.6)	13(14.4)	90	14.7
mode of transport	On foot	229(64.7)	125(35.3)	354	57.7
	By car	163(62.7)	97(37.3)	260	42.3

5.4 Personal characteristics of study participants

Of the participant 422 (65.5%) had high decision-making power for the utilization of maternal and child healthcare services and 490 (79.8) had good knowledge on importance of ANC service and 558(90.9%) had positive attitude towards ANC (*Table 5*).

Table 5: Personal related characteristics of respondents for the assessment utilization and factors associated with ANC8+ model among mothers who delivered in public hospitals of the central zone, Tigray, North Ethiopia 2024 G.C (N=614).

Variable	category	Utilization status		frequency	Percentage (%)
		Not utilized n (%)	Utilized n (%)		
Decision-making power	low	149(70.3)	63(29.7)	212	34.5
	high	243(60.4)	159(39.6)	402	65.5
knowledge of ANC	poor	78(62.9)	46(37.1)	124	20.2
	good	314(64.1)	176(35.9)	490	79.8
attitude towards ANC	negative	46(82.1)	10(17.9)	56	9.1
	positive	346(62)	212(38)	558	90.1

5.5 Utilization of ANC 8+ utilization

From a total of 614 mothers, the utilization of WHO recommended ANC contact (ANC8+) was 36.2% (95% CI: 32.3-40.1).

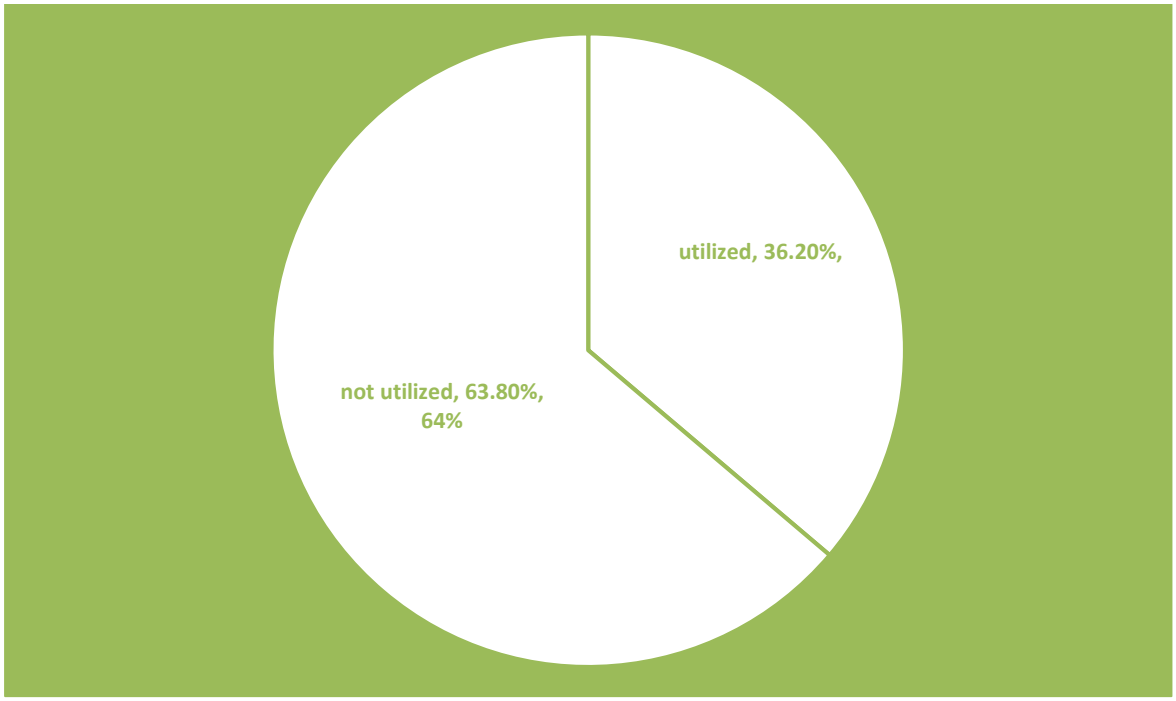

Figure 3: utilization of ANC 8+utilization among mothers who gave birth in public hospitals of the central zone, Tigray region, north Ethiopia.

5.6 Factors associated with utilization ofANC8+

In the bivariate binary logistic regression, those variables with $p < 0.25$ were candidates for multivariate logistic regression and statistical significance was declared at a p-value < 0.05. Thus, maternal education, maternal occupation, partner occupation, distance to health institution, pregnancy planning, ANC initiation timing, history BOH, presence of pregnancy danger signs, mothers' attitude toward ANC, and women's autonomy, were candidates for multivariate analysis. This study's multivariable logistic regression analysis revealed that partner occupation, presence of danger signs, pregnancy planning, ANC initiation timing, distance to health institution, and attitude towards ANC had a statistically significant association with utilization of the WHO recommended 8+ ANC contact's schedule. Mothers whose partners were traders had 1.7 times higher odds [AOR = 1.755, (95% CI: 1.097–2.807)] of utilizing the recommended ANC contacts compared to mothers with employed partners.

Similarly, mothers with farmer partners had 1.2 times higher odds [AOR = 1.260, (95% CI: 0.722–2.196)], and those with partners in other occupations, such as carpentry or woodworking, had 1.6 times higher odds [AOR = 1.615, (95% CI: 0.863–3.023)], compared to mothers with employed partners.

Mothers who initiated ANC contact within the first 12 weeks of pregnancy had 3.2 times higher odds [AOR = 3.275, (95% CI: 2.204–4.868)] of utilizing the WHO-recommended 8+ ANC contacts compared to those who initiated ANC later than 12 weeks. Additionally, mothers who experienced pregnancy danger signs had 2.1 times higher odds [AOR = 2.131, (95% CI: 1.362–3.333)] of adhering to the recommended ANC schedule compared to those who did not experience pregnancy danger signs.

Mothers with planned pregnancy were 2.2 times higher odds [AOR = 2.287, (95% CI: 1.394–3.751)] to utilize the recommended ANC contacts compared to those with unplanned pregnancy. Furthermore, mothers living within a 30-minute walking distance to a health institution had 3.7 times higher odds [AOR = 3.683, (95% CI: 1.777–7.632)], while those living 30–60 minutes away had 2.1 times higher odds [AOR = 2.099, 95% CI: 1.055–4.174] of utilizing the recommended ANC contacts compared to mothers living beyond a one-hour walking distance.

Lastly, mothers with a positive attitude toward ANC services were 2.3 times more likely [AOR = 2.364, (95% CI: 1.039–5.379)] to utilize the recommended ANC services compared to those with a negative attitude towards ANC service. These findings highlight the importance of early ANC initiation, pregnancy planning, accessibility to health facilities, and positive attitudes in improving ANC utilization (*Table 6*).

Table 6:Bivariate and multivariate logistic regression analysis result for significant variables for the assessment utilization and factors associated with ANC8+ model among mothers who delivered in public hospitals of central zone, Tigray, North Ethiopia 2024 G.C(N=614).

variable	category	Utilization status		COR(95% CI)	AOR(95%CI)
		Not utilized n (%)	Utilized n (%)		
ANC initiation time	Within the first 12 weeks	117(44.3)	147(55.7)	4.607	3.275 (2.204-4.868)
	After 12 weeks	275(78.6)	75(21.4)	1	1
Partner occupation	Employed	176 (73)	65(27)	1	1
	trader	101 (52.1)	93 (47.9)	2.493(1.671-3.721)	1.755(1.097-2.807)
	farmer	64 (64.6)	35 (35.4)	1.481(1.897-2.443)	1.260(.722-2.196)
	others	51(63.7)	29 (37.3)	1.540(.900-2.635)	1.615(0.863 - 3.023)
Presence of pregnancy danger sign	yes	82 (54.7)	68 (45.3)	1.669(1.147-2.429)	2.131(1.362-3.333)
	no	310 (66.8)	154 (33.2)	1	1
Pregnancy planning	yes	263 (57.8)	192 (42.2)	3.139(2.024-4.868)	2.287 (1.394-3.751)
	no	129 (81.1)	30 (18.9)	1	1
Distance in min	<=30 min	87 (45.3)	105(54.7)	7.149(3.721-13.731)	3.683 (1.777-7.632)

	30-60 min	228(68.7)	104(31.3)	2.702(1.436-5.082)	2.099(1.055-4.174)
	>60 min	77(85.6)	13 (14.4)	1	1
attitude	negative	46 (82.1)	10 (17.9)	1	1
	positive	346(62)	212(38)	2.818(1.393-5.709)	2.364 (1.039-5.379)

6 Discussion

This study aimed to assess the utilization of WHO-recommended eight or more antenatal care (ANC8+) contacts and associated factors among mothers who delivered in public hospitals in the central zone of Tigray, Ethiopia. The findings revealed that the utilization of ANC8+ was 36.2% (95% CI: 32.3-40.1) among mothers who delivered in public hospitals in the central zone of Tigray. This indicates that while progress has been made, a significant proportion of mothers still do not meet the WHO-recommended ANC contact targets, highlighting the need for further interventions to improve maternal health service utilization. The study's findings are consistent with research conducted in Saudi Arabia, which reported a 34% utilization rate of ANC8+ (33). However, the results are higher than those reported in Uganda**,** where only 28% of mothers achieved the recommended ANC contacts (40). The disparity could be attributed to differences in healthcare infrastructure, accessibility, and awareness campaigns between the two regions.

On the other hand, the ANC8+ utilization rate in the central zone of Tigray is lower than that reported in Arbaminch, Ethiopia**,** where 41% of mothers achieved the recommended ANC contacts(38). This discrepancy within Ethiopia could be due to regional differences in healthcare access, awareness, and the effectiveness of maternal health programs.

The current study revealed that mothers who had trader(merchant) partners were 1.7 times [AOR1.755CI (1.097-2.807)], Farmer partner 1.2 times [AOR1.260CI (.722- 2.196) other occupations such as carpenter, woodworker were 1.6 times [AOR1.615CI (.863-3.023)] the odds of utilizing WHO recommended ANC contacts compared to mothers with employed partner. This finding is supported by a study from Uganda(40). This variation suggests potential differences in work schedules, or awareness levels across occupations, influencing women's ability to access ANC.

Our study also found that Early ANC initiation within the first 12 weeks of pregnancy significantly increased the likelihood of attending 8+ ANC visits, mothers who attended their first ANC visit within the first 12 weeks of pregnancy had 3.2 times [AOR = 3.275, (95% CI: 2.204–4.868)] the odds of utilizing eight or more recommended contacts than those who did not. This finding aligns with numerous studies demonstrating that early booking fosters consistent engagement with ANC services. Early initiation provides opportunities for timely risk assessment, health education, and building rapport with healthcare providers, which likely

promotes continued attendance. (40). on the contrary, women who had late bookings for ANC were less likely to have 8 or more ANC contacts compared to women who initiated ANC contacts within the first trimester (35). Early ANC contacts offer a chance for timely detection and treatment of potential health problems and raise a strong relationship between the woman and her healthcare provider(4). Women who initiate their ANC contacts timely are likely to attend more times because they probably establish a relationship with their healthcare provider, are motivated, and are more likely to be aware of the importance of regular antenatal care contacts.

The use of adequate antenatal care services was significantly correlated with the development of danger signs during pregnancy. Mothers who did experience a danger sign during their pregnancy were two times more likely to continue attending antenatal care contact than those who did not [AOR = 2.131, (95% CI: 1.362–3.333)]This result is in line with studies conducted at Arbaminch (38) and Bahirdar Zuria(51) which indicate that mothers were more likely to use the services when they were aware of pregnancy risk factors This indicates that women are more likely to seek care when they perceive a threat to their health. This aligns with studies showing that perceived risk and awareness of danger signs motivate women to utilize antenatal care services. This underscores the importance of educating women about pregnancy danger signs to promote timely care-seeking behavior.

Our study also showed Pregnancy planning to be another factor for ANC utilization. ANC8+ utilization is 2.2 times higher odds [AOR = 2.287, (95% CI: 1.394–3.751)] more likely among mothers with a planned pregnancy compared to mothers with an unplanned pregnancy. This finding is consistent with research indicating that women with planned pregnancies are more likely to be proactive in seeking healthcare. Planned pregnancies often reflect higher levels of awareness and preparedness, leading to better adherence to ANC guidelines(46). This could be due to pregnant women with a planned pregnancy are much more cautious and eager to know their pregnancy progress than those who had unplanned (47, 48). Most of the time planned pregnancies are safer for the mother and deliver healthier babies, hence, intention and desire to become pregnant must be a positive factor (48-50).

On the other hand, Geographical accessibility, as measured by walking distance to health facilities, significantly impacted ANC utilization. Women living closer to health facilities were more likely to attend ANC visits, mothers who live within 30 min walking distance from the health institution were 3.7 times higher odds [AOR = 3.683, (95% CI: 1.777–7.632)], and

mothers who live within 30-60 min walking distance from the health facility were two times [AOR = 2.099, 95% CI: 1.055–4.174] more likely to use ANC compared to mother who lives beyond one-hour walking distance from the health facility. This finding is similar to finding a study in Welega, Ethiopia(42). Previous studies in Ethiopia and other African countries have also shown an association between ANC utilization and proximity to a health facility(44, 45). Far distance from health institutions may cost them extra expense for transportation costs which in turn could prevent them from receiving ANC services.

Finally, a positive attitude towards ANC services significantly increased utilization. Mothers with a positive attitude toward ANC service were 2.3 times [2.364 (1.039-5.379)] the odds of using the service compared to mothers with a negative attitude towards ANC. Studies from various settings have consistently shown that women's attitudes influence their healthcare-seeking behavior(55-57). This underscores the importance of addressing sociocultural barriers and promoting a positive attitude towards ANC.

7 Strengths and limitations of the study

7.1 Strength of the study

This is a facility-based, cross-sectional study that was conducted across several public hospitals found in the central zone of the Tigray region, north Ethiopia. This study involves a large number of participants which provides a comprehensive representation of the study population. We determined utilization of the WHO-recommended 8+ANC contacts schedule by evaluating whether the mother followed the recommended contacts according to her gestational age at the time of birth, rather than just the total number of contacts. This increased the objectivity of the study. To minimize recall bias, the study targeted mothers who had given birth during the data collection period.

7.2 Limitations of the study

Information in the survey is based on self-reports, so there may be social desirability bias and recall bias. Thus, medical record cards are in parallel checked to minimize recall bias. In addition, some literature review for the study was conducted according to focused antenatal care, which reduced the accuracy of the comparability. However, due to its cross-sectional design, the study cannot establish a causal relationship between the outcome and associated factors. Further research studies may provide more insights. Additionally, a mixed methods study that combines qualitative in-depth exploration with quantitative findings could offer a deeper understanding of how identified factors impact.

8 Conclusion

In summary, this study showed that the study area had a low utilization of the WHO-recommended antenatal care service. Partner occupation, presence of danger signs, pregnancy planning, ANC initiation timing, distance to health institution and attitude towards ANC are factors associated with optimal ANC. These findings provide valuable insights for developing targeted interventions to improve ANC coverage and maternal health outcomes. Therefore, it is essential to strengthen efforts towards community mobilization to antenatal service to increase women receiving all eight recommended contacts.

9 Recommendation

For Health Facilities:

- Establish outreach clinics.
- Address transportation barriers.
- Create welcoming environments.
- Implement efficient appointment systems.
- Provide comprehensive education on danger signs.

Healthcare Providers:

- Promote early ANC initiation.
- Build strong patient relationships.
- Adhere to WHO guidelines for comprehensive care.
- Deliver empathetic, respectful care.
- Recognize the influence of partner occupation and pregnancy intention.

Researchers:

- Conduct qualitative studies to understand barriers to ANC.
- Evaluate intervention effectiveness.
- Further investigation into partner occupation-related barriers.

Policymakers:

- Increase investment in health systems.
- Promote community engagement.
- Fund planned pregnancy programs.

References

1. **organization wh**. **MaternalMortality 2020** [Available from: **Available online:https://www.who.int/news-room/fact-sheets/detail/maternal-mortality**
2. Organization WH. Trends in maternal mortality 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. 2019.
3. Organization WH. Trends in maternal mortality 2000 to 2020: estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA/Population Division: executive summary. 2023.
4. Organization WH. WHO recommendations on antenatal care for a positive pregnancy experience: summary: highlights and key messages from the World Health Organization's 2016 global recommendations for routine antenatal care. World Health Organization; 2018.
5. Organization WH. national safe motherhood protocoli [Available from: https://platform.who.int/docs/default-source/mca-documents/policy-documents/operational-guidance/GHA-CC-10-02-OPERATIONALGUIDANCE-eng-National-Safe-Motherhood-Protocol.pdf.
6. united nations doeasa. antenatal care 2024 [updated jan 2024. Available from: https://data.unicef.org/topic/maternal-health/antenatal-care/.
7. Hailu GA, Weret ZS, Adasho ZA, Eshete BM. Quality of antenatal care and associated factors in public health centers in Addis Ababa, Ethiopia, a cross-sectional study. PLoS One. 2022;17(6):e0269710.
8. ethiopia moh. Ethiopia MOH - Obstetrics Protocol 2020 2020 [Available from: https://www.scribd.com/document/505962352/Ethiopia-MOH-Obstetrics-Protocol-2020.
9. Ethiopia FMoH. Management protocol on selected obstetrics topics for hospitals.; 2020.
10. united nations doeasa. SDG Indicators ,Regional groupings used in Report and Statistical Annex [Available from: https://unstats.un.org/sdgs/indicators/regional-groups.
11. organization wh. newborn mortality 2020- [Available from: https://www.who.int/news-room/fact-sheets/detail/newborn-mortality.
12. Organization WH. Strategies towards ending preventable maternal mortality (EPMM). 2015.
13. ICF. EPHIEEa. Ethiopia Mini Demographic and Health

Survey 2019: Final Report. Rockville, Maryland, USA: EPHI and ICF. 2021.
14. ETHIOPIA U. maternal mortality ratio [Available from: https://ethiopia.unfpa.org/en/topics/maternal-health-17.
15. DATA U. Antenatal care. 2024 [Available from: https://data.unicef.org/topic/maternal-health/antenatal-care
16. Ekholuenetale M. Prevalence of eight or more antenatal care contacts: findings from multi-country nationally representative data. Global Pediatric Health. 2021;8:2333794X211045822.
17. Indicators K. Mini demographic and health survey. EPHI and ICF. 2019.
18. Yakob B, Gage A, Nigatu TG, Hurlburt S, Hagos S, Dinsa G, et al. Low effective coverage of family planning and antenatal care services in Ethiopia. International Journal for Quality in Health Care. 2019;31(10):725-32.
19. Pons-Duran C, Bekele D, Haneuse S, Hunegnaw BM, Alemu K, Kassa M, et al. Antenatal care coverage in a low-resource setting: Estimations from the Birhan Cohort. PLOS Global Public Health. 2023;3(11):e0001912.
20. Tessema ZT, Tesema GA, Yazachew L. Individual-level and community-level factors associated with eight or more antenatal care contacts in sub-Saharan Africa: evidence from 36 sub-Saharan African countries. BMJ open. 2022;12(3):e049379.
21. Sisay G, Mulat T. Antenatal Care Dropout and Associated Factors in Ethiopia: A Systematic Review and Meta-Analysis. Health services research and managerial epidemiology. 2023;10:23333928231165743.
22. Dickson KS, Okyere J, Ahinkorah BO, Seidu A-A, Salihu T, Bediako V, et al. Skilled antenatal care services utilisation in sub-Saharan Africa: a pooled analysis of demographic and health surveys from 32 countries. BMC Pregnancy and Childbirth. 2022;22(1):831.

23. Tsegay Y, Gebrehiwot T, Goicolea I, Edin K, Lemma H, Sebastian MS. Determinants of antenatal and delivery care utilization in Tigray region, Ethiopia: a cross-sectional study. International journal for equity in health. 2013;12:1-10.
24. Seyoum T, Alemayehu M, Christensson K, Lindgren H. Client factors affect provider adherence to guidelines during first antenatal care in public health facilities, Ethiopia: a multi-center cross-sectional study. Ethiopian Journal of Health Sciences. 2020;30(6).
25. Awusi V, Anyanwu E, Okeleke V. Determinants of antenatal care services utilization in Emevor Village, Nigeria. Benin Journal of Postgraduate Medicine. 2009;11(1).
26. Vasconcelos A, Sousa S, Bandeira N, Alves M, Papoila AL, Pereira F, et al. Determinants of antenatal care utilization–contacts and screenings–in Sao Tome & Principe: a hospital-based cross-sectional study. Archives of Public Health. 2023;81(1):107.
27. Boah M, Issah A-N, Yeboah D, Kpordoxah MR, Sira J. Association Between Compliance With the New WHO-Recommended Frequency and Timing of Antenatal Care Contacts and Receiving Quality Antenatal Care in Cameroon. SAGE Open. 2022;12(3):21582440221117807.
28. Apanga PA, Kumbeni MT. Association between early antenatal care and antenatal care contacts across low-and middle-income countries: effect modification by place of residence. Epidemiology and Health. 2021;43.
29. Jiwani SS, Amouzou-Aguirre A, Carvajal L, Chou D, Keita Y, Moran AC, et al. Timing and number of antenatal care contacts in low and middle-income countries: analysis in the countdown to 2030 priority countries. Journal of global health. 2020;10(1).
30. Fagbamigbe AF, Olaseinde O, Setlhare V. Sub-national analysis and determinants of numbers of antenatal care contacts in Nigeria: assessing the compliance with the WHO recommended standard guidelines. BMC Pregnancy and Childbirth. 2021;21(1):402.
31. El-Khatib Z, Kolawole Odusina E, Ghose B, Yaya S. Patterns and predictors of insufficient antenatal care utilization in Nigeria over a decade: a pooled data analysis using demographic and health surveys. International journal of environmental research and public health. 2020;17(21):8261.
32. Ekholuenetale M, Nzoputam CI, Barrow A. Prevalence and socioeconomic inequalities in eight or more antenatal care contacts in Ghana: findings from 2019 population-based data. International journal of women's health. 2021:349-60.
33. Al-Wutayd O. Inadequate and late antenatal contacts among Saudi mothers: a hospital-based cross-sectional study. International Journal of Women's Health. 2020:731-8.
34. Ekholuenetale M, Benebo FO, Idebolo AF. Individual-, household-, and community-level factors associated with eight or more antenatal care contacts in Nigeria: Evidence from Demographic and Health Survey. Plos one. 2020;15(9):e0239855.
35. Ekholuenetale M, Nzoputam CI, Barrow A, Onikan A. Women's enlightenment and early antenatal care initiation are determining factors for the use of eight or more antenatal visits in Benin: further analysis of the Demographic and Health Survey. Journal of the Egyptian Public Health Association. 2020;95:1-12.
36. Belay AT, Fenta SM, Birhan Biresaw H, Abebaw Moyehodie Y, Melkam Yelam M, Mekie M. The Magnitude of Optimal Antenatal Care Utilization and Its Associated Factors among Pregnant Women in South Gondar Zone, Northwest Ethiopia: A Cross-Sectional Study. International journal of reproductive medicine. 2022;2022(1):1415247.
37. Gebrekirstos LG, Wube TB, Gebremedhin MH, Lake EA. Magnitude and determinants of adequate antenatal care service utilization among mothers in Southern Ethiopia. Plos one. 2021;16(7):e0251477.
38. Deresa Dinagde D, Feyisa GT, Afework HT, Chewaka MT, Wada HW. Level of optimal antenatal care utilization and its associated factors among pregnant women in Arba Minch town, southern Ethiopia: new WHO-recommended ANC 8+ model. Frontiers in Global Women's Health. 2024;5:1259637.

39. Stanikzai MH, Wafa MH, Wasiq AW, Sayam H. Magnitude and determinants of antenatal care utilization in Kandahar city, Afghanistan. Obstetrics and Gynecology International. 2021;2021(1):5201682.
40. Lee S, Adam E, Kanyike AM, Wani S, Kasibante S, Mukunya D, et al. Compliance with the WHO recommended 8+ antenatal care contacts schedule among postpartum mothers in eastern Uganda: A cross-sectional study. Plos one. 2024;19(12):e0314769.
41. Ekholuenetale M, Nzoputam CI, Barrow A. Effects of socioeconomic factors and booking time on the WHO recommended eight antenatal care contacts in Liberia. PLOS Global Public Health. 2022;2(2):e0000136.
42. Terfasa TG, Afework MF, Berhe FT. Antenatal care utilization and it's associated factors in east Wollega zone, Ethiopia. Journal of Pregnancy and Child Health. 2017;4(2):316.
43. Alem AZ, Tegegne BA, Aragaw FM, Teklu RE, Baykeda TA. Multilevel negative binomial analysis of factors associated with numbers of antenatal care contacts in low and middle income countries: Findings from 59 nationally representative datasets. Plos one. 2024;19(4):e0301542.
44. Tewodros B, Dibaba Y. Factors affecting antenatal care utilization in Yem special woreda, southwestern Ethiopia. Ethiopian Journal of health sciences. 2009;19(1).
45. Yalem Tsegay YT, Tesfay Gebrehiwot TG, Goicolea I, Edin K, Hailemariam Lemma HL, San Sebastian M. Determinants of antenatal and delivery care utilization in tigray region, Ethiopia: a cross-sectional study. 2013.
46. Tekelab T, Chojenta C, Smith R, Loxton D. Factors affecting utilization of antenatal care in Ethiopia: a systematic review and meta-analysis. PloS one. 2019;14(4):e0214848.
47. Fagbamigbe AF, Idemudia ES. Barriers to antenatal care use in Nigeria: evidences from non-users and implications for maternal health programming. BMC pregnancy and childbirth. 2015;15:1-10.
48. Shibre G, Mekonnen W. Socio-economic inequalities in ANC attendance among mothers who gave birth in the past 12 months in Debre Brehan town and surrounding rural areas, North East Ethiopia: a community-based survey. Reproductive health. 2019;16:1-14.
49. Aliyu A. Family planning services in Africa: the successes and challenges. IntechOpen, DOI: 10.5772/intechopen. 73255. 2018.
50. Okedo-Alex IN, Akamike IC, Ezeanosike OB, Uneke CJ. Determinants of antenatal care utilisation in sub-Saharan Africa: a systematic review. BMJ open. 2019;9(10):e031890.
51. Bekele YA, Tafere TE, Emiru AA, Netsere HB. Determinants of antenatal care dropout among mothers who gave birth in the last six months in BAHIR Dar ZURIA WOREDA community; mixed designs. BMC health services research. 2020;20:1-9.
52. Afaya A, Azongo TB, Dzomeku VM, Afaya RA, Salia SM, Adatara P, et al. Women's knowledge and its associated factors regarding optimum utilisation of antenatal care in rural Ghana: A cross-sectional study. Plos one. 2020;15(7):e0234575.
53. Aziz Ali S, Aziz Ali S, Feroz A, Saleem S, Fatmai Z, Kadir MM. 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. 2020;20:1-12.
54. Janakiraman B, Gebreyesus T, Yihunie M, Genet MG. Knowledge, attitude, and practice of antenatal exercises among pregnant women in Ethiopia: A cross-sectional study. PloS one. 2021;16(2):e0247533.
55. Taye BT, Kebede AA, Wondie KY. Intention to use maternal health services and associated factors among women who gave birth at home in rural Sehala Seyemit district: a community-based cross-sectional study. BMC Pregnancy and Childbirth. 2022;22(1):213.
56. Afroz S, Sutopa TS, Haque MR. Young mothers' attitudes towards domestic violence and their maternal healthcare services utilization in Bangladesh: A multilevel cluster analysis. PLoS one. 2022;17(8):e0268062.
57. Njuguna J, Kamau N, Muruka C. Impact of free delivery policy on utilization of maternal health services in county referral hospitals in Kenya. BMC health services research. 2017;17:1-6.

58. FDRoECS. A. Population Projection of Ethiopia for All Regions at Wereda Level from 2014–2017.
59. Gebregziabher M, Amdeselassie F, Esayas R, Abebe Z, Silvia H, Teklehaimanot AA, et al. Geographical distribution of the health crisis of war in the Tigray region of Ethiopia. BMJ global health. 2022;7(4):e008475.
60. Institute E public health I. ethiopia demographic health survey. . 2016.
61. Nigatu D, Gebremariam A, Abera M, Setegn T, Deribe K. Factors associated with women's autonomy regarding maternal and child health care utilization in Bale Zone: a community based cross-sectional study. BMC women's health. 2014;14:1-9.
62. Girmaye E, Mamo K, Ejara B, Wondimu F, Mossisa M. Assessment of knowledge, attitude, and practice of skilled assistance seeking maternal healthcare services and associated factors among women in West Shoa Zone, Oromia region, Ethiopia. Nursing Research and Practice. 2021;2021(1):8888087.

Annexes

Annex I: Information sheet (English version)

Mekelle University College of Health Science School of Nursing Department of Maternity &Reproductive Health Nursing

My name is _____. I am working with Adisu Tesfu who is doing research for the partial fulfillment of a Master's Degree in Maternity and RH nursing at Mekelle University. I am here to study utilization and factors associated with the contact ANC model in public hospitals of central zone Tigray, north Ethiopia. The result of the study will help identify utilization and factors associated with the contact ANC model in public hospitals of central zone Tigray, north Ethiopia, and the findings of the study also help as a significant input for policymakers, program managers, and other stakeholders to design programs and strategies that increase utilization It will also serve for principal investigator as a partial fulfillment for a Master's degree in maternal and RH nursing. I am going to ask you questions to be responded to by you. Some of the questions are very personal questions that some people find difficult to answer. Your answers are completely confidential. Your name will not be written on this form, and will never be used in connection with any of the information you tell me. Participation by answering the questions that I am going to provide you is strictly on voluntary base. However, your honest answer to the question will help me to better understand the determinants of the prevalence and factors associated with the utilization of ANC. Being a study participant in this study will not get you any direct benefit and your involvement in the study will not give you any risk. Your right not to be involved in the first place or to withdraw at any time is respected. I would greatly appreciate your cooperation and help in response to this study. The interview will take about 20-30 minutes.

If you would like to know more, please contact:

Principal investigator adisu tesfu-

Phone number +2519321884436 or email adisut70@gmail.com

Are you willing to participate? Yes_____ No_____

Annex: 2 Consent form of participant

I the undersigned, am told that the researcher is going to conduct the study, to assess utilization and factors associated with the contact ANC model in public hospitals of central zone Tigray, north Ethiopia. I have been told that the research will benefit the community in general including me, the respondent, and that the research will not inflict any harm to me. I have been told that I have the full right I have enough time to understand and then take part in the study based on my interest besides; I am briefed that I will be interviewed for not more than 30 minutes. Moreover, am notified that my participation in the study is entirely voluntary and that I can quit the study any time I want. I will not be subject to any form of punishment following my failure to participate in the study. In the same way am told that the information collected will not be disclosed by any means to any people other than those participating in the study unless obtain permission from me. Equally, am told that I can ask them questions I find difficult or any type. I agree to participate in the research voluntarily.

Signature _____ Date_____

Interviewer name _____ signature _____

Date of interview _____Time started _____Time-finished _____

Supervisor name _____ Signature_____

-

Annex: 3 questionnaire English version

Part 1: socio demography characteristics of participants			
S.no	Question	Response	Remark
101	Age of the mother?	-------years	
102	Where do you live?	Urban Rural	
103	What is your religion	1 orthodox 2 Muslim 3 catholic 4 protestant	
104	What is your educational status?	1. No formal education 2. Primary school 3. Secondary school 4. Diploma and above	
105	What is your occupation?	1. housewife 2. employed 3. trader 4. farmer 5. Others(specify	
106	What is your marital status?	1. Single 2. Married 3. Divorced 4. Widow	
107	Do you have exposure to any mass media(magazine, radio, television) at least once a week	1 yes 2 no	
108	Partner occupation	1. employed 2. trader 3. farmer 4. Others(specify	
109	Partner educational status	1. No formal education 2. Primary school 3. Secondary school 4. Diploma and above	
Part 2: Reproductive history, health facility-related factors:			

201	When was your LNMP	**DD……/MM…../YEAR……**	
202	gestational age at delivery for the current pregnancy	--------**weeks**	Calculate based on LNMP or ultrasound scan on chart
203	Have you followed ANC service for the current pregnancy	1. Yes 2. no	Skip if No to 204
204	How many times		
205	What is the time to your nearest health institution on foot in a minute	……..min	
206	What is your mode of transport to arrive at the health institution	……..	
207	When do you initiate ANC contact for the current pregnancy	1. Within the first 12 weeks 2. After 12weeks	
208	How many times do you get pregnant	…….	
209	Do you have previous ANC service history?	1. Yes 2. no	
210	have you experienced any of the following danger sign • severe vaginal bleeding your current pregnancy, swollen hand or face, • blurred vision, • persistent frontal or occipital headache, • altered consciousness, • abnormal body movement (convulsions), • severe abdominal/epigastric pain, profuse vaginal discharge, absence or reduction of fetal movement, • and persistent and severe vomiting, especially after 12 weeks of gestational age.…during your pregnancy period	1. Yes 2. no	
211	Do you have a previous history of any of the following	Yes no	

	• Intrauterine demise: The mother loses the baby in the uterus. • Repeated abortions, especially in the first or the second trimester. • Preterm labour. • Anomalies in the fetus. • Severe intrauterine growth restriction (IUGR) or fetal growth restriction		
212	Was your current pregnancy planned	1. Yes 2. no	
3 Personal factors			
301	decision making autonomy		
	Who decides about health care for you?	1. Me alone 2. Jointly 3. Husband /male partner alone/others	
	Who decides on the large household purchase or sale?	1. Me alone 2. Jointly 3. Husband /male partner alone/others	
	Who decides on intra-household resource allocation/ daily household purchases?	1. Me alone 2. Jointly 3. Husband /male partner alone/others	
	Who decides on visits of family, friends, or relatives?	1. Me alone 2. Jointly 3. Husband /male partner alone/others	
	Who decides when to have an additional child?	1. Me alone 2. Jointly 3. Husband /male partner alone/others	
	Who usually decides how your partner's/husband's earnings will be used?	1. Me alone 2. Jointly 3. Husband /male partner alone/others	

	Who decides to go for ANC, PNC, where to deliver, and infant immunization?	1. Me alone 2. Jointly 3. Husband /male partner alone/others	
	Who usually decides what foods to be cooked each day?	1. Me alone 2. Jointly 3. Husband /male partner alone/others	
302	**Mothers' knowledge of ANC**		
	1. ANC can prevent complications in pregnancy?	1. Yes 2. no	
	2. Pregnant women may have problems without ANC.	1. Yes 2. no	
	3. Regular ANC medications can promote the optimal growth of an unborn child.	1. Yes 2. no	
	4. Health facility delivery is safer and better than home delivery?	1. Yes 2. no	
	5. Do you know the recommended place for delivery?	1. Yes 2. no	
	6. Do you know the recommended frequency and timing of ANC visits?	1. Yes 2. no	
	7. ANC is recommended regardless of complications.	1. Yes 2. no	
	8. Do you know the items to prepare before delivery?	1. Yes 2. no	
	9. Do know about family planning?	1. Yes 2. no	
	10. Do know about malaria prevention?	1. Yes 2. no	
303	**ATTITUDE TOWARDS ANC**		
	1. Do you agree on the importance of skilled health providers for maternity care?	1Strongly Agree 2Agree 3Disagree 4Strongly Disagree	

	2. How do you agree with the need to have a plan for possible pregnancy complications?	1Strongly Agree 2Agree 3Disagree 4Strongly Disagree	
	3. Do you agree delays in seeking care for obstetric complications contribute to maternal death?	1Strongly Agree 2Agree 3Disagree 4Strongly Disagree	
	4. How do you agree with the importance of planning the delivery place?	1Strongly Agree 2Agree 3Disagree 4Strongly Disagree	

ልጋብ 1 : (ብትግርኛክፍሊ) ቃለመጠይቅ (በትግርኛክፍሊ)

ዩንቨርሲቲመቐለኮሌጅጥዕናሳይንስነርሲንግቤትትምህርቲ

ጥዕናይሃበለይአነ……..ይባሃል አነ ዝሰርሕ ዘለኩ ምስ አብ መቀለ ዩኒቨርስቲ ከፍሊ ት/ቲ ነርሲንግ ናይ ካልኣይ ዲግሪ መፅንዓታዊ ፁሑፍ ዘካይድ ዘሎ ተመሃራይ ኣዲሱ ተስፉ እንትከውን ዕላማ ናይዚ መፅናዕቲ ኣብሆስፒታላት ማእከላይ ዞባ ዝወለዳ ኣዴታት ምስ ቅድመ-ሕርሲ ክትትል ዝተኣሳሰሩ ኣጠቓቕማን ረቒሒታትን፣ንምፅንዓ ተዕልሙ ዝተዘጋጀወ ፅንዕት ኣዩ።እቲ ዝእከብ ሓበሬታ ንሕብረተሰብ ንምምሃርን ካሎኣት ስራሓቲ ንምስራሕን ብተወሳኺ ነቲ ዋና ኣፅናዓይ ንካልኣይ ዲግሪ መማልኢ ፅሑፍ ከገልግሎ እዩ።ነዚ መፅናዕቲ ንምክያድ ዝተፈላለዩ ሕቶታት ክህልዉና እዮም።ትክክለኛ ሓበሬታ ክትህብኒ ድማ ብትሕትናእሓትት።እተን ሕቶታት ካብ 20 ክሳብ 30 ደቒቓ እየን ዝወስዳ።ኣብዚ መፅናዕቲ ብምስታፍኪ ቀጥታዊ ዝኾነ ጥቅሚ ዘይክትረኽቢ ትኽእሊ። ኮይኑ ግና እቲ ዝእከብ ሓበሬታ ኣብዝሕንፀፅ ትልሚ ግደ ክህልዮ እዩ። ኣብዚ መፅናዕቲ ብምስታፍኪ ምንም ኣይነት ሳዕቤን ኣባኺ ኣይበፅሕን።ናይ ውልቀሰባት መልሲ ዝትሓዝ ብዝወሃብ ኮድ ቁፅሪ ክኸውን ከሎ ናይ ውልቀሰብ ሽም ይኹን አድራሻ አይተሓዝን።ብዘይካ ናይቲ መፅናዕቲ ኣባላት ካሊእ ማንም ሰብ ኣይረኦን።ውፅኢት እውን ዝግለፅ ብጥቅሉል እምበር ናይ ውልቀሰባት ዝግለፅ ኣይኮነን፡ንዞም ሕቶታት ምሉእ ብምሉእ ወይ ድማ ብኽፋል ናይ ዘይምምላስ መሰልኪ ሕልዉ እዩ።እዚ ድማ ኣብ ዘድልየኪ ግልጋሎት ዝፈጥሮ ምንም ዓይነት ፅዕንቶ የለን።

ተወሳኺ ሓበሬታ እንተድልይኪ ብዝስዕብ ኣድራሻ ምጥያቕ ትኽእሊ ኢኺ።

ኣዲሱ ተስፉ ስልኪ ቁፃሪ **0921884436**

ልጋብ 2 ፃሕፍስምምዓነትኣንቀፃ (ብትግርኛክፍሊ)

አነ ከም ዝተነገረኒ እቲ መፅናዕቲ ብዛዕባ ኣብ ሆስፒታላት ማእከላይ ዞባ ዝወለዳ ኣዴታት ምስ ቅድመ ሕርሲ ዝተኣሳሰሩ ኣጠቓቕማን ረቒሒታትን ፣ ተዛምድቲ ምክንያታት ንምፅናዕ እዩ። ብተወሳኺ እዉን ካብቲ መፅናዕቲ ዝተረኽበ ዉፂኢት ንመንግስቲ፣ብጠቅላላ ንሕብረተሰብ ንዓይ ሓዊሱ ንኹሉ ተሳታፊ እዚ መፅናዕትን ከምዝጠቅም ተነጊሩኒ ኣሎ ካሊእ ድማ እዚ መፅናዕቲ እዙይ ብዝኾን ይኹን መንገዲ ንዓይ ከምዘይነድእ ተነጊሩኒን ፈሊጠ ኣለኹ ብተወሳኺ ዕላማ እዚ መፅናዕቲ ንምግንዛብ እኹል ግዜ ከም ዝተዋሃበኒ ከምኡ እዉን ንምስታፍ ወይ እዉን ንዘይምስታፍ ምሉእ መሰል ከም ዘለኒ ተረዲአ ኣለኹ ቃለመጠይቅ ኣብ ዝግበረለይ ግዜ ኣብ ቃለ መሕትት ዝፀንሓሉ ግዜ ካብ 20 ክሳብ 30 ደቒቓ ዘይበልፅ ምኺኑፈሊጠእየ።ካሊእ ድማ ኣብዚ መፅናዕቲ ወይ ቃለመሕትት ንምስታፍ ኣብ ድሌት ዝተመስረተ ምኺኑ ኣብ ዝኾነ ይኹን ግዜ ካብቲ መፅናዕቲ ወይ ቃለ-መሕትት ናይ ምዉፃእ ምሉእ መሰል ከም ዘለኒ ተነጊሩኒ ፈሊጠ ኣለኹ።ብተወሳኺ ኣብዚ ቃለ መሕትት ብዘይ ምስታፈይ ዝኾነ ይኹን ተፅዕኖ ከምዘይበፅሓኒ ኣረጋጊፀኣለኹ።ብካሊእ ወገን ድማ እቲ ዝተኣከበ ሓበሬታ ብዘይ ናተይ ፍቓድ ናብ ካሊእ ከም ዘይወፅእ ተነጊሩኒ እዩ።ብተወሳኺ ዝኾነ ይኹን ዘይበረሀለይ ነገር ንኽሓትት ምሉእ መሰል ከም ዘለኒ ተነጊሩኒ ኣሎ።

ፌርማ _____ ዕለት____ _ታራ.ቁፅሪ ቃለ መጠየቅ ዝተገበረሉ

እዚ መፅንዓቲ ዓላማ ብዝግባእ ግልፂ ብዝኮነ ቋንቋ ተረዲአ ቦዚ መሰረት ናይ መፃንዓቲ ዓላማ ስለዝተረደኣኒ ንምስታፍ ውሳነይ በዚ መሰረት የራጋግፃ።

ፊርማ _____ መዓልቲ _____

አስትውዑሉ፤ተሳታፊ በግደታ ኣብዚመፅናዕቲ ክሳተፉ ኣይግደዳን።

ቀዳማይ ክፋል፡ማሕበረ-ዲሞግራፊኩነታትተሳተፍቲ			
ተ .ቁ	ሕቶታት	መልሲ	መብርሂ
101	ዕድመኣይ?	…….	
102	ኣበይ ኢኻ ትነብሪ፧	1. ከተማ 2. ገጠር	
103	እንታይ ዓይነት ሃይማኖት ኢኺትኽተሊ	1. ኦርቶዶክስ 2. ሙስሊም 3. ካቶሊክ 4. ፕሮቴስታንት	
104	ደረጃ ትምህርቲ?	1. ስሩዕ ትምህርቲ ዘይተምሃረት 2. ቀዳማይ ብርኪ 3. ካልኣይ ብርኪ 4. ዲፕሎማን ልዕሊኡን	
105	እንታይ ዓይነት ስራሕ ትሰርሒ?	1. ናይ ቤትእመቤት 2. ተቐጺራ ትሰርሕ 3. ሓረስታይ 4. ካሊእ(ትከሲ)	
106	ኩነታት ሓዳር?	1. .ዘይተመረዐወት 2. በዓልቲ ሓዳር 3. ሰብኣያዝሞታ 4. ዝተፋተሐት	
107	ናይመራኸቢ(መጽሔት፣ሬድዮ፣ተለቪዥን) እንተወሓደ ኣብ ሰሙን ሓደ ግዜ ትከታተሊ ዶ	1. እወ 2. ኣይፋል	
108	ስራሕ በዓልቤትኪ/መጻምድቲ እንታይ እዩ፣	1. ተቐጺሩ ዝሰርሕ 2. ነጋዳይ 3. ሓረስታይ 4. ካሊኣ	
109	ደረጃትምህርቲበዓልቤትኪ/መጻምድቲ	1. ስሩዕትምህርቲ ዘይተምሃረ 2. ቀዳማይብርኪ 3. ካልኣይ ብርኪ 4. ዲፕሎማን ልዕሊኡን	
ካልኣይ ክፋል: ምስ ሰነ ተዋልዶን ትካል ጥዕና ተዛመድቲ ረቐሒታት			
201	ናይ መወዳእታ ወርሓዊ ዕግያት ዝራእክሉ መዓዝ ነይሩ?	….ዕለት /….ወርሒ / …ዓ/ም	

202	ዕድመ ናይ እዚ ጥንሲ/ ዕሸል/ ክንደይ ገይሩ ብ ሰሙን?	.....ሰሙን	ብመሰረት ቁ 202 አስልሕዎ ወይ አልትራሳውንድ ውፂእት ይራአዩ
203	ቅድመ ወሊድ ክትትል/ምርመራ/ ትገብሪ ዶ ነይርኪ?	1. እወ 2. አይፋሉን	
204	ክንደይግዜ ተኸታቲልኪ	.....	
205	ናብቲ ኣብ ቀረባኪ ዝርከብ ትካል ጥዕና ንምብፃ ክንደይ ግዜ ይወስድ	.....ደቒቓ	
206	ናብ ትካል ጥዕና እትኸዱሉ ኣገባብ መጓዓዝያ እንታይ እዩ	1. 1 ብእግሪምጉዓዝ 2. 2ብመኪና/ተክካሪ 3. 3 ካልእ(ጥቀሲ)	
207	ኣብ ኣየናይ ሰሙን ናይቲ ጥንሲ ኢኻ ንናይ ቀረባ እዋን ጥንሲ ግልጋሎት ክትትል ጥንሲ ጀሚርኪ	1. ቅድሚ 12 ሰሙን 2. ደሕሪ 12 ሰሙን	
208	ክንደይ ግዜ ጠንስኪ	.....	
209	ቅድሚ ሕጂ ናይ ቅድሚ ሕርሲ ክትትል ግልጋሎት ታሪኽ ኣለካ ድዩ	1. እወ 2. አይፋሉን	
210	ኣብ ናይ ሕዚ ጥንሲ ካብዞም ዝስዕቡ ናይ ጥንሲ ሓደጋ ምልክት ዋላ ሓደ ኣጋጢሙኪ ድዩ • ከቢድምፍሳስደም ርሕሚ፣ሕበጥ ኢድ ወይ ገጽ፣ • ድብዝዝ ምርኣይ፣ . • ቀጻሊ ሕማም ርእሲ ቅድሚት ወይ ድሕሪት፣ • ዝተቐየረ ንቐሓት፣ . • ዘይንቡር ምንቅስቓስ ኣካላት (ምንቅጥቃጥ)፣ . • ከቢድ ቃንዛ ከብዲ. • ምንቅስቓስ ዕሸል ዘይምህላው ወይ ምንካይ፣ • ቀጻልን ከቢድን ተምላስ፣ . • ብፍላይ ድሕሪ 12 ሰሙን ዕድመ ጥንሲ	1. እወ 2. አይፋሉን	
211	ቅድሚ ሕጂ ካብዞም ዝስዕቡ ታሪኽ ኣለኪ ዶ	1. እወ	

	• ተደጋጋሚ ምንጻል ጥንሲ • ቅድሚ ግዜኡ ዝውለድ ዕሸል ። • ኣብ ዕሸል ዝፍጠር ምዝንባዕ። • ኣብ ውሽጢ ሓደ ወርሒ ሓድሽ ዝተወልደ ህጻን ሞት • ከቢድ ምድራት ዕብየት ዕሸል	**2.** ኣይፋሉን	
212	ናይ ሕዚ ጥንሲ ዝተተለመ ድዩ	1. እወ 2. ኣይፋሉን	
	ሳልሳይክፋል፡ውልቃዊረኞሒታት		
201	**ዓርሰ-ምሕደራ**		
	1. ብዛዕባ ክንክን ጥዕና መን ይውስነልኪ?	1. ኣነበይነይ 2. ብሓባር 3. ሰብኣይ /ተባዕታይመጻምድቲበይኑ/ካልኦት	
	2. ነቲ ዓበይቲ ናይ ገዛ ዕደጋ ወይ ምሻጥ መን ይውስን?	1. ኣነበይነይ 2. ብሓባር 3. ሰብኣይ /ተባዕታይመጻምድቲበይኑ/ካልኦት	
	3. ኣብ ውሽጢ ስድራ ቤት ዝግበር ምሕደራ ሃፍቲ/ መዓልታዊ ዕደጋ ገዛ መን ይውስን? 4.	1. ኣነበይነይ 2. ብሓባር 3. ሰብኣይ /ተባዕታይመጻምድቲበይኑ/ካልኦት	
	4. ናብ ምብጻሕ ስድራቤት፡ፈተውቲ ወይ ኣዝማድ መን እዩ ዚውስን?	1. ኣነበይነይ 2. ብሓባር 3. ሰብኣይ /ተባዕታይመጻምድቲበይኑ/ካልኦት	
	5. ተወሳኺ ቆልዓ መዓዝ ከም ዝውለድ መን ይውስን?	1. ኣነበይነይ 2. ብሓባር	

		3. ሰብኣይ /ተባዕታይመጻምድቲበይኑ/ካልኦት	
	6. መብዛሕትኡ ግዜ መን'ዩ ኣታዊታት መጻምድትኪ/ሰብኣይኪ ብኽመይ ከምትጥቀመሉ ዝውስን?	1. ኣነበይነይ 2. ብሓባር 3. ሰብኣይ /ተባዕታይመጻምድቲበይኑ/ካልኦት	
	7. መን እዩ ክትትል ቅድመ ወሊድ፡ ክትትል ድህረ ወሊድ፡ኣበይ ከም ዝወልድ፡ከምኡ'ው ንንኽታበት ዕሸላት ዝውስን?	1. ኣነበይነይ 2. ብሓባር 3. ሰብኣይ /ተባዕታይመጻምድቲበይኑ/ካልኦት	
	8. መብዛሕትኡ ግዜ ኣብ ነፍሲ ወከፍ መዓልቲ እንታይ ዓይነት ምግብታት ከም ዝበስል ዚውስን መን እዩ፧	1. ኣነበይነይ 2. ብሓባር 3. ሰብኣይ /ተባዕታይመጻምድቲበይኑ/ካልኦት	
302	**ፍልጠት ኣዴታት ኣብ ኣገዳስነት ኣገልግሎት ክንክን ቅድመ ሕርሲ**		
	1. ቅድመ ሕርሲ ዝግበር ክትትል ኣብ ጥንሲ ንዝፍጠር ጸገማት ከከላኽል ይኽእል ዶ?	1. እወ 2. ኣይፋልን	
	2. ነፍሰጾራት ደቂ ኣንስትዮ ብዘይ ቅድመ ሕርሲ ክትትል ጸገማት ክህልወን ይኽእል ዶ።	1. እወ 2. ኣይፋልን	
	3. ስሩዕ መድሃኒታት ቅድመ ሕርሲ ንዝበለጸ ዕብየት ናይቲ ኣብ ከብዲ ዘሎ ህጻን ከደንፍዕ ይኽእል ዶ?	1. እወ 2. ኣይፋልን	
	4. ኣብ ትካል ጥዕና ዝግበር ሕርሲካብ ኣብ ገዛ ዝግበር ሕርሲ ዝሓሸ ድዩ?	1. እወ 2. ኣይፋልን	
	5. ንመውለዲ ዝምከር ቦታ ትፈልጢ ዶ?	1. እወ 2. ኣይፋልን	
	6. ሓንቲ ኣዶ ቅደሚ ምሕራሳ ከንደይ ግዜ ቅድሚ ሕርሲ ክትትልከትግበረ ከመዘለዋን መዓዝ ክትትል ከትጅምር ከመዘለዋን ተፍለጢ ዶ	1. እወ 2. ኣይፋልን	
	7. ክትትል ቅድሚ ሕርሲ ኣብ ጥንሲ ንዘጋጠም ጸገማት ብዘየግድስ ይምከር ዶ?	1. እወ 2. ኣይፋልን	
	8. ቅድሚ ሕረሲምብጻሑ ክትዳለዉሉ ዘለኪ ነገራት ትፈልጢ ዶ?	1. እወ 2. ኣይፋልን	

	9. ብዛዕባ ውጥን ስድራ ቤት ኣፍልጦ ኣለኪ ድዩ?	1. እወ 2. ኣይፋልን	
	10. ብዛዕባ ምክልኻል ዓሶ ኣፍልጦ ኣለኪ ዶ?	1. እወ 2. ኣይፋልን	
303	**ኣዴታት ኣብ ኣገልግሎት ክትትል ቅድመ ሕርሲ ዘለወን ኣተሓሳስባ**		
	1. ንኣገዳስነት ክኢላታት ወሃብቲ ጥዕና ኣብ ክትትል ቅድሚ ሕርሲ ትሰማምዲዶ?	1. ኣትሪረይሰማማዕ 2. ይስማዕማዕ 3. ኣይሰማምዑን። 4. ብትሪኣይሰማማዕንእየ	
	2. ኣድላይነት መደብ ምህላው ኣብ ክህሉ ዝኽእል ጸገም ጥንሲ ትሰማምዑሉ ዶ ?	1. ኣትሪረ ይሰማማዕ 2. ይስማዕማዕ 3. ኣይሰማምዑን። 4. ብትሪ ኣይሰማማዕን እየ	
	3. ኣብ እዋን ጥንስን ሕርስን ንዘጋጥሙ ጸገማት ብእዋኑ ሕክምና ዘይምረካብ ኣብ ሞት ኣዴታት ኣበርክቶ ከም ዘለዎ ትሰማምዲ ዶ?	1. ኣትሪረ ይሰማማዕ 2. ይስማዕማዕ 3. ኣይሰማምዑን። 4. ብትሪ ኣይሰማማዕን እየ	
	4. ኣገዳስነት ምውጣን መውለዲ ቦታ ትሰማምዑሉ ዶ?	1. ኣትሪረ ይሰማማዕ 2. ይስማዕማዕ 3. ኣይሰማምዑን። 4. ብትሪ ኣይሰማማዕን እየ	