SALALE UNIVERSITY
COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF PUBLIC HEALTH
UTILIZATION OF ANTENATAL CARE EIGHT CONTACTS AND ASSOCIATED FACTORS AMONG MOTHERS WHO GAVE BIRTH IN THE LAST SIX MONTHS IN NORTH SHOA ZONE, OROMIA REGION, ETHIOPIA, 2024

BY:-BERHANU KEFENI (BSc in Public Health)

A RESEARCH THESIS TO BE SUMMITTED TO SALALE UNIVERSITY COLLEGE OF HEALTH SCIENCE DEPARTMENT OF PUBLIC HEALTH IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR DEGREE OF MASTER'S OF MPH IN EPIDEMIOLOGY

DECEMBER, 2024
FITCHE ETHIOPIA

UTILIZATION OF ANTENATAL CARE EIGHT CONTACT AND ASSOCIATED FACTORS AMONG MOTHERS GAVE BIRTH IN THE LAST SIX MONTHS IN NORTH SHEWA ZONE, OROMIA REGION, ETHIOPIA, 2024: COMMUNITY BASED CROSS-SECTIONAL STUDY

BY: BERHANU KEFENI (BSc in Public Health)

ADVISORS:

MAJOR ADVISOR: Mr QARO QANCHE (MPH)

CO-ADVISOR: Ms HIWOT DAJANE (MPH)

DECEMBER, 2024

FICHE, ETHIOPIA

Approved by the board of examiners

The thesis entitled, utilization of antenatal care eight contacts and associated factors among mothers who gave birth in the last six months in North Shoa Zone, Oromia Region, Ethiopia. This study was conducted at Salale University by Berhanu Kefeni Bedada and the title has been approved by the concerned bodies of Salale University for the partial fulfilment of the requirements for the masters of public health in epidemiology

Advisor

_____Qaro Qanche_____   **06/12/2024**

Full name   Signature   Date

Advisor

_____Hiwot Dejene_____   **09/12/2024**

Full name   Signature   Date

External examiner

_____   _____   _____

Full name   Signature   Date

Internal Examiner

_____   _____   _____

Full name   Signature   Date

Chairman

_____   _____   _____

Full name   Signature   Date

Acknowledgement

ABSTRACT

Background:- Maternal health outcomes depends on utilization of recommended antenatal care. However, in sub-Saharan countries, including Ethiopia, the coverage of recommended antenatal care is low. The World Health Organization recommends eight antenatal care contacts, but there is little evidence on their uptake. This study assesses the utilization of antenatal care eight contacts and associated factors in North Shoa Zone.

Objective: - To assess utilization of antenatal care eight contact and its associated factors among mothers gave birth in the last six month in North Shoa, Oromia, Ethiopia, in 2024.

Methods:- A community based cross-sectional study was conducted from March to May, 2024 involving 635 mothers gave birth in the last six months who were randomly selected. Data were collected through interview based semi structured questionnaire. Epi-data version 4.6 and SPSS 25 facilitated data entry and analysis. Binary and multiple logistic regressions were performed, reporting adjusted odd ratio (AOR) with a 95% confidence interval (CI).

Results:-The response rate of the study participants was 98.3%. Utilization of antenatal care 8 contacts in North Shoa Zone was 17.15%, (95% CI: 14.3 -20.3). Being in age >35years (AOR=4.29, 95% CI: 1.22-15.09). Being age range of 25 – 29 and 30-34 years (AOR = 2.93, 95%CI: 1.01-8.56) and (AOR = 10.70, 95% CI: 3.31-17.36) respectively. Having planned pregnancy (AOR=1.90, 95%CI: 1.12-3.27). Booking in <12 weeks of gestation (AOR=3.90, 95%CI: 1.87-6.15). Attending primary and diploma and above (AOR=1.32, 95% CI: 1.01- 2.58) and (AOR=1.45, 95%CI: 1.10, 2.65) respectively. Residing in urban areas (AOR=4.29 (2.17-8.49) and travelling more than 1-3 hours to reach the health facility (AOR = 0.04, 95% CI: 0.06-0.47) have significant association with utilization of ANC 8 contacts.

Conclusion:- The coverage of ANC eight contacts was low and can be influenced by the factors like maternal age, maternal education, planned pregnancy, residence, ANC booking time and distance from nearest facility. Therefore, Strategic interventions to address the identified barriers are essential to improve service utilization in line with recommended guidelines in the area.

Keywords:-utilization, eight ANC contact, associated factors, Ethiopia.

Table of contents

Contents

LIST OF FIGURE

LIST OF TABLES

ACRONYMS / ABBREVIATION

ANC	Antenatal Care
AOR	Adjusted Odd Ratio
CI	Confidence Interval
COR	Crude Odd ratio
EDHS	Ethiopian Demographic and Health Survey
ETB	Ethiopian Birr
EPI	Expanded programme on immunization
FANC	Focused Antenatal Care
FMOH	Federal ministry of health
HEW	Health Extension Worker
AIDS	Acquired Immune Deficiency syndrome
HIV	Human Immune virus
MCH	Maternal-Child-Health
MMR	Maternal mortality rate
STI	Sexually transmitted diseases
SDG	Sustainable development goal
WHO	World Health Organization
UHEW	urban health extension worker
UHC	Universal health coverage

1. INTRODUCTION

1.1 Background

Antenatal care (ANC)for pregnant women by health professionals maintains women's health during pregnancy and improves pregnancy outcomes by identifying and managing pregnancy related complications and ANC visits are a platform for delivery of evidence-based clinical interventions, counselling on maternal health, birth and emergency preparedness(1).

The 2016 ANC guidelines include a significant new recommendation that pregnant women have eight contacts with the health care providers during each pregnancy for ANC care and/or counselling sessions for pregnant women at the household and community levels(2).

The World Health Organization (WHO) has recommended the four-visit focused ANC model since 2002, which recommends at least four visits, but an updated version with eight ANC contacts was released in 2016 that calls for ANC contacts before 12 weeks of gestation. The word "visit" in the previous model has now changed to "contact" to indicate an active interaction between a pregnant woman and a healthcare provider(3) And the new model is being implemented since Ethiopia adopted the new recommendation and incorporated it in the management protocol for health facility in 2021(4).

The uptake of adequate ANC contacts is influenced by several factors such as socioeconomic factors, maternal age, educational level, intended pregnancies, women's enlightenment and timing of first ANC visit. In addition, exposure to media, family income, and obstetric service accessibility have been linked to higher prenatal care service uptake(5).

WHO recommended that pregnant women in developing countries should seek ANC within the first three months of pregnancy for early identification of active tuberculosis (TB), nutrition status, immunization against tetanus, human immune virus/acquired immune deficiency syndrome (HIV/AIDS), sexually transmitted infections (STIs), for ultrasound (up to 24 weeks of gestation), and hepatitis B surface antigens the antenatal period represents an important opportunity(6).

The timing of antenatal care appointments is one of the fundamental elements of ANC services and helps in the early detection, management, and prevention of problems that occur during pregnancy. Additionally, the ANC model that recommends increasing the number of contacts from four to eight, with the aim of reducing prenatal mortality and improving women's experience of care(7).

Antenatal care sessions 8 contact is care that a pregnant woman receives at least eight times per pregnancy by health care providers. The first ANC contact was with in 12th week of pregnancy, twice in the second trimester (weeks 20 and 26), and Five contacts in the third trimester (weeks 30, 34, 36, 38 and 40 weeks of gestation. This newly issued recommendation for ANC 8 contacts aims to achieve better maternal, fetal and neonatal health outcomes(8).

1.2 Statement of problem

Globally in 2015 World Health Organization (WHO) estimates that 302,000 maternal deaths occurred as result of pregnancy and childbirth-related complications each year, with 99% of these deaths occurring in developing countries(9).

In 2016, WHO recommended increasing the frequency of contacts between pregnant mothers ANCs and health professionals from four to eight times, this is seen as a potential strategy to reduce maternal mortality by up to 8 deaths per 1,000 live births, and this recommendation is particularly relevant to preventative measures such as early detection of danger signs, reduced complications and closing healthcare disparities. It is believed that it will be useful for implementation in rural and marginalized areas. This policy may increase the likelihood of improved utilization of maternal and child health services such as nutritional guidance, blood tests, use of intermittent prophylactic therapy during pregnancy, and tetanus vaccination(5)

With sub-Saharan Africa alone accounting for roughly 66% (201 000), followed by Southern Asia (66,000). With sub-Saharan Africa, the estimated maternal mortality ratio is 500 per 100,000 live births. More than 60% of all maternal deaths were contributed by ten countries; Ethiopia is one of them(10).

In Ethiopia, according to EDHS 2016 maternal mortality ratio is estimated about 412 deaths per 100,000 life birth. The Sustainable Development Goals target a global maternal mortality ratio not greater than 70 maternal deaths per 100,000 live births by 2030.In Ethiopia, even if there is improvement in maternal health care service utilization including antenatal care, most of the women did not attend minimum number of visit recommended by World Health Organization(6).

According to EDHS 2019 report 43% of women attend antenatal care at least four during their pregnancy so these finding indicates the country needs more effort to improve the coverage of adequate ANC(11).

Maternal mortality in low-income areas can be significantly reduced by improving access to skilled health professionals which are closely associated with ANC and emergency obstetric care. Despite the clear importance of obstetric care, including ANC, poor access to and underutilization of such services remains a key determinant of maternal mortality and morbidity worldwide(12).

EDHS 2019 showed that there were large differences in the utilization of antenatal care services depending on the residence. Women in Addis Ababa were most likely to use antenatal care (97%) and lowest in Somali (30%).women in urban areas (85%) and rural women (75%)(13).

Pregnant women are at risk for pregnancy-related complications. To prevent problems and enable early detection of disease and complication of pregnancy a pregnant woman should follow WHO recommended antenatal care for her eight contacts(3). Even though early initiation of ANC is essential, most of pregnant women in Ethiopia begin their first ANC visit in the second and third trimester of pregnancy(4).

To my knowledge, this research is the first of its kind to look at the prevalence and potential factors to the uptake of eight or more ANC contacts in North Shoa Zone, Therefore, assessment of utilization of antenatal care eight contact and its associated factors has a major public health importance to come up with strategies that could escalate maternal health outcome, ANC service provision and completion of ANC schedule(14).

1.3. Significance and Justification of the study

Although Ethiopia has shown remarkable achievements in reducing maternal mortality in the last 10 years, the prevalence of utilization of recommended antenatal care (ANC) is still low in the country(15)

Every pregnant woman is at risk of pregnancy-related complication. To obviate and allow early detection of problems, pregnant women should start ANC within 12weeks of pregnancy and follow recommended schedule for up to eight contact(10).

The present study will be contributed for utilization of ANC eight contact and will be provided more information for any intervening organization. The results of this study will have positive contribution for health care providers, educators and researchers, to improve or strengthen policies related to provision of ANC 8 contact. The study will be hopeful to be used as base line information for concerned governmental bodies, nongovernmental organizations or health service providers to plan and act in motivating women to use ANC earlier starting from the first trimester (<12weeks of gestation) for at least eight contacts in accordance with the WHO recommendation so that maternal and infant mortality and morbidity shall be reduced. Moreover, assumed that information obtained from this study will be update knowledge in the area of maternal and child health and the findings might be help to enhance family and social support system for pregnant women in communities. This study is largely pioneering, lays the groundwork for further research in the North Shoa Zone.

In general, information obtained on reasons behind Utilization of ANC eight contact by some pregnant women, are aimed at encouraging pregnant women to make their ANC contact eight times according to recommendation by FMOH as well as WHO.

2. LITERATURE REVIEW

2.1 Antenatal care

World Health Organization (WHO) estimates that about 302,000 women die worldwide every year in connection with pregnancy and childbirth. Nearly all (99 %) maternal, newborn, and child deaths occur in low and middle income countries. Maternal health also affects the health of the Newborn infant in addition Low birth weight is a reflection of maternal ill health and nutritional status during pregnancy, which results in a significant neonatal morbidity (16).

Sub-Saharan Africa had the highest maternal mortality rate (MMR) at 500 maternal deaths per 100,000 live births. Ethiopia is one of the few countries that account for most of the maternal deaths; others include India, Nigeria, Democratic Republic of the Congo, Pakistan, Sudan, and Indonesia(17).

The study conducted in Benin revealed that after about 3 years of the launch of WHO minimum of 8 ANC contacts model, only 8.0% of women had at least 8 ANC contacts with the health care providers throughout the period of their pregnancy (18) .Study conducted in Ghana estimated a 41.9% prevalence of eight or more ANC contacts among women of reproductive age. The higher prevalence of eight ANC or more contacts may be as a result of the improvement in maternal and child health seen in Ghana in recent years(19).

Ethiopia as one of the sub-Sahara country maternal care is extremely poor. According to EDHS 2016 only 62% of women received antenatal care from a skilled provider,32% made four or more antenatal care visits during the course of her pregnancy (12).

Study in Arba Minch 2015 revealed that 82.6% of the pregnant women initiated antenatal care at or after four months of gestation and This might be due to sociodemographic, economic, and Household income is also one of the factors significantly associated with antenatal care and Pregnant women who had low household monthly income is 5 times more likely to book late for their first ANC as compared to their counterparts with high monthly income(15).

WHO previously recommended that pregnant women complete at least four ANC visit, However, new guidelines from the WHO ANC Model (2016) increase the recommended number of contacts a pregnant woman has with health providers throughout her pregnancy from four to eight visits, and future programs should consider measuring based on these guidelines(20)

The prevalence of optimal antenatal care visits is found to be low, i.e., approximately three in five women continued to utilize optimal antenatal care, Maternal education, home visiting by health extension workers, and ANC booking In less than 12 weeks of gestation, mass-media

exposure, planned pregnancy, parity, having medical or pregnancy-related conditions, and access to transportation to reach health facilities and women's education is also predictors of inadequate utilization of optimal antenatal care(21)

World Health Organization issued a new series of recommendations in 2016 in order to improve quality of antenatal care, reduce the risk of stillbirths and pregnancy complications, and give women a positive pregnancy experience. The recommended interventions span five categories: routine antenatal nutrition, maternal and fetal assessment, preventive measures, interventions for management of common physiologic symptoms in pregnancy, and health system-level interventions to improve the utilization and quality of ANC. The 2016 WHO ANC guidance increases the number of contacts a pregnant woman has with health providers throughout her pregnancy from at least four to at least eight contacts: one contact in the first trimester, two contacts in the second trimester, and five contacts in the third trimester(22).

2.2 Factors affecting utilization of antenatal care

Study in Bangladesh showed that Mothers from the urban areas were 1.82 times more likely to receive the WHO recommended ANC contacts than their rural counterparts and Women with primary and higher levels of education were more likely to comply with the WHO recommended ANC contacts than women with no education(23). Increased educational level increases women's received optimal ANC visits(24).

Mothers aged 25-34 years old at the time of birth of the child were more likely to have eight or more ANC visits and higher mean of the frequency of ANC visits than their youngers (aged <24 years) and older (aged 35 and above)counterparts(25).

Mother's parity showed significant negative association with both the mean of ANC visits and the proportion of at least eight ANC visit. The coverage of eight or more ANC visits was found to be 7.8% among the mothers with parity one, compared to 2.5% among the mothers with parity four or more(22).

A community based cross-sectional study conducted in East Wollega Zone, Ethiopia indicate that those women whose husband's occupation other than farming were nearly twice more likely to use ANC service as compared to those farmer's wives and also those who were located at a walking time of <30 min to the nearest health facility were nearly two times more likely to use ANC service as compared to those located at a waking time of ≥ 60 min(26)

The result of the study in Northwest Ethiopia, Debre Tabor Town indicates that Mothers who experienced stillbirth before recent pregnancy were more likely to utilize antenatal care than those didn't encountered any yet and also planned pregnancy was found to be significantly associated with the utilization of ANC. Pregnant women whose have planned pregnancy were four times more likely to use focused antenatal care service when compared to those having unplanned pregnancy(14)

Analysis of 2016 Ethiopia demographic health survey revealed that women who start ANC after 12 weeks of gestation are less likely to have adequate ANC visits than those who start before 12 weeks of gestation(27). This may be because early ANC initiation leads to more visits, which improves the likelihood that women will receive information on reproductive health, from healthcare profession(28). Optimal ANC utilization is reduced by 29% for Protestants and 48% for Catholic & traditional as compared to Orthodox Christian followers(29)

The ability to fully utilize ANC services in developing countries is affected by a number of factors like ANC services and demographic factors, knowledge of the importance of ANC services and previous obstetric history (30).

Though WHO recommended that the first antenatal visit should occur within the first three months of pregnancy, only one-third started their ANC within the recommended time. Among the women who had not utilized ANC, the major reasons for not utilizing ANC were lack of awareness about ANC, distance from health facility those who have taken health education on maternal health were more likely to use ANC service. This could be explained by the fact that to those who have taken health education on maternal health will have knowledge and awareness about the advantages of the interventions and pregnancy related risk(26).

Research conducted in Africa indicates that access to ANC varies according on residential settings. Lack of transportation, lack of skilled staff, long wait times, and limited information availability could all be determinants for women living in rural areas. On the other hand, having better access to public and private healthcare facilities and mass media exposure for knowledge, is more common in urban areas(31).
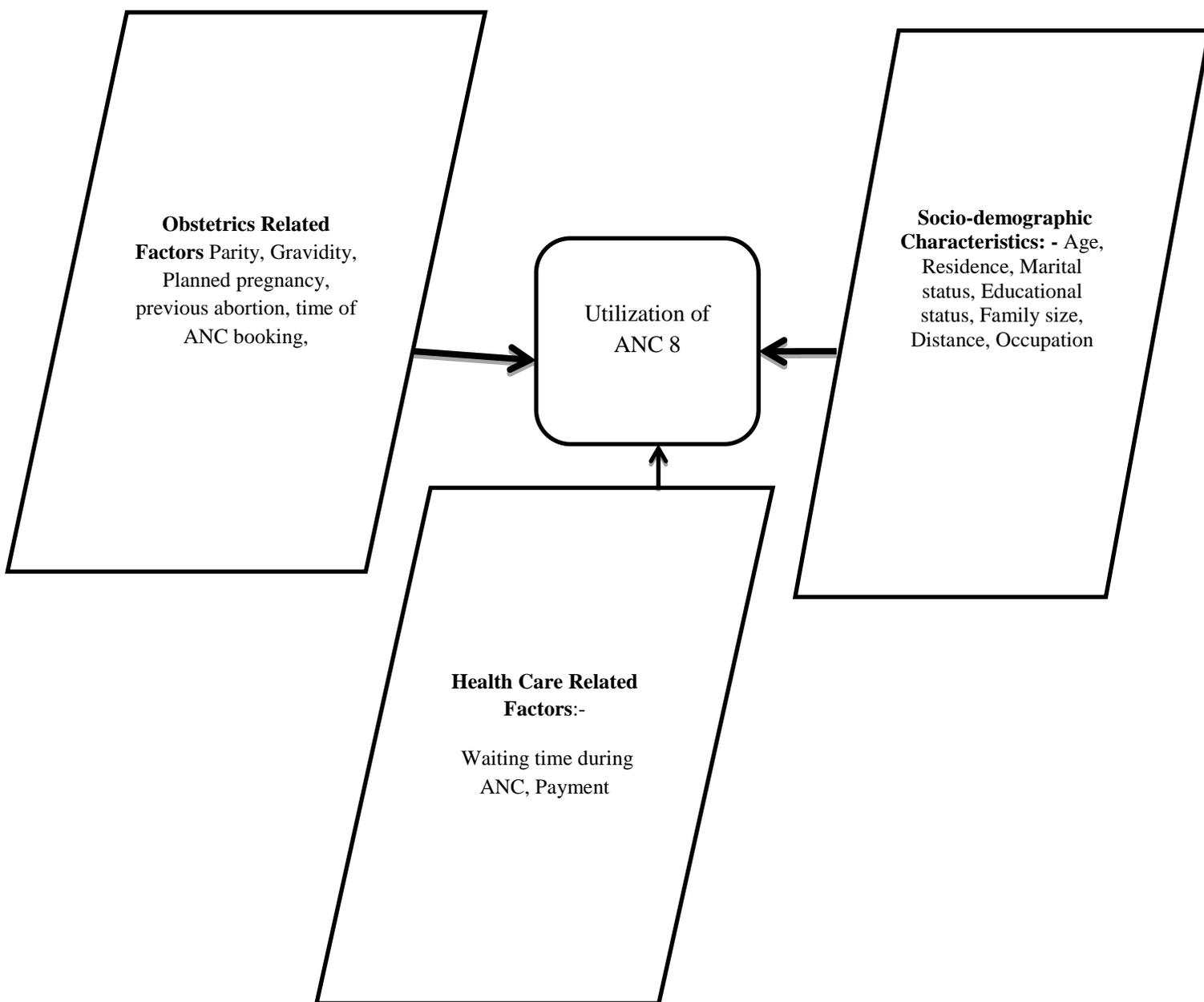
Figure 1:-Conceptual Frame work of factors Associated with Utilization of ANC eight contact adapted from different literatures (26,31–35)

3. OBJECTIVES OF THE STUDY

3.1 General objective

- To assess utilization of antenatal care eight contact and its associated factors among mother who gave birth in the last six month in North Shoa, Oromia, Ethiopia, in 2024

3.2 Specific objectives

- To determine the magnitude of utilization of antenatal care eight contact among mother who gave birth in the last six month in North Shoa, Oromia, Ethiopia, in 2024.

- To identify factors associated with utilization of antenatal care eight contacts among mother who gave birth in the last six month in North Shoa, Oromia, Ethiopia, in 2024.

4. Methods

4.1. Study area and period

The study was conducted in North Shoa Zone of Oromia Regional State. The zone's capital town is Fiche which located at a distance of 112 km from Addis Ababa in north direction. North Shoa is surrounded by Amhara regional state in North and East, Shegar City in South and West Shoa zone in the West. The zone has fourteen woreda and three administrative towns namely: Abichu, Alaltu, Debra Libanos, Degam, Dera, G/Jarso, Hidabu Abote, Jida, Qimbibit, Kuyu, Warajarso, Wachale Yaya Gullale, Sululta, Mulo, Berak, G/Guracha town, Fitche town, and Canco town. North Shoa Zone has the total population of 2,025,370 where 1,032,939 are female and from which 70,280 are pregnant mothers(36). Eighty-eight percent (1, 782326) North Shoa population is living in rural and 12 % (243044) is living in urban. The North Shoa Zone has 5 hospitals, 74 health center and 306 health posts and it has 49 medium clinics, 55 primary clinics, 7 dental clinics, 64 drug store, 5 pharmacies, traditional medicine 3, and ophthalmic clinic 1(36). The study was conducted from March 2024 to May 2024.

4.2. Study design

A community-based cross-sectional study was employed.

4.3 Population

4.3.1. Source population

All mothers who gave birth in the last six months in North Shoa Zone.

4.3.2 Study population

All selected eligible women who gave birth in the last six months.

4.4 Inclusion and Exclusion

4.4.1 Inclusion criteria

Al l women who gave birth in the last six months and living in randomly selected district.

4.4.2 Exclusion criteria

Mother who cannot able to communicate and seriously ill or women who are unable to speak will be excluded from the study.

4.5. Sample size Determination

The sample size (n) for objective was determined based on a single population proportion formula with the following assumptions. 50% proportion of eight ANC contact utilization, margin of error (d) 5% and 95% confidence interval.

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

$$= \frac{(1.96)^2\,(0.5)\,(0.5)}{(0.05)^2}$$

$$= 384$$

By considering 10 % non-response rate and design effect of 1.5, the final sample size is 635. By considering design effect of   where as

- n= required sample size
- Z= critical value for normal distribution at 95% confidence interval which equals to 1.96
- Prevalence (P) = proportion of utilization of ANC eight contact
- Precision (d) = 0.05 (5% margin of error)

4.6. Sampling technique

A multi stage sampling technique was used. On the first stage, out of sixteen rural woreda in the zone, four woreda were selected by using simple random sampling approach (lottery method). On the second stage, out of three towns, one town was selected by lottery method. Then kebeles of selected woreda and town where identified and some of them selected by random methods. Then after, a list of house hold with woman gave birth less than six months were taken from updated community health information system (CHIS) register in each selected kebeles.

Then the total sample size was allocated proportionally to the selected kebeles based on the number of women who gave birth last six months. Then simple random sampling methods were used to select the study participants from each selected kebele using a family folder as a sampling frame

Schematic presentation of sampling procedure

North Shoa zone (16 districts and 3 town)

3 Towns **16 districts**

Simple random sampling

| Fiche town 1kebele | Sululta woreda 6 kebeles | Abichu gna 'a 5 kebeles | Debra lebanous 4 kebeles | Wachale 8 kebeles |

Simple Random Sampling

| N=400 n=100 | N=496 n=124 | N=572 n=143 | N=472 n=118 | N=600 n=150 |

Total sample-635
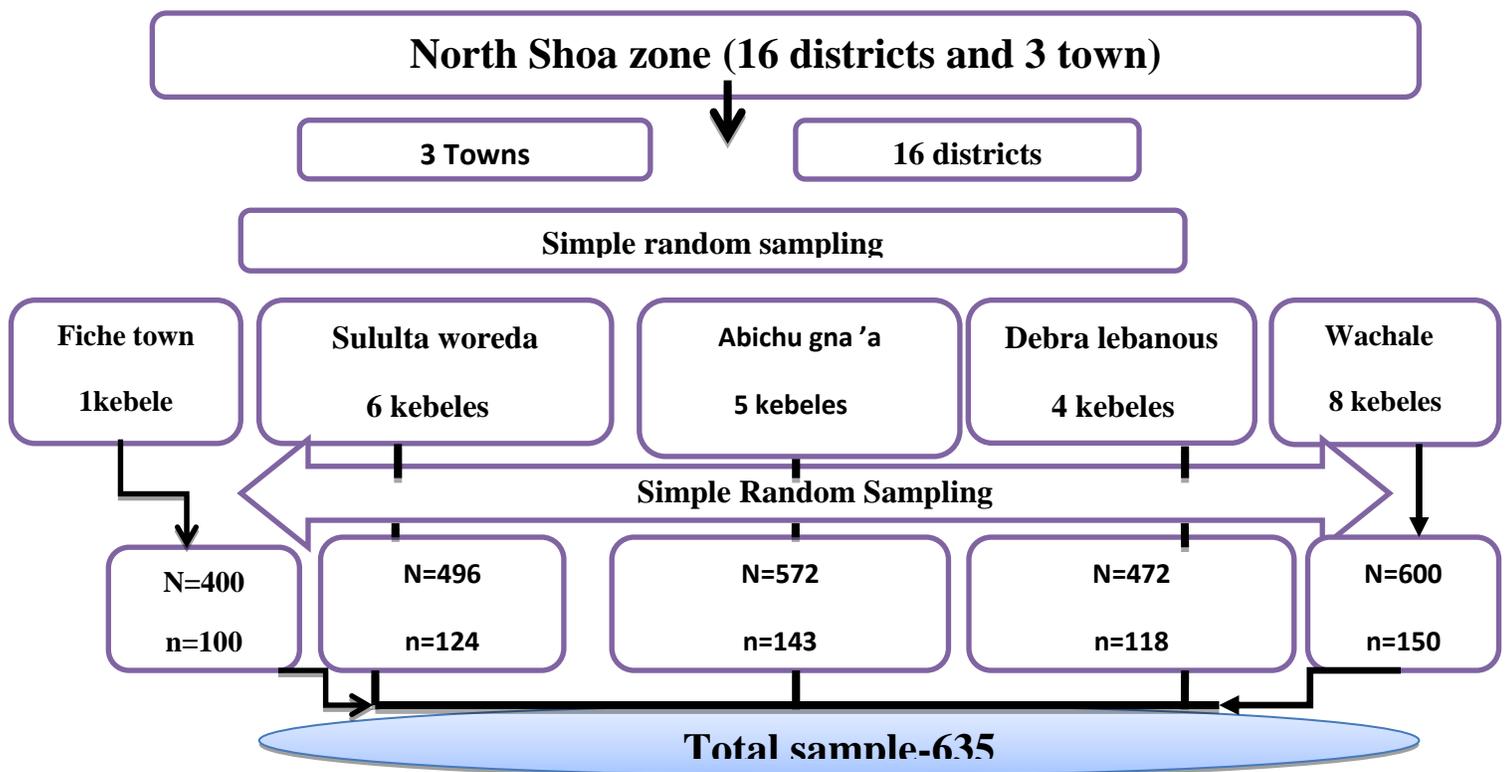
Figure 2: Diagrammatic presentation of sampling procedure of utilization of ANC 8 contact and associated factors among mothers gave birth in the last six month in North Shoa Zone, in 2024

4.7 Variables of study

4.7.1. Dependent variables
Utilization of ANC eight contact.

4.7.2 Independent variables
Socio-demographic factors: - Maternal age, residence, marital status, religion, maternal education, husband educational, maternal occupation, family size.

Obstetric history: - Gravidity, parity, previous utilization of ANC, history of abortion, types of pregnancy.

Health care related factors: - Time constraints and waiting time to get service, transportation cost.

4.8. Operational definitions
- **Utilization of antenatal care 8 contact:-**Women who had ANC eight times during pregnancy or Women attended each suggested visit according to the new WHO recommendation of 2016**(37)**.
- **Not utilizing antenatal care 8 contact:-**Women who hadn't used ANC eight times during her last pregnancy(37).
- **Contact** - an active connection between a pregnant woman and a health care provider that can take place at the facility or at community level(37).
- **Timely ANC initiation:—**this indicates that the first antenatal interaction occurred before 12 weeks (during the first trimester)(3).
- **Distance from the facility:** long distance was defined as taking more than 60 min to reach the health facility and short distance was defined as taking less than 30 min(32).
- **Types of institution:** hospital, health center, or health post to which they preferred to go.

4.9 .Data collection tools and procedure

Data was collected by using a pretested semi-structured Afan Oromo version questionnaire by face to face interview that was adapted with modification from related studies. The questionnaire was prepared originally in English and then translated to Afan Oromo and back to English to check the consistency. The main points included in the questionnaire are socio-demographic characteristics, obstetric and reproductive health history, and utilization of ANC contacts.

Nine clinical nurses was participated in data collection and supervised by six public health officers those recruited from the same setting. A two-days training regarding objectives, the relevance of the study and data collection techniques such as interview techniques, the confidentiality of the information, participants' right, informed consent, and practical demonstration of the interview was given to the data collectors and supervisor by the trainer.

4.10. Data quality assurance

Pre-test study was conducted on 10% (64) of sample size at Fitche Town, D/Lebanous, Wachale, Sululta, and Abichu gna. Based on the pre-test, questions was revised, edited and modified for its length, clarity, content and completeness. Supervisor and data collectors were trained for two days prior to data collection on objective of the study, procedures of the data collection, data collection tools and handling of the data. The procedure manual for the data collection was prepared and distributed for data collectors and supervisor. This facilitates and improves communication between data collectors, supervisor and principal investigator. During data collection the supervisors and principal investigator was reviewed filled questionnaire on a daily basis for completeness, accuracy and consistency.

4.11. Data processing and analysis

Data entry was made using Epi-data version 4.6 and then exported to Statistical Package for Social Sciences (SPSS) version 25 for further analysis. Before analysis, data was cleaned for possible errors, completeness and consistencies of questionnaires were checked. Descriptive statistics was made for categorical and continuous variables in the form of percentage and means respectively. Binary logistic regression model was carried out to identify variables that could independently associate with utilization of ANC eight contacts. Variables whose p-value less than 0.25 in bi-variate analysis were included in the multivariate model. The Hosmer-Lemeshow statistics were used to check the goodness of fit of the model. Multi-co linearity was checked for variables that were statically insignificant on multi-variant analysis. Multiple

logistic regressions were used for controlling confounding. Odds ratio along with a 95% confidence level was estimated to measure the strength of association. Variables were interpreted as having a statistically significant association when the p-value is ≤ 0.05. The results were presented using tables, figures, and texts.

4.12 Ethical consideration.

To conduct this research project, ethical approval letter ref/no SLU-IRERC-236/2016 date 12/10/2016 E.C was obtained from Salale University Research and Ethical review Committee. A letter of authorization also acquired from North shoa zone health department. Written informed consent was obtained from each study participants after the objectives of the study were explained. Participation of respondents strictly made on voluntary basis. The participants were informed that the information collected was anonymous; they could withdraw from the interview if they were unhappy during interview and only those who were willing interviewed. Confidentiality of responses maintained throughout research process. Personal privacy and cultural norms were respected properly. No names used; however, the questionnaires were serially numbered for the purpose of data entry.

4.13 Dissemination of results.

The result of the study will be submitted to Salale University School of public health as a partial fulfilment of MPH in epidemiology, North Shoa health office and other responsible bodies. Efforts will be made to present on scientific conferences and it will be disseminated through scientific publications on reputable local or international journals.

Publication plan: - The finding of the study will be disseminated through scientific publications on reputable local or international journals.

5. RESULT

5.1. Sociodemographic characteristics of the study participants

In this study, a total of 624 mothers who gave birth six months before the study period took part in it and responded the questionnaire, giving a 98.3% response rate. The mothers who participated in the study ranged in age from 18 to 40, with a mean age of 29. The majority of responders 593(95%) were married. Mothers from urban residence made up about 282(45.2%), while mothers from rural areas made up 342(54.8%).The majority of study participants 492(79.8%) were Orthodox, with Muslims making up 70(11.2%), protestant making up 57(9.1%), and wakefata people making up 3(0.5%). In terms of educational background, a majority of them 260 (41.7%) just completed elementary school. 430(68.9%), or just over half, of them were housewives as well. According to reports, 356(57.1%) of the mothers had exposure to mass media for at least once in a week.

Table 1:-sociodemographic characteristics of the study participant of north shoa zone

Variables	Category	Frequency	Percent
Age	≤ 24	109	17.4
	25–29	204	32.7
	30–34	189	30.3
	≥ 35	122	19.6
Religion	Orthodox	494	79.2
	Muslim	70	11.2
	Protestant	57	9.1
	Wakefata	3	.5
Marital status	Single	11	1.8
	Married	593	95.0
	Divorced	15	2.4
	Separated	5	.8
Educational level	Illiterate	203	32.5
	Primary	260	41.7
	Secondary	82	13.1
	Preparatory	12	1.9
	Diploma and above	67	10.7

Occupation	House wife	430	68.9
	Merchant	96	15.4
	Daily labourer	16	2.6
	Farmer	20	3.2
	Gov't employee	59	9.5
	Other	3	.5
Educational level of husband	Illiterate	159	25.5
	Primary	202	32.4
	Secondary	141	22.6
	Preparatory	27	4.3
	Diploma and above	94	15.1
Husband occupation	Merchant	278	44.6
	Daily labourer	97	15.5
	Farmer.	141	22.6
	Gov't employee	12	1.9
	Other	96	15.4
Own mobile phone	Yes	424	67.9
	No	200	32.1
The decision of maternal care	Husband	107	17.1
	Wife	53	8.5
	Both	464	74.4
Access to mass media	Yes	356	57.1
	No	268	42.9
Transportation fee	Yes	360	57.7
	No	264	42.3
Residence	Rural	342	54.8
	Urban	282	45.2
Distance from health facility	Less than 30 minute	375	60.1
	30-59minute	193	30.9
	1-3hrs.	56	9.0

5.2. Obstetric-related characteristics of the study participants:-

Most of, 489 (78%) of pregnancies, were wanted and planned. Approximately 272(43.6) and 178 (28.5%) respondents had two to four, five to seven alive children respectively. About a quarter, 154 (24.5%) of interviewed women had their first pregnancy. Nearly 86 (13.8%) of women had history of abortion from which 10 (11.4%) had induced abortion.

Table 2:-obstetrics related characteristics of the study participants of north shoa zone

Variables	Category	Frequency	Percent
Number of pregnancy	Gravid one	149	23.9
	Gravida two	212	34.0
	Gravid three	187	30.0
	Above three	76	12.2
	Total	624	100.0
Family size	1	154	24.7
	2-4	272	43.6
	5-7	178	28.5
	8 and above	20	3.2
Abortion history	Yes	86	13.8
	No	537	86.1
Cause of Abortion	Spontaneous	78	12.5
	Induced	10	1.6
Pregnancy planned	Yes	134	21.5
	No	489	78.4

5.3. Utilization of ANC 8 contact in North Shoa Zone

The prevalence of utilization of ANC 8 contact is presented on figure 3 below. A total of 624 women participated in the study. The magnitude of utilization of ANC 8 contact was 17.15%, (95% CI: 14.3 -20.3).
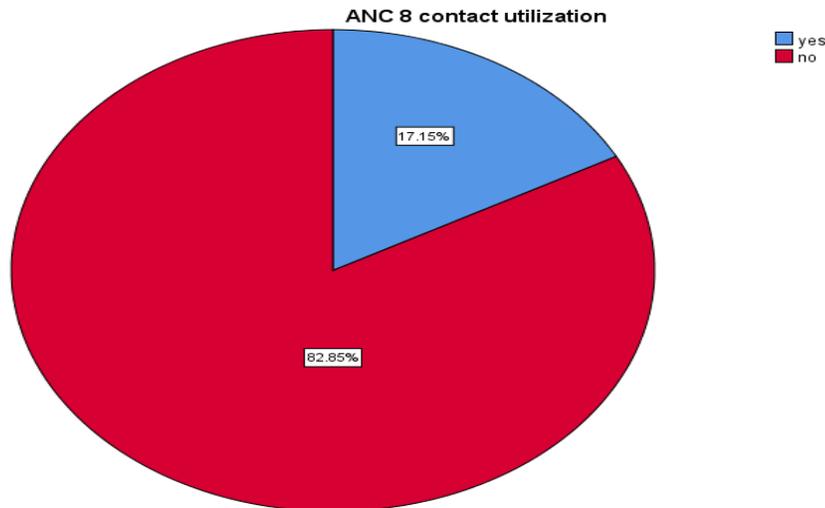
Figure 3: utilization of ANC eight contact among women in North Shoa Zone

5.4. Factors Associated with ANC 8 contact utilization

Bivariate analysis

In bivariate analysis maternal age, maternal education, educational level of husband, family size, decision of maternal health care, access to media, transportation fee, residence, Distance from health facility, number of pregnancy, staff approach, waiting time and ANC booking were associated in bivariate analysis with utilization of ANC eight contacts.

Multivariable Analysis

In multivariable logistic regression 14 candidate variables are entered and variables like maternal age, maternal education, planned pregnancy, ANC booking time, place of residence and distance from health facility were significantly associated with ANC 8 contacts.

Women with the age group of between 25 – 29 years and 30-34 years had higher odds of using ANC 8 contact as compared to those < 24 years (AOR = 2.93,95%CI:1.01-8.56) and (AOR = 10.70,95% CI: 3.31-17.36), respectively. And women with age group of >35years had the odds

of utilization of ANC 8 contact 4.294 times more likely to utilize antenatal care as compared to those <24 years old women(AOR=4.29, 95% CI: 1.22-15.09).

Women who had primary and diploma and above status were 1.32 times (AOR=1.32 95% CI: 1.01-2.58) and 1.45 times (AOR=1.45, 95%CI: 1.10-2.65) more likely to have ANC 8 contact than women with no formal education respectively.

The odds of ANC 8 contact utilization were 4.29 times more likely among urban women (AOR=4.29, CI: 2.17-8.49) as compared to women residing in rural areas.

The women who planned for pregnancy had ANC eight contact utilization of 1.900 times more likely (AOR=1.90, 95%CI: 1.12-3.27) as compared to unplanned pregnancy.

Women who had to travel more than 1-3 hours to reach the nearest health facility were 96% (AOR = 0.04, 95% CI: 0.06-0.47) less likely to receive ANC 8 contact services than less than 30 minute from nearest health facility.

Women who booked in <12 weeks of gestation had ANC 8 contact utilization of 3.90 times more likely (AOR=3.90 95% CI: 1.87-6.15) utilize ANC eight contact as compared to booking in > 12 weeks of pregnancy.

Table 3:-factors associated with utilization of ANC 8 contact in north shoa

Variables	Category variables	ANC 8 contact utilization		COR (95% CI)	AOR (95% CI)
		Yes (%)	No (%)		
Age of mother	≤ 24	20(10.58)	169(89.42)	1	1
	25–29	37(18.13)	167(81.87)	1.81(1.14,3.37)	2.93(1.01,8.56)*
	30–34	32(29.35)	77(70.65)	3.51(1.98,6.81)	10.70(3.31,17.36)*
	≥ 35	18(14.75)	104(85.25)	1.46(1.38,5.12)	4.29(1.22,15.09)*
Educational status of mother	Illiterate	28(13.86)	175 (86.14)	1	1
	primary education(1-8)	45 (17.30)	215(82.69)	1.31(1.06,2.28)	1.32(1.01,2.58)*
	secondary school (grade 9-12)	9 (10.97)	73 (89.03)	0.77(0.27,1.90)	0.82(0.30,1.20)
	Diploma and above	25(37.32)	42(62.68)	3.72(2.01,7.51)	1.45(1.10,2.65)*
Residence	Rural	24(7.03)	318(93)	1	1
	Urban	83 (29.43)	199(70.57)	5.53(3.39-8.99)	4.29(2.17-8.49)*
Distance from health facility	<30	94(25.06)	281(74.94)	1	1
	30-1hrs	10(5)	183(95)	0.16(0.05-0.55)	0.64(0.17-2.36)
	1-3hrs	3(7.14)	53(92.86)	0.17(0.28-3.90)	0.04(0.06,0.47)*
ANC booking time	<12 weeks of gestation	86(26.4)	239(73.6)	4.76(2.87-7.91)	3.90(1.87-6.15)*
	>12 weeks of gestation	21(7)	278(93)	1	1
The pregnancy planned	Yes	29(14.28)	81(85.72)	2.00(1.23-3.26)	1.90(1.12-3.27)*
	No	78(17.99)	436(82.01)	1	1

6. Discussion

The study showed that only 107(17.15%) was found to be utilized ANC eight contact with in the last six months. This study was lower than the finding of institutional based cross- sectional study conducted in 2022 in Arba Minch town which was about 41%(32).This difference could be due to this study include the rural areas but study conducted Arba Minch town might have increased access to the service and considered only urban individuals. However, finding of the study was slightly the same with the Findings from Nigeria Demographic and Health Survey 2018 which was 17.4% (33).This finding was lower than Findings from 2019 Population-Based study conducted in Ghana which was about 41.9 % of study participants were utilized ANC eight contact(38).This inconsistency may be due to difference in the socio-demographic characteristics of the participants of the studies. However, this antenatal care 8 contacts utilization is higher than study conducted in the Benin Demographic and Health Survey 2022 which was 8%(18).Due to new WHO ANC 8 contacts model was not immediately institutionalized, lack of communication or awareness and poor health care system.

The result of the study found that women with the age group of between 25 – 29 years and 30-34 years had higher odds of utilization of ANC 8 contact 2.93times and 10.70 times more likely as compared to those age < 24 years respectively. This result is consistent study conducted in Jakarta,Idonesia(25)which shows that the age of women was positively associated with utilization of ANC services. Age is one of the factors that influence adherence to ANC visits. Pregnant women between the ages of 24-35years who were productive age typically attend antenatal care appointments regularly because they believe that antenatal care is crucial. When a person's age increases, their maturity in thinking improves, so pregnant women are motivated to check their pregnancy and know the importance of antenatal care.

Meanwhile, pregnant women aged 35 years or more tended to be utilizing less antenatal visits because they felt they had had a good pregnancy experience. Age greatly determines a mother's health; the mother is at high risk if the pregnant woman is under 24 and over 35 years old. Age under 24 years is feared to have a risk of complications that are closely related to women's reproductive health, and when over 35 years have a high risk due to a decline in reproductive function. This disorder is not only physical due to the not optimal development of the function of the reproductive organs but psychologically they are not ready to bear the moral, mental, and

emotional upheavals that arise, as well as the lack of experience in conducting antenatal care examinations.

This study also found that women with higher educational attainment had increased prevalence of 8 or more ANC contacts. Those with primary and diploma and above level of education were found to have increased prevalence of 8 ANC contacts, when compared to those with no formal education. Women who had primary and diploma and above level were 1.322 times and 1.45times more likely to have ANC 8 contact than women with no formal education respectively. This is in line with study done in the Ethiopian Mini Demographic and Health Surveys EDHS 2019(24), This study was in line with the previous study (23),consistent with study conducted in Eastern Jakarta, India 2022(25) , study conducted in Bangladesh(22) and study conducted eastern Wollega (26). The level of education can affect a person's level of exposure and accessibility to health information. The higher the level of education, the pregnant woman can find better information, especially in terms of health, so that the mother can understand her health condition, and vice versa. If the mother knows a lot of information about the importance of complying with ANC, then the mother will know how to reduce the risk of pregnancy, one of which is by complying with pregnancy check-ups.

Planned pregnancy was significantly associated with ANC 8 contact utilization. The women who had planned for pregnancy had ANC eight contact utilization of 1.90 times more likely as compared to unplanned pregnancy. This result is in line with A Cross-Sectional Study conducted in South Gondar Zone , Northwest Ethiopia : 2022 (39) and study conducted in Debre Tabor town(14).Compared to women with unplanned pregnancies, those with planned pregnancies had a high chance of receiving antenatal care. Additionally, mothers who had an unplanned pregnancy had a greater ANC dropout rate than mothers who had a planned pregnancy. According to many research carried out in both developed and developing nations, women who become pregnant unplanned either do not use ANC or receive inadequate ANC. This might be because some women were not emotionally and financially ready for the demands of pregnancy and childbearing, and most likely due to the delay in recognizing pregnancy. This can be occurring because pregnant women prefer receiving antenatal care in order to have a safe pregnancy. In addition, more women are using ANC visits as a result of their desired pregnancies. This may be the matter because mothers who wish to become infants prioritize having a good pregnancy and seeking antenatal care in particular.

The time needed to get to the nearest HF was an associated factor for women to use ANC 8 contact services in this study. This study was in line with the previous study(22)and consistent with study conducted in eastern Wollega(26) which shows that increased distance to a health facility decreased ANC services. This might be the distance to a health facility or time taken to get to the nearest HF that decreases the chance of getting health services due to less access to the transportation system and low economy for payment for transportation. In addition, the optimal use of antenatal care in this study had a significant impact on road access to HFs. In fact, the cost of transport and the type of transport depend on the availability of the road as it increases optimal use of antenatal care.

Women who lived in urban areas were more likely to use eight or more ANC services than women who lived rural areas. The finding of this study is consistent with study conducted in South Gondar Zone, Northwest Ethiopia(23) and study conducted in eastern Wollega(26).The finding of study implies, living in an urban setting has a positive impact on ANC utilization.

Women who live in an urban area may have easier access to transportation resources such as automobiles, or motorcycles that can make ANC services more accessible. This could be attributed to the fact that urban women are more inclined than rural women to use various media, information, and written papers, as well as have more understanding about their health. Another factor might be that you do not have access to enough health care.

This urban-rural in equalities in maternal health care service uptake is a major concern. This finding is common in many resource-constrained settings due to disparity in the distribution of functional health facilities which is usually in favour of the urban residence.

The results of the study showed that women who had ANC booking in less than 12 weeks of gestation were significantly associated with utilization of eight or more ANC contacts. Women who started ANC contact in <12 weeks of gestation had higher possibility of ≥8 ANC contacts. this study is consistent with study conducted in Nigeria: Evidence from Demographic and Health Survey 2020 (27) and in line with study conducted in Arba Minch, Southern Ethiopia,2022 (28).There is no doubt, that early booking for ANC would result in optimal number of ANC contacts during pregnancy as those who start early will have higher possibility of achieving optimal ANC visits. Booking in >12 weeks of gestation for ANC had large reduction in having at least 8 ANC contacts during pregnancy.

Strength

There are notable strengths in this study. First, the study used the recent WHO guidelines of ANC as the recommended number of contacts, providing results with the potential for immediate policy implementation in north shoa zone. This is the first research using the new WHO guideline to examine ANC utilization and associated factors in North Shoa Zone. This study, provide evidence-based information for Guideline implementation in maternal health care service utilization across North Shoa Zone, Ethiopia. This study used a zonal representative sample; therefore, findings are generalizable to the North Shoa Zone population.

Limitations, need to be considered in this study

Firstly, the study used data collected based on mothers' ability to recall ANC contacts. Recalling 8 ANC contacts may be challenging for some participants, which can contribute to over or under-reporting. However, in general, mothers tend to recall key childbirth events well, and study do not expected this limitation to alter the conclusion of our findings.

Secondly, the study does not include all the variables that may be important for maternal healthcare service use. For instance, some cultural, economic, and contextual barriers to accessing ANC are not exclusively included. In Future studies may include those additional factors, including some qualitative data, to explore ANC use in North Shoa Zone further.

7. Conclusion and Recommendations

7.1. Conclusion

The purpose of this study was to find out what factors influence maternal antenatal care 8 contacts utilization in the North Shoa Zone, such as socioeconomic, demographic, and environmental factors. The result of this study showed that the magnitude of ANC 8 contact services was 17.15%. This prevalence is grossly inadequate considering the maternal mortality burden in Ethiopia. The study found that maternal age, maternal education, planned pregnancy, ANC booking time, residence, and time taken to get the nearest health facility were the factors significantly associated with utilization of ANC eight contacts. Therefore, it is important to provide more information during the antenatal contacts to increase the rate of women receiving all eight recommended contacts.

7.2. Recommendations

Promoting early booking, health facilities in rural, remote and hard-to-reach neighbourhoods should be equipped with infrastructure, health care personnel and comprehensive services as commonly available in the urban residence.

Comprehensive maternal health policies and initiatives must be developed and put into action in order to increase the optimal uptake of ANC contacts. It is important to focus on improving the utilization of ANC services for illiterate and rural women. It has been suggested that universal health coverage and maternal health care services be made available.

Living in urban areas and planned pregnancies is associated with frequent ANC visits and receiving higher number of items of ANC contents. This study suggests that, in the short term, less educated and mothers with unplanned pregnancy should be targeted to improve outcomes.

To North Shoa health office

Increase awareness of the community through health extension workers and local mass media. To encourage women to use health facilities for different purposes such antenatal care, abortion and other services.

To Health care providers

Health care providers should council women about ANC 8 contact to disseminate information for those women who have not heard.

Health care Providers have to create awareness about ANC 8 contact.

To Local Mass Medias

Should give due emphasis on creating awareness on ANC 8 contact

To researchers

Should conduct further both qualitative and quantitative study with strong study design

DECLARATION

DECLARATION I, the undersigned, declare that this thesis is my original work, has not been presented for masters of Public Health/Reproductive Health (MPH/RH) in this or any other university and that all sources of materials used for the thesis have been fully acknowledged.

Name of the student: Berhanu Kefeni   Date. 06/12/2024 Signature
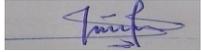
APPROVAL OF THE FIRST ADVISOR

Name of the first advisor: Qaro Qanche (MPH)

Date   **06/12/2024**   Signature
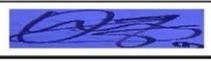
APPROVAL OF THE SECOND ADVISOR

Name of the second advisor: Hiwot Dejene (MPH)

Date   **09/12/2024**   Signature

8. Reference

1. Woldeamanuel BT, Belachew TA. Timing of first antenatal care visits and number of items of antenatal care contents received and associated factors in Ethiopia : multilevel mixed effects analysis Zeitpunkt der ersten Besuche bei der Schwangerenvorsorge und Anzahl der erhaltenen Inhalte. Reprod Health [Internet]. 2021;1–16. Available from: https://doi.org/10.1186/s12978-021-01275-9

2. Woldie M. ORIGNAL ARTICLE FACTORS INFLUENCING ANTENATAL CARE SERVICE UTILIZATION IN HADIYA ZONE.

3. Hanson J, Global A, Cdc R. National Antenatal care guidelines. Minist Heal Rwanda [Internet]. 2020;(February):1–113. Available from: https://icapdatadissemination.wikischolars.columbia.edu/file/view/TRAC+report_Rwanda+National+ART+Evaluation_Final_18Jan08.doc/355073978/TRAC+report_Rwanda+National+ART+Evaluation_Final_18Jan08.doc

4. Ministry of Health-Ethiopia. Management protocol on selected Obstetrics topics for Hospitals. Moh. 2020;(December):1–209.

5. Id ME, Igwegbe C, Id N, Id AB. PLOS GLOBAL PUBLIC HEALTH Effects of socioeconomic factors and booking time on the WHO recommended eight antenatal care contacts in Liberia. 2022;1–14. Available from: http://dx.doi.org/10.1371/journal.pgph.0000136

6. Beyamo A, Facha W, Lire A. Focused Antenatal Care Service Utilization and Associated Factors in Damot Focused Antenatal Care Service Utilization and Associated Factors in Damot Sore District , Southern Ethiopia , Community Based Cross Sectional Study. 2017;(January).

7. Program CS. 2016 WHO Antenatal Care Guidelines Malaria in Pregnancy Frequently Asked Questions (FAQ). 2018;(March):1–6.

8. Semaw EA. Intention to Use Eight Antenatal Care Model and Associated Factors Among Pregnant Women Who Come for Antenatal Care in Northwest of Amhara Region Referral Hospitals , Ethiopia , 2021. 2023;1–24.

9. Teklesilasie W, Deressa W. Husbands ' involvement in antenatal care and its association with women ' s utilization of skilled birth attendants in Sidama zone , Ethiopia : a prospective cohort study. 2018;1–10.

10. Mulat G, Kassaw T, Aychiluhim M. Epidemiology : Open Access Antenatal Care service utilization and its associated factors among mothers who gave live birth in the past one year in Womberma Woreda , North West Ethiopia. 2015;1–10.

11. 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. 2019;8:1–14.

12. Institutions H, Kondale M, Tumebo T, Gultie T, Megersa T, Yirga H, et al. Journal of Womens Health Care Timing of First Antenatal Care Visit and associated Factors among Pregnant Women Attending Anatal Clinics in Halaba Kulito Governmental. 2016;5(2):8–11.

13. Debelo BT, Danusa KT. Level of Late Initiation of Antenatal Care Visit and Associated Factors Amongst Antenatal Care Attendant Mothers in Gedo General Hospital , West Shoa Zone , Oromia Region ,. 2022;10(June):1–8.

14.   Ayalew TW, Nigatu AM. Focused antenatal care utilization and associated factors in Debre Tabor Town, northwest Ethiopia, 2017. BMC Res Notes [Internet]. 2018;11(1):1–6. Available from: https://doi.org/10.1186/s13104-018-3928-y

15.   Gebremeskel F, Dibaba Y, Admassu B. Timing of First Antenatal Care Attendance and Associated Factors among Pregnant Women in Arba Minch Town and Arba Minch District , Gamo Gofa Zone , South Ethiopia. 2015;2015.

16.   Bahilu T, Tewodros B, Mariam AG, Dibaba Y. ORIGINAL ARTICLE FACTORS AFFECTING ANTENATAL CARE UTILIZATION IN YEM SPECIAL WOREDA , SOUTHWESTERN ETHIOPIA.

17.   Chemir F, Alemseged F, Workneh D. Satisfaction with focused antenatal care service and associated factors among pregnant women attending focused antenatal care at health centers in Jimma town , Jimma zone , South West Ethiopia ; a facility based cross-sectional study triangulated with qua. 2014;1–8.

18.   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. J Egypt Public Health Assoc. 2020;95(1).

19.   Michael Ekholuenetale CIN& AB. Prevalence and Socioeconomic Inequalities in Eight or More Antenatal Care Contacts in Ghana_ Findings from 2019 Population-Based Data. 2019.

20.   WHO. ANTENATAL CARE (eight visits) / ANTENATAL. In: 8th ed. 2016.

21.   Hailemariam T, Atnafu A, Gezie LD, Tilahun B. Utilization of optimal antenatal care , institutional delivery , and associated factors in Northwest Ethiopia. Sci Rep [Internet]. 2023;(0123456789):1–12. Available from: https://doi.org/10.1038/s41598-023-28044-x

22.   Islam MM, Shahed M, Id M. Determinants of frequency and contents of antenatal care visits in Bangladesh : Assessing the extent of compliance with the WHO recommendations. 2018;1–22.

23.   Fenta SM, Moyehodie YA, Belay AT, Biresaw HB, Fentaw KD, Yalew MM, et al. Postnatal Care Utilization Coverage and its Associated Factors Among Mothers in South Gondar Zone, Northwest Ethiopia: A Cross-Sectional Study. SAGE Open Nurs. 2022;8.

24.   Ethiopian Public Health Institute (EPHI), ICF. Ethiopia Mini Demographic and Health Survey 2019: Final Report [Internet]. 2021. 1–207 p. Available from: https://dhsprogram.com/pubs/pdf/FR363/FR363.pdf

25.   Suryanegara W, Sirait BI. Relationship between the Age of Pregnant Women and ANC Compliance. 2023;13(July):376–86.

26.   Terfasa TG, Afework MF, Berhe FT. Antenatal Care Utilization and It's Associated Factors in East Wollega Zone, Ethiopia. J Pregnancy Child Heal. 2017;04(02):2–7.

27.   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 [Internet]. 2020;15(9 September):1–19. Available from: http://dx.doi.org/10.1371/journal.pone.0239855

28.   Deresa D, Id D, Tesema KF, Wolde F. PLOS GLOBAL PUBLIC HEALTH Intimate partner

violence is independently associated with poor utilization of antenatal care in Arba Minch town , southern Ethiopia : A cross-sectional study. 2024;1–13. Available from: http://dx.doi.org/10.1371/journal.pgph.0002246

29. Gunasekera HR. Demographic and Health Survey--1993. Vol. 1, Sri Lanka journal of population studies. 1998. 107–110 p.

30. Gupta S, Yamada G, Mpembeni R, Frumence G, Callaghan-koru JA. Factors Associated with Four or More Antenatal Care Visits and Its Decline among Pregnant Women in Tanzania between 1999 and 2010. 2015;9(7).

31. Chanda SK, Ahammed B, Hasan Howlader M, Ashikuzzaman M, Shovo TEA, Tanvir Hossain M. Factors associating different antenatal care contacts of women: A cross-sectional analysis of Bangladesh demographic and health survey 2014 data. PLoS One [Internet]. 2020;15(4):1–17. Available from: http://dx.doi.org/10.1371/journal.pone.0232257

32. 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. Front Glob Women's Heal [Internet]. 2024;5(July):1–9. Available from: https://doi.org/10.3389/fgwh.2024.1259637

33. 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):1–8.

34. Chilot D, Aragaw FM. E ectiveness of eight or more antenatal contacts on health facility delivery and early postnatal care in low- and middle-income countries : a propensity score matching.

35. Ekholuenetale M. Prevalence of Eight or More Antenatal Care Contacts : Findings From Multi-Country Nationally Representative Data. 2021;

36. Office NSZ administation. north shoa zone 2024 population profile projection. 2024;

37. Tunçalp, 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 An Int J Obstet Gynaecol. 2017;124(6):860–2.

38. 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. Int J Womens Health. 2021;13:349–60.

39. Belay AT, Fenta SM, Biresaw HB, Moyehodie YA, Yelam MM, 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. 2022;2022.

9. Annex I. Information sheet and consent form:
Salale University College of Health Sciences Department of public health

Greetings!

My name _____ I came from College of Health Science, Department of public health, Salale University. I am here to gather information about utilization of ANC eight contacts follow up of mothers, so I want to ask you some questions. Would you mind if I take some minutes with you? Your name will not be included in the information; I promise to keep the confidentiality of your reply. It takes us about 25 minutes to the interview. Though it seems long time the study helps to improve the ANC service for all pregnant women. As, a result, I kindly request you to participate in genuinely answering the interview.

I agree to participate

I don't agree to participate

I have been briefly informed about the study and I clearly under stood the objective. Since it doesn't affect my personal life/health, I don't need any remedy. Consequently, I hereby approve my consent to take part in the study as an interviewee with my signature.

Date_____/_____/2024

Signature_____

Annex II English version questionnaire

Section I Socio-demographic characteristics

S.N	Question(variable description)	Response	code	skim
101	Age of mother	_____years		
102	Religion?	1.Orthodox 2.Muslim 3.Protestant 4.waqefata 5.Other(specify)		
103	Marital status	1. Single. 2.Married 3.Divorced 4.Separated		
104	Educational level	1. Illiterate 2.Primary 3.Secondary. 4.Preparatory 5.Diploma and above		
105	Occupation	1. House wife 2.marchent, 3.Daily laborer 4 Farmer. 5. Gov't employee 6.Other__		
106	Education level of husband	1. Illiterate 2.Primary 3.Secondary. 4.Preparatory 6.Diploma and above		
107	Husband occupation	1. Merchant, 2.Daily labourer 3. Farmer. 4. Gov't employee 5.Other__		
108	Family size	1.1 2.2-4 3.5-7 4.8 and above		
109	Own mobile phone	1.yes 2.no		
110	the decision of maternal care service utilization	1.husband 2.wife 3.both		
111	Access to mass media	1.yes 2.no		
113	Transportation fee	1 Pay. 2. Don't pay		
114	Residence	1. Rural 2. Urban		
115	Distance from health facility	1. Less than 30 minute. 2. 30-59minute 3.1-3hrs. 4.>3hrs		

Section II:-Obstetric history

S.N	Question(variable description)	Response	code	skim
116	Number of pregnancies?	1. Gravid one 2.Gravida two 3. Gravid three 4. Above three		
117	History of Abortion?	1. Yes 2. No		
118	If there is abortion?	1.Number of spontaneous____2.Number of induced___		

Section III: Past history of service utilizations

S.N	Question(variable description)	Response	code	skim
125	Previous utilization of ANC?	1. Yes 2.No		
126	Time of ANC booking pregnancy in weeks	_____**weeks**		
127	Have you had ANC eight time for the pregnancy	**1.Yes** **2.No**		
128	Number of contact for ANC	1. One 2.Two-three 3. Four-seven. 4.eight and above		

Section IV: Past service related variables

S.N	Question(variable description)	Response	code	skim
131	Is there any payment you were asked for check-up?	1. Yes 2.No		
Rate the following items of service in terms of your satisfaction				
133	Staff approaches.	1. Very dissatisfied 2. Dissatisfied 3 .Unsure 4.satisfied 5.Very satisfied		
134	Privacy	1. Very dissatisfied 2. Dissatisfied 3 .Unsure 4.satisfied 5.Very satisfied		
135	Charge of service?	1. Very dissatisfied 2. Dissatisfied 3 .Unsure 4.satisfied 5.Very satisfied		
136	Waiting time	1. Very dissatisfied 2. Dissatisfied 3 .Unsure 4.satisfied 5.Very satisfied		

Section V: History of pregnancy

S.N	Question(variable description)	Response	code	skim
137	How did you know your pregnancy?	1. Missed period once. 2.Missed period twice and more 3. Physiological changes 4.Other signs like nausea and urine test. 6. Other [specify]		
138	Is the pregnancy planned?	1. Yes 2. No		

Part VI: History of ANC

S.N	Question(variable description)	Response	code	skim

139	Before your first attendance of the ANC, who advised you to come?	1.Community health workers 2.Media (radio/TV) .3.Husband 4.Mother 5.Sister 6. Friend,7. Other (specify)		
140	If you were advised to attend ANC by someone, Did you informed when to start?	1. Yes 2. No		
143	If you are advised on the time to start ANC	.___ weeks		

Annex II: Ethical approval letter

Salale University
Institutional Research Ethics Review Committee (SIU-IRERC)

Date: 17 / 10 / 2016

Ref. No: SIU–IRERC–236/2016

To: Berhanu Kefeni

Subject: Research Ethics Approval Letter

This is to kindly notify you that your project protocol entitled **"Utilization of Antenatal care eight contacts and associated factors among women who gave birth in the last six months in North Shewa Zone, Oromia-Ethiopia, 2024"** has been approved for the intended one-year period of implementation. The review process of the Research protocol has been carefully conducted by Salale University institutional research ethics review committee (SIU-IRERC). The protocol is ethically sound to be implemented through adhering to the research ethics principles during the implementation. Thus, the committee is pleased to inform you that your study protocol has been approved.

The committee would like to remind you that the research principal is expected to submit a progress report of the research at least once before the end of its implementation. The committee also looks forward to receiving the final technical report and recommendations that will be generated from the study.

Sincerely,

Solomon Balami (Phd)
Salale University IRB
Chairperson

CC:

- Salale University Institutional Research Ethics Review Committee
- Salale University Collage of health sciences CARD

Annex III:-Odeeffannoo fi unka hayyamaa:

Yuunivarsiitii Salaalee Kolleejjii Saayinsii Fayyaa Kutaa Fayyaa hawaasaa

Nagaa!

Maqaan koo_____ Kolleejjii Saayinsii Fayyaa, , Yuunivarsiitii Salaalee irraa dhufe. Ani waa'ee hordoffii haadholii Kunuunsa da'umsaan duraa yeroo saddeet godhamu odeeffannoo walitti qabuuf as dhufe, kanaaf gaaffii tokko tokko isin gaafachuu barbaada.

Daqiiqaa muraasa si waliin fudhadhe si rakkisuu? Maqaan keessan odeeffannoo keessatti hin hammatamu; Deebii keessan iccitii akkan eegu waadaa isiniif gala. Gaaffii fi deebii xumuruuf gara daqiiqaa 25 nutti fudhata. Yeroo dheeraa fakkaatus qorannoon kun tajaajila kunuunsa da'umsaan duraa dubartoota ulfaa hundaaf kennamu fooyyessuuf gargaara. Kanarraa kan ka'e, gaaffii fi deebii dhugaadhaan deebii kennuu irratti akka hirmaattan kabajaan isin gaafadha.

    Hirmaachuuf walii gala

    Hirmaachuuf walii hin galu

Waa'ee qorannichaa gabaabinaan kan naaf beeksise yoo ta'u, kaayyoon isaas ifatti hubadheera. Erga inni jireenya/fayyaa dhuunfaa koo irratti dhiibbaa hin geessisu, qoricha tokkollee na hin barbaachisu. Kanarraa kan ka'e, ani kanaan akka nama gaaffii fi deebii taasifameetti qorannicha irratti hirmaachuuf hayyama koo mallattoo kootiin ni raggaasisa.

        Guyyaa_____/_____/2024   Mallattoo _____

DabalataI: Gaafannoo Afaan Oromootti Hiikkame.

 Odeeffannoo waliigalaa.

lakk	Gaafannoo	Deebii	koodii	
101	Umurii haadhaa	waggaa_____		
102	Amantii	1.ortodoksii 2.musliima 3.peenxee4.waaqeffataa5.kan biro		
103	Haala gaa'elaa ?	1.Hin heerumne 2. Heerumeera 3. Bultii hiika. 4.gargar bahan		
104	Sadarkaa barnootaa ?	1. Dubbisuu fi barreessuu kan hin dandeenye 2.sadarkaa tokkoffaa 3. Sadarkaa lammaffaa 4 .Qophaa'ina 5. dippiloomaa fi isaa ol		
105	Hojiin kee maali?	1. Haadha manaa 2. Daldaaltuu 3. Hojjetaa guyyaa guyyaa 4. Qonnaan bulaa 5. Hojjetaa mootummaa.6.Kan biroo___ .		
106	Sadarkaa barnoota abba warraa	1. Dubbisuu fi barreessuu kan hin dandeenye 2.sadarkaa tokkoffaa 3. Sadarkaa lammaffaa 4 .Qophaa'ina 5. dippiloomaa fi isaa ol		
107	Hojiin abba warraa maali	2. Daldaalaa 3.Hojjetaa guyyaa guyyaa 4. Qonnaan bulaa 5. Hojjetaa mootummaa 6.Kan biroo___		
108	Baayina maatii	1.1 2.2-4 3.5-7 4.8 fi isaa ol		
109	Bilbila dhuunfa qabdu	1.eeyyeen 2.lakkii		
110	Tajaajila fayyaa keessanii akka argatan eenyutu murteessa	1.abba warraa 2.haadha warraa 3.lachuu		
111	Miidiyaa hawaasa ni fayyadamtuu	1.Eeyyeen 2.lakkii		
112	Galii ji'aan argattan	1. qarshii 500 gadi 2. qarshii 500-1000 birr 3.qarshii 1000-2000 4.Above 2000 birr		
113	Geejjibaaf ni kanfaltuu	1.eeyyeen 2.lakkii		
114	Iddoo jireenyaa	1. baadiyyaa 2. Magaalaa		
115	Fageenya dhaabbata fayyaa irraa	1. daqiida 30 gadi. 2. daqiida 30-59 3.sa'aatii 1-3. 4sa'aatii 3ol		
Kutaa II:Seenaa ulfa adda cite				
116	baayina ulfaa	1.ulfa jalqabaa 2. Ulfa lammaffaa 3.ulfa sadaffaa 4.ulfa afuu fi isaa ol		
117	Ulfi sirraa bahee jiraa	1.eeyyeen 2.lakkii		
118	Si'a meeqaaf sirraa bahe	1.ofiin kan bahe____2.barbaaddee kan ofirraa baste_____		
Kutaa III: Seenaa itti fayyadama tajaajilaa Kunuunsa da'uumsa duraa ulfa darbe .				

125	Ulfa dhumaa kana dura Kunuunsa da'uumsa dura hordoffii taasistanii jirtu	1.eeyyeen 2.lakkii		
126	Yeroo umurii ulfaa torbee meeqa irra jiru kan kunuunsa da'uumsa duraa jalqabde	Torbee_____		
127	Kunuunsa da'uumsa duraa marsaa saddeet yeroo ulfaa taasistee jiratta	1.eeyyeen 2.lakkii		
128	Marsaa meeqaaf kunuunsa da'uumsa duraa taasiste	1.tokko 2.lama hanga sadiif 3.afurii hanga torbaa 4.saddeeti fi isaa ol		
Kutaa IV: Jijjiiramoota tajaajila waliin walqabatan darbe				
131	Tajaajilaa kunuunsa da'uumsa duraatif kanfaltii gaafatamtanii jirtuu	1.eeyyeen 2.lakkii		
132	Yoo kafaltani jirta ta'e qarshii olanaan tajaajilaf kanfaltan meeqa	_____		
133	Simannaa ogeessota	1.Baay'ee itti hin qufne 2.Itti hin qufne 3.hin Mirkaneeffanne 4. Itti quufe 5. Baay'ee itti qufe.		
134	Icitii eeguu	1. Baay'ee itti hin qufne 2.Itti hin qufne 3.hin Mirkaneeffanne 4. Itti quufe 5. Baay'ee itti qufe.		
135	Kaffaltii tajaajilaa	1. Baay'ee itti hin qufne 2.Itti hin qufne 3.hin Mirkaneeffanne 4. Itti quufe 5. Baay'ee itti qufe		
136	Yeroo turtii	1. Baay'ee itti hin qufne 2.Itti hin qufne 3.hin Mirkaneeffanne 4. Itti quufe 5. Baay'ee itti qufe		
Kutaa V: Seenaa ulfa yeroo ammaa				
137	Ulfa'uu kee akkamitti beekta?	1. Yeroo tokko marsaa laguu darbe. 2. Yeroo lama period darbe. 3. Jijjiirama fiiziyoloojii Mallattoolee biroo kan akka qorannoo fincaanii 4. Kan biroo [ibsi].		
138	Ulfichi karoorfamee turee?	1.Eeyyee 2. Lakki		
PartVI: Seenaa ulfa yeroo ammaa kunuunsa da'umsaan duraa				
139	Yeroo jalqabaaf kunuunsa da'umsaan duraa irratti osoo hin argamiin dura namni akka dhuftu si gorse eenyu	1. Hojjettoota fayyaa hawaasaa. 2. Miidiyaa (raadiyoo/TV). 3. Abbaa manaa 4.Haadha 5.Obboleettii. 6.Hiriyaa 7.Kan biroo (ibsi _____		
140	Yoo nama tokkoon kunuunsa da'umsaan duraa irratti akka argamtu si gorfame, Yoom akka jalqabdu si beeksisee ?	1. Eeyyee 2. Lakki		
141	Yeroo kunuunsa da'umsaan duraa	_____		

47

itti jalqabdan yoo isin gorsan			