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BAHIR DAR UNIVERSITY COLLEGE OF MEDICINE AND HEALTH SCIENCE SCHOOL OF PUBLIC HEALTH, DEPARTMENT OF HEALTH SYSTEMS MANAGEMENT AND HEALTH ECONOMICS.

Late Initiation Of Antenatal Care And Associated Factors Among Antenatal Care Followers At Public Health Facilities In South Achefer Woreda, North Gojjam**,** Ethiopia, 2024.

BY: Meseret Kumilachew KASSIE (BSC in PUBLIC HEALTH)

A THESIS RESEARCH SUBMITTED TO COLLEGE OF MEDICINE AND HEALTH SCIENCE DEPARTMENT OF HEALTH SYSTEM MANAGEMENT AND HEALTH ECONOMICS IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS IN GENERAL PUBLIC HEALTH.

APRIL, 2025

BAHIR DAR UNIVERSITY

BAHIR DAR UNIVERSITY COLLEGE OF MEDICINE AND HEALTH SCIENCE SCHOOL OF PUBLIC HEALTH, DEPARTMENT OF HEALTH SYSTEMS MANAGEMENT AND HEALTH ECONOMICS

FULL TITLE	ASSESSMENT OF LATE INITIATION OF ANTENATAL CARE AND ASSOCIATED FACTORS AMONG ANTENATAL CARE FOLLOWERS AT PUBLIC HEALTH FACILITIES IN SOUTH ACHEFER WOREDA, NORTH GO JAM, ETHIOPIA, 2024.
REQUIREMENT OF THE DEGREE	A THESIS RESEARCH SUBMITTED TO COLLEGE OF MEDICINE AND HEALTH SCIENCE DEPARTMENT OF HEALTH SYSTEM MANAGEMENT AND HEALTH ECONOMICS IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS IN GENERAL PUBLIC HEALTH
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APRIL, 2025

BAHIR DAR, ETHIOPIA

ACKNOWLEDGMENT

First of all I would like to thank the Almighty God for everything. Secondly my gratitude goes to Bihar Dar University College of medicine and health science school of public health, department of health systems management and health economics for unreserved effort to reach in this phase. My deepest gratitude also goes to my advisors Mr.Habtamu Alganeh(MPH, asst. professor in health informatics) & Mrs.Wubalem G/Amlake(MPH) for the provision of encouragement, continuous information to develop, performs and timely constructive comments for this thesis. The last but not the least the data collectors and participants give their time collecting the raw data and giving pertinent information's for this thesis. Moreover my class mates providing pertinent information on gap feeling.

ACRONYMS AND ABBREVIATIONS

ANC----------Antenatal Care

DHIS---------- Data for Health Information System

ETB----------Ethiopian Birr

EDHS----------Ethiopia Demographic Health Survey

MDG----------Millennium Development Goal

MMR----------Maternal Mortality Ratio

NGOS----------Non-Governmental Organizations

NRR----------None Response Rate

PI----------Principal Investigator

PNC----------Postnatal Car**e**

SDG---------- Sustainable Development Goal

SPSS----------Statistical Package for Social Science

SS ---------- Sample size

WHO----------World Health Organization

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ABSTRACT

Background: To improve maternal health, barriers that limit access to antenatal care must be identified at all level of the health system. Late initiation of first antenatal care service appear to have higher rates of poor pregnancy outcomes. Determinants and magnitude related with late antenatal care initiation was limited in the area. So I intended, knowing magnitude and the determinants of late booking for antenatal care is very critical for announcing policy makers to design effective strategies to continue the maternal and neonatal mortality and morbidity reduction.

Objective: To assess magnitude of late initiation of antenatal care and associated factors among antenatal care followers at public health facilities in south Achefer district from North Go jam, Ethiopia, 2024.

Methods: Facility based cross-sectional study was conducted on 421 pregnant mothers in South Achefer District, 2024. Study participants were selected using systematic random sampling technique. Data was entered using Epidata version 4.6 and SPSS version 23 was used for analysis. Variables with P-value < 0.25 at 95% confidence interval in Bivariable logistic regression were included in multivariable logistic regression. **Result:** The prevalence of late ANC booking was two hundred seventy nine (66.43% 95%CI, 61.4-70.1 %) in this study area. Didn't read and write (AOR=2.441, 95%1.1465.198), Being farmer (AOR=3.549; 95%CI, 1.182-10.656), parity (primiparous) (AOR=0.290; 95% CI, 0.090-0.936), missed period of pregnancy (AOR=4.358; 95%CI, 2.409-7.886) and perceiving inappropriate time for first ANC (AOR=2.762, 95%CI, 1.267-6.020) were associated with late initiation of ANC.

Conclusion and Recommendation: The prevalence of late initiation of ANC still remains a high in the study area. Missed period, Didn't read and write, perceiving inappropriate time of first ANC visit, husbands occupation is farmer and being primiparous were all found to be significant associated with late ANC booking. It is important to provide information, education and communication that could address timely initiation of pregnant mother and on early identification of pregnancy recognition by urine test

Keywords: late antenatal care, magnitude, associated factors, Ethiopia

1. INTRODUCTION

1.1. Background

Antenatal care is a care given to a pregnant women and it is a key maternal services in improving a wide range of health outcome for women and their new born and mitigate pregnant related problems(1). Since normal physiological symptoms of child bearing mothers and pregnancy related medical complicated mothers are difficult to differentiate and early antenatal care initiation can mitigate thoroughly(2).

In 2016, the WHO approved a new ANC model with increased numbers of contacts from four visits to eight contacts, intending to reduce prenatal mortality and improve pregnancy outcomes. Recent evidence shows that eight or more ANC contacts can decrease prenatal deaths by 8 per 1000 births in comparison to four visits(3).

In the cycle of reproductive health care, antenatal care give important health benefits, which includes health promotion, disease prevention screening, diagnosis and management by providing timely and appropriate evidence based, follow up. Antenatal care can improve both prenatal and maternal outcome and provide an opportunity to communicate with and support pregnant mother and their families(4).

Late antenatal contact is a time of visits provided after the first trimester and initiation of antenatal care >12wks of gestational age. All pregnant ladies are recommended to go for their first antenatal care checks up to their first trimester to identify and mitigate any medical complication as well as to screen any risk factors that may affect the progress and outcome their pregnancy(5).

As stated to 2015 study, about 303 000 of women and adolescent girls died from maternity- related problems and about 2.6 million babies were stillborn internationally. More than80% of this mortality can be prevented, if the pregnant women or adolescent girls had been able to get intensive antenatal care. The majority (99%) and 98% of maternal and child deaths, in the order, occurred in developing and middle income countries(8).

Regardless of the 2015 commitment, about 295,000 women died globally during and following pregnancy and childbirth in 2017 (54). To reduce maternity- related complications, various maternal healthcare services are being applied. Among those services, antenatal care (ANC) service is pillar and key strategies to scale down maternal and neonatal morbidity and mortality directly through the sensing and treatment of maternity related illnesses(9).

Around 2 million stillbirths in the year 2019 and 2.4 million neonatal deaths in the year 2020 were stated worldwide. Where the health systems are not much enough in access and minimum health services utilization package(6,55). In sub- Saharan Ethiopia share high number of maternal mortalities 412/100,0000 live birth this in turn the country rank fourth from ten top high maternal mortality yearly(6).

The hazard of risk pregnancy outcomes, such as stillbirths, preterm births, and low birth weight, can be mitigated through corrective action provided to pregnant women at ANC, such as deworming, iron and folic acid supplementation, and intermittent preventive treatment of malaria during pregnancy. Ethiopia lags behind in terms of coverage of ANC(10).

Different studies have shown that women who beginning ANC follow up early and attended frequently were more likely to be assisted during child birth by health professional as compared to those who initiated ANC late and has few follow up record(11)..Informed pregnant mother, account of early follow up, maternal age and visual image of the enormity of ANC care per maternity were significantly related with the early ANC care; thus, informing and set up the importance of early ANC care need to be accented at the time of delivery provided(12).

To increase the uptake of ANC services early, the government of Ethiopia together with other non-governmental organizations (NGOs) has compelled different drives that strength access such as primary health care expansion, health extension programs, and charge free maternal health services(13).Even though, all these efforts made, in Ethiopia, the late initiation of first ANC visits during the first trimester as recommended by WHO is still high, and less pregnant women attend their first ANC visits early(14, 15).

1.2. Statement of the problem

Regular contact in the recommended time of the antenatal care by skilled health care providers during pregnancy allows women to receive more health benefits for their health and their babies. Early antenatal care initiation alleviates adverse outcomes of pregnancy-related complications(16).Due to the high burden and its consequences, maternal health is one of the top priorities in the national health agenda, guided by global health initiatives and support from different international communities to improve maternal health(17).

According to WHO 2020 fact sheet, every day approximately 800 women die from preventable and treatable causes related to complications during and following pregnancy and childbirth. Of those 99% of all maternal deaths occur in developing countries every day. As stated in south Achefer woreda from 2022-2023 there were a total of 6 maternal death, among those more than 83% of the died mother has late booking of ANC initiation history in their pregnancy period and 50% death were due to pregnancy induced hypertension and post portal bleeding after home delivery(48).

This is due to more experienced injuries or other debilitating outcomes due to low quality and late initiation of antenatal care follow up(16, 18). late initiation of first antenatal care service appear to have higher rates of poor pregnancy outcomes, such as prenatal mortality, low birth weight, pre-term birth low Apgar scores as well as the incidence of maternal anemia and pregnancy induced hypertension (PIH) were found to be related to late ANC booking**,** those can be easily resolved in first ANC visit (17, 19).

Some of the data shows that many pregnant women attend their first ANC visits after the first trimester. Evidence indicated that globally 43% of pregnant women initiate their first ANC visit timely, although there is a huge discrepancy between developed and developing regions(7, 20).For example, compared to the developed region, where 85% of pregnant women start their ANC follow-up in the first trimester, only 45% in developing regions, and this stands at 25% for SSA(21). EDHS 2016 also showed that, 42% of first ANC attendants were initiated lately(22).According to the systematic review conducted on delayed initiation of ANC in Ethiopia, prevalence of late initiation of ANC was 64%(23).

According to mini EDHS 2019 late initiation ANC was 43%. According to the study in Dar es Salaam reported that perceptions of antenatal care, past experience with pregnancy, fear of pregnancy disclosure, socio-cultural beliefs, and behavior and knowledge level were key individual and social factors for late ANC attendance. Facility related factors that influence ANC attendance include outcomes for patients, equity, efficiency, process quality, humanity are related to late ANC booking(24, 25).

Timely antenatal care in the first three months of gestational period is very important for screening and treating bad outcome that occur in the time pregnancy and child bearing age. However, as I have reviewed different literature, prevalence's and determinants related with late initiation of ANC are different across value and studies. The study also limited in the rural setting. Thus, assessing the factors associated with late initiation of ANC booking in different set- ups is key determinant in improving maternal and child health services. Therefore, assessment of late ANC initiation, and its associated factors has a major public health importance to come up with strategies that could escalate maternal and child health outcome, the quality of ANC service provision and timing of first ANC initiation in south Achefer district at public health centers (HCs) in North Go jam, Ethiopia.

1.3. Significance of the study

Increasing maternal and newborn health is one of the unaddressed issues of MDG and remains a high priority of SDG and this will be achieved by proper health care service during pregnancy, labor and delivery and post-natal care.

Timely antenatal care will play an essential role for early identification of problem and expressing an entry for the continuity of care and it will address unaddressed area. Knowing the determinants of late booking for antenatal care in different part of Ethiopia is very critical for announcing policy makers to design effective strategies to continue the maternal and neonatal mortality and morbidity reduction. The result of the current study will provide helpful information for the local health office, ministry of health, and other stakeholders to plan effective strategies for sustainable maternal and neonatal health. Furthermore, this study will be used as a baseline for further investigation on maternal and neonatal health.

2. LITERATURE REVIEW

Introduction to literature review late antenatal initiation

This literature review focuses on two areas. First, the review shows about magnitude of late ANC initiation in different part of the world. Second, the review state and synthesize about factors associated with late ANC initiation. This includes those factors that has positive or negative associate with late ANC initiation from global to local perspectives. Those determinates are classified in four thematic areas. Socio-demographic and economic factors, Maternal, knowledge and husband related factors, Obstetric related factor and health service utilization related factors. Logical flows of idea for those factors are synthesized.

Magnitude of late antenatal care

The WHO identifies ANC as one of the most widely used strategies to improve maternal and child health and the recommendations are designed to be adaptable and flexible; based on their country context and populations' needs(26).

Most pregnant women have access to skilled antenatal care at least once, but globally only 60 % receive antenatal care visits; where as 87% of pregnant women access antenatal care by skilled health personnel at least once. The lowest levels of four antenatal care are observed in sub-Saharan Africa 53 % and South Asia 49 % (27).

Study conducted in different African countries like Ghana 2022, and Gambia 2023 the prevalence of late accessing antenatal care booking among study participants were 44.8%(28).and 57%(25) respectively. Evidence show in Ethiopia for antenatal care follow up as Ethiopia Mini Demographic Health Survey, the prevalence of delayed ANC initiation was 62.3%)(29). and different studies done in different part of Ethiopia like Addis Ababa city 2023 showed that 47%(30).

Study in Harare Town, Ethiopia 2022,(34.3%) of pregnant mothers started ANC late in either second or third trimester(31). Study done in south west Ethiopia, 70.0% of pregnant were delayed first ANC bookings(32). The prevalence of late ANC visit was 57.7%, study done in Hawassa Public Health Facilities, South Ethiopia, 2019(33). 48% pregnant women were initiated their first ANC late in jimma Zone Public Hospitals, Southwest Ethiopia, 2020(34).

Magnitude of late antenatal care initiation was 74.60% with 95% CI (70% to 79%) study conducted in Mehal-Sayint district, South Wollo zone, North-east, Ethiopia 2021(35).

According to study conducted in debre-markos public health institution, East Gojam Ethiopia 2018, the prevalence was 33.4%(36).

A study conducted in Addis Zemene primary hospital, South Gondar, Ethiopia 52.5% of late antenatal booking was (37).

Study conducted in hayatabad medical complex, 2024 prevalence of late booking was 16.67 % (53)

Associated factors with late initiation

Socio-demographic and economic factors

Several studies were conducted in different parts of the world to asses factors associated with late initiation of antenatal care and studies suggested that there is a significant association between late initiation of antenatal care and socio demographic factors like age of the mothers, educational and occupational status of mothers and husbands, place of residence family size, monthly income and transportation cost.

Age has an association with late antenatal care, the study was done on cross- sectional design to determine the burden and factors associated with late initiation of antenatal care in Ghana 2022, the multivariable regression analysis showed that participants 'age 35 years and above booking late for ANC was nearly 9 times more compared with those between the ages of 15–24years(28).Evidence from Gambia demographic and health survey data,2019-20 show that, the odds of late ANC initiation among women age 25–34 and 35–49 decreased by 23% as compared to age group 15–24(25).maternal age(20-25) has significant association with late antenatal booking in Addis Ababa,2023(30). age >25 is a significant factor as study done in illubabur,2021(38).

Level of education has significant association to late booking of antenatal care as evidence supported such as: study in Ghana 2022, partners had no formal education was 3 times more late for ANC initiation as compared to who had basic education (28).results show that level of education(tertiary) has significant association with late initiation of ANC booking(24, 25).

Study in mini EDHS multilevel analysis, 2019 show that, education level (no education and primary education) has an association with late initiation(39).Study done at Debre-markos town in 2018,rural setting, no formal education significantly associated with late initiation of antenatal care(36).

Occupational status has significantly associated to late initiation of antenatal care such that: Ghana 2022, participants' informal occupation booking late for ANC service were 3 times more as compared to formal occupation(28).

Study conducted in Gambia 2023 , magnitude and determinants of delayed initiation of antenatal care among pregnant women; evidence from Gambia demographic and health survey data in Women residence in urban area were less likely to late ANC booking as compared to women who were rural residence(25).Study in mini EDHS multilevel analysis, 2019 show that urban residence has significant association in the lower odds of late antenatal care(39).rural residence were significantly associated to late initiation of ANC booking(38).Pregnant women from rural place of residence were 6.73 times more likely of late ANC initiation for women from urban place of residence(35)

Family size has significant association with late antenatal care and this is justified by a study conducted in Illu-babur Zone southwest Ethiopia 2021 respondents living within a family size of four and above had 2.25 times higher odds of late first ANC visit as compared to those who were living within three and less family size(38).

Monthly income, poorest economic status has great association with late antenatal care(39).monthly income of the family has significantly associated with antenatal care utilization as a study conducted in Debre-markos 2021(40)

Being married has significant association with late antenatal care as study conducted in Addis Ababa 2023, similarly transportation cost has significantly associated with late initiation of ANC(30).

Maternal, knowledge and family related factors

Different studies were identified a number of factors that related to pregnant women, knowledge and husband related factor make ANC initiation delayed to book their first ANC visiting.

Knowledge of ANC services has greatly associated with late for ANC. Study conducted in Ghana 2022, the odds of participants that had adequate knowledge of ANC services booking late for ANC was 79% less compared with those that had inadequate knowledge of antenatal care(28).perceiving starting time, no awareness of danger sign significant association with late initiation ANC(39).poor knowledge about ANC more likely to book late for ANC as compared to those who had had good knowledge(41).pregnant women who perceiving the correct time of ANC booking greater than 12wks of gestation were more likely to delay the ANC initiation than those who perceive less than 12wks of gestation and having a wrong perception about the timing of the first ANC visit greatly associated with late(30).

Some of the maternal related factors that has an association to late antenatal care from different studies: Gambia demographic and health survey data, the odds of late ANC initiation among women who had less than eight ANC visits were 18.26 higher than women who had eight and more ANC visits(25).

The odds of late ANC initiation among women who did not plan their last pregnancy increased by 59% as compared to women who planned their pregnancy(25).Study done at Debre-markos town in 2018, unplanned pregnancy were significantly associated with late antenatal care booking, in that women whose pregnancy unplanned were more likely to start ANC late as compared to planned pregnancy(30).

Cross sectional study done to determine late antenatal care initiation and its associated factors in Illu-babur zone 2021, Women who had not attended ANC during their previous pregnancy had 3.32 times higher odds of late first ANC visit as compared to women who attended antenatal care during the past pregnancy (38). Pregnant women who had no

ANC for previous pregnancy were more likely to start their ANC lately compared to those who had ANC for previous pregnancy(30).

Women health developmental army has an association with late initiation antenatal care: on cross sectional study done in Illu-babur zone 2021 ,woman who was not a member of the women's health development army had 2.35 times higher odds of late first ANC visit compared to those who were member of women health developmental army(38).

Husband support, mothers who came to health facilities alone during ANC booking were more likely to initiate late for ANC follow up as compared to those came with their husbands(40). Women delayed attending clinic early due to their ignorance of the exact gestational period for one to start the clinic pregnant mothers who recognized their pregnancy by missed period were more likely to book late for ANC follow-up as compared to those recognized by urine test(41). A study conducted in Mehal-Sayint district south Wollo 2020 on facility based cross sectional study, the odds of late ANC initiation for pregnant women not attending ANC conference was 2.59 times the odds of late ANC initiation for women attending ANC conference(35).

Family planning utilization has significant association with late ANC booking. No history of family planning utilization was significantly associated to late initiation of antenatal care follow up. Disclose pregnancy status before they go for ANC initiation is less likely risk for late initiation. Decision power for pregnancy mother is more likely for early initiation of antenatal care(35).pregnant women who get advice from any one are less like to late first booking of ANC as compared to those women didn't received advice from anyone(24, 25). Women who get advice from health care providers are less likely to late first ANC booking as compared to those who received from others like TV, Radio(42).

Obstetric history and service utilization

Evidence from Gambia demographic and health survey data show that, the odds of late ANC initiation among women who had previous cesarean section higher than women who had had no cesarean section(25).

Parity was another predicting factor that affected delayed initiation of ANC. In this regard A facility based cross-sectional study was conducted in dare s salaam, 2023 to determine prevalence of antenatal initiation, and results show that gravidity and parity(3-4) has significant association with late initiation of ANC booking(24, 25). Women with no parity (nulliparous) were less likely to have delayed their ANC initiation as compared to women who were primipara and above (15).

Lack of history of abortion affect delayed initiation of antenatal care in the study conducted jimma town, south west Ethiopia, 2020(34).

No history of obstetric complications has significantly associated to late antenatal care as study conducted in Hawassa south Ethiopia, 2019(33).

Another institutional based cross-sectional study for determining late initiation of antenatal care and its associated factor was done in Harare 2022, from this study previous child death(41).Women who had gave live birth are 2 times more likely having early booking than those women who had a history of child death(41).

Health facility related factors

Cross sectional study done to determine late antenatal care initiation and its associated factor in Illu-Ababora zone 2021,distance from health center takes greater than one hour are more likely the risk for late initiation of late antenatal care booking as compared to those who takes < 1 hours(38).

Pregnant women who did not know working about the service delivery during working hours in the institution were less likely to be late for ANC initiation than mothers who knew about the service delivery through time in Mizan-Aman town, South West Ethiopia, 2022 and waiting time (1:30-2hours) has significantly associated to late initiation of antenatal booking(32, 41)

Waiting time has significant association with late ANC. Those women had waited time of 1:30-2hours before having the service are less likely to book first ANC as compared to those pregnant mothers who had service utilization more than 2 hour(24, 25).

Health insurance, the odds of late ANC initiation among women who had no health insurance coverage increased by 78% as compared to women who had health insurance coverage(25).

Transport cost has significant association , the bulk of their reasons for delays were linked to long distances being travelled, leading to the payment of expensive taxi fees(43).

3. Conceptual frame work

The model show hypothesized variables in different thematic area were associated to central part of the outcome variable as reviewed from different literature shown in fig 1.

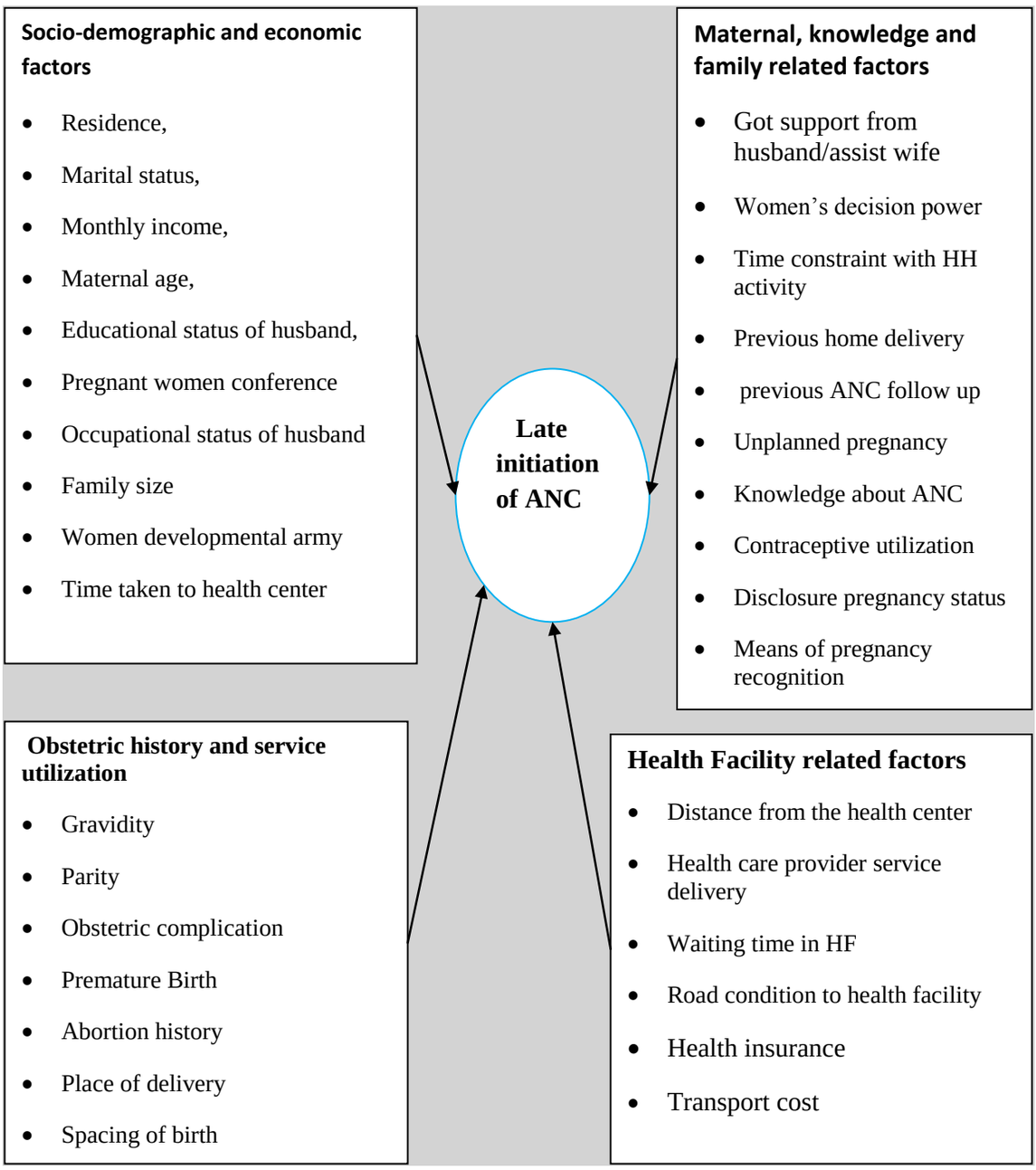

Figure 1 Conceptual Framework for factors Associated with late ANC initiation among pregnant Women, adapted from different literatures (34, 35, 37, 38, 44-47)**,**

4. OBJECTIVE OF THE STUDY

4.3. General objective

The aim of this study was to assess magnitude of late initiation of antenatal care and its associated factors among pregnant women in south Achefer district, 2024

4.4. Specific objective

- To assess magnitude of late initiations of antenatal care at south Achefer district public health facilities, 2024.

- To identify associated factor for late initiation of antenatal care in those public health facilities in south Achefer district north Go jam Ethiopia from.

5. METHODS AND MATERIALS

5.1. Study area

The study was conducted in south Achefer woreda, North Go jam Ethiopia, which is located 538 Kilometers Northwest of Addis Ababa, the capital City of Ethiopia,60km from Bahir Dar with a total population estimated to be 177,754 and 41914 of them were women of reproductive age group. Administratively the woreda is structured into 26 Keble with a total of 8 governmental health centers. The woreda had more than 30 private clinics. All health facilities in the woreda provide ANC services. In the district administration health department office there were 5990 women expected to be pregnant and annul ANC coverage was less than 70% in 2024. There were 172 health care providers including health extension worker, among those 24 are midwives (48).

5.2. Study design and period

A health facility based cross-sectional study was conducted at south Achefer district, North Gojam Ethiopia from November 22, 2024–December 22, 2024.

5.3. Source population

All pregnant women who attend ANC service in the public health facilities at South Achefer district.

5.4. Study population

All pregnant women who attend ANC service in the selected public health facilities during study period.

5.5. Inclusion and exclusion criteria

Inclusion criteria

Women initiated ANC service during the study period in the selected health center those who were visited and volunteer were included in the study.

Exclusion criteria

Women who have unknown gestational age and/ pregnant women who had danger signs of pregnancy /are seriously ill were excluded from this study.

5.6. Study variables

Dependent variable

Late initiation of ANC >12 weeks of gestational age/ANC<=12 weeks of gestational age

Independent variable

Socio-demographic and economic factors such as: maternal age, educational status, occupation, marital status, religion, family size, residence, and husband's education and occupation.

Obstetric history of pregnant mother such as: gravidity, parity, history of abortion, premature birth, birth interval and place of delivery.

Maternal-Pregnancy and family related factors such as: means of pregnancy recognition, disclosure pregnancy status for someone, plan of pregnancy, and Women's decision power, and previous pregnancy complication, ANC conference, knowledge and awareness of the time of first ANC. Got support from husband/assist wife, Time constraint with household activity, previous home delivery, women's health developmental army and contraceptive utilization.

Health Facility related factors such as**:** Distance from the health center, Health care provider welcome /commitment, Fear of long waiting time in health facility, poor road condition, and health insurance.

5.7. Operational and term definitions.

Knowledgeable about ANC: A total of 9 questions to assess knowledge of women about ANC were asked. Each correct answer was given value "1" and wrong answer as "0". Then women who answer correctly 5 and above consider as knowledgeable, otherwise they have poor knowledge(51).

Estimated house hold income: It was estimated annual house hold income and classified as low level income, if it is below the median/second quartile and high level of income above the second quartile(52).

Women's health developmental army: Enormous voluntary structural arrangement that involves women's development team and one-to-five connections to advance population health and renew the health benefit(52).

Antenatal care: is pregnancy- related services given by skilled healthcare providers starting from conception up to the onset of labor(4, 7).

ANC initiation: The first visit by a pregnant woman to the health facility for the purpose of initiating antenatal care services(4).

Early ANC: is the first ANC received as soon as the pregnancy is suspected until 12 weeks of gestational (4).

Late initiation of antenatal care: Pregnant mothers come to follow up after 12 completed weeks(53).

5.8. Sample size determination

Single population proportion formula was applied to determine the sample size with the following assumption late initiation of ANC was taken in public health facilities in south Achefer district with 95% confidence interval , as the previous study in Gondar and p = 52.5%(37),marginal error of 5%, and 10% non-response rate.

$n = (Z\ \alpha/2)^2 P\ (1-P)/d^2$

$n= (1.96)^2\ 0.525(1-0.525)/\ (0.05)^2$

n=3.8416(0.525*0.0475)/0.0025= 383

Where, n=sample size; Z α/2 = Z value at 95% level of confidence (1.96); P is the proportion of late initiation of ANC; d=the margin of error at 95% CI.

By considering 10% non- response rate (38), the final sample size was 383+38 = 421

For the second objective, sample size was calculated using Epi info 7 at south Achefer district.

Table 1.Sample size calculation for the factor associated late initiation of ANC review from different literature, south Achefer district, north Gojam, Ethiopia, and 2024.

Variables	OR	Confidence level	Power	Sample size	NNR (10%)	Total SS	References
Poor knowledge	3.6	95%	80%	104	10	114	(37)
Self-employment	3.5	95%	80%	196	20	216	(37)
Transport cost	3.9	95%	80%	136	14	150	(37)
Being House wife	3.4	95%	80%	120	12	122	(35)
Unplanned pregnancy	2.4	95%	80%	310	31	341	(35)

5.9. Sampling technique

Simple random sampling was applied to select 4 health centers by lottery method and systematic random sampling technique with k^{th} interval, k=2 for each health center, first mother were selected from ANC attendant. In order to get a representative sample from the source population, overall performance of the district and performance of those four health centers has been reviewed. Based on evidence/data from district health office, a total of 1000 (284 from Ashuda HC, 404 from Durbety HC, 198 from Lalibela HC and 114 from Zhibist HC) pregnant women attend ANC service in two month performance. So, final sample was calculated based on proportional allocation of ANC load in each selected health centers as shown in figure 2

Schematic presentation of the sampling frame for quantitative study, selecting calculated sample size

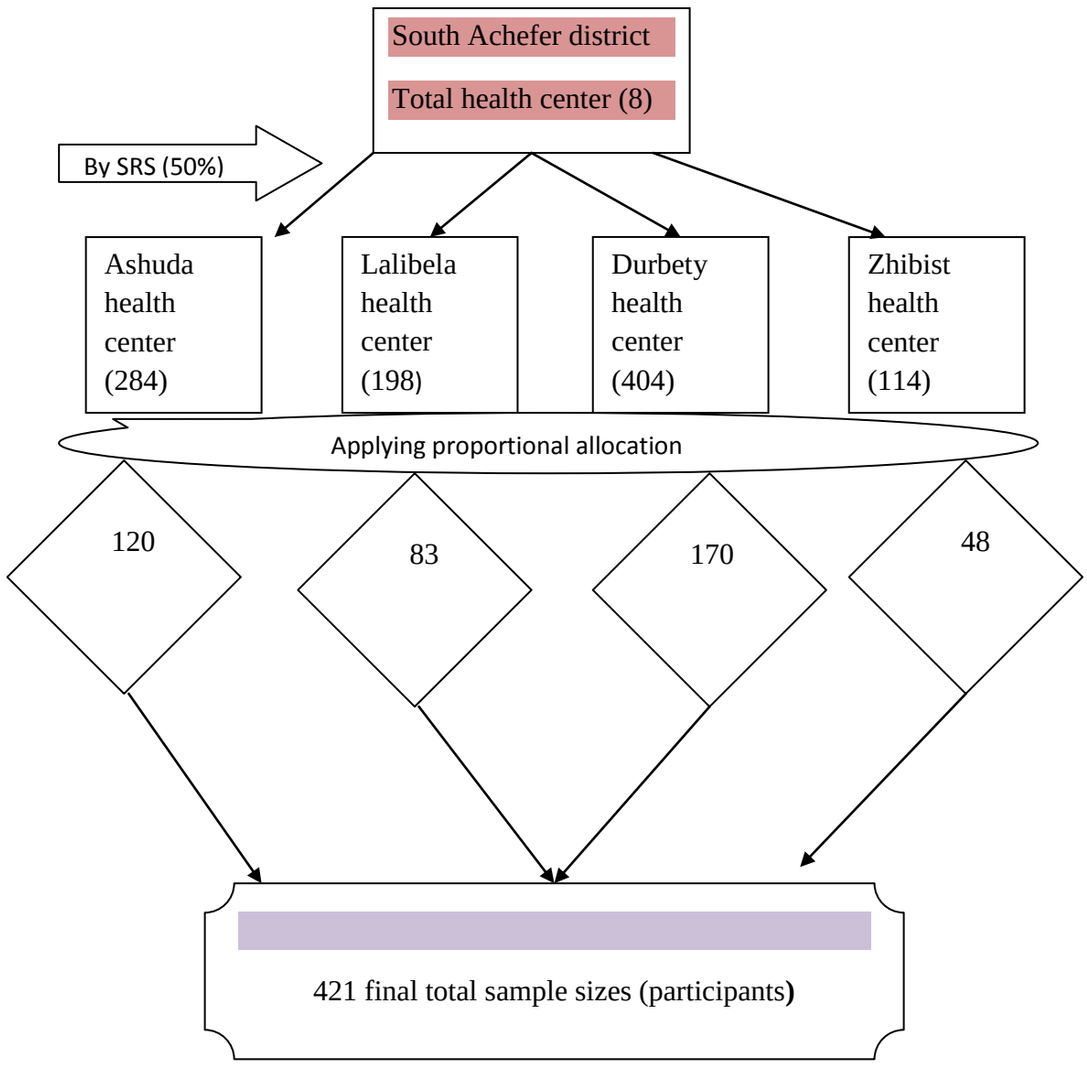

figure 2 schematic representation of sampling procedure for late initiation of antenatal care selecting final study unit in south Achefer district among pregnant mothers, 2024

5.10. Data collection procedure and instrument

Data collection tools were developed after reviewing different literatures (35, 45, 46, 49). A structured questionnaire was used to address all variables. Data was collected by face-to-face interview using interviewer administered questionnaire. The questionnaire contains socio-demographic and economic factors, obstetric related factors, maternal and family related factors, and health facility related factors. Epidata version 4.6 was used to enter the data, and SPSS version 23 was used to analyze it.

5.11. Data quality control/assurance

To ensure the quality of the research, training was given for one day to 4 diploma midwives for data collectors and 2 BSC midwife for supervisors. Questionnaire were prepared in English version and translated to Amharic language (local language). Then final Amharic language questionnaire was re-translated to English language to check for inconsistency or distortion in the meaning of words in the content of the instruments.

Pretests were carried out in 5% of the sample size before the actual data collection performed at Lihudy health center in south Achefer public health facilities, to assess the validity and reliability of the questionnaire to check the clarity of questions, ambiguity, arrangement of questions, order and options for the questions, and skipping pattern accordingly. The whole data collection procedures were closely supervised by field supervisors and investigators to ensure the completeness and reliability of the gathered information throughout the data collection process.

5.12. Data analysis procedure

The data was entered, coded and cleaned using Epidata V.4.6. After completion of the entry, the data was exported to SPSS V.23 for analysis. Missing data were managed by observing cross- tabulation result, percentages and frequency. Bivariable logistic regression model was apply to identify the association between independent variables and dependent variables, and variables with a p value of less than 0.25 were selected as candidate variable for multivariable logistic regression analysis to determine various factors on the outcome variable. Multivariable logistic regression model was applied to select significant factors and for controlling confounding effect. Adjusted OR (AOR) with a 95% CI was used to identify the independent predictors of late initiation of ANC. P- values less than 0.05 were taken as statistically significant. The goodness of fit of the model was assessed using Hosmer-Lemeshow's statistical test with P_value 0.47.

5.13. Ethical consideration

Ethical clearance and official letter were obtained from Bahir Dar University College of medicine and health science institutional review board with reference number RDD/87/2017 and Amhara regional health bureau were write official letter with reference number APHI 03/38 to North Gojam zone and north Gojam zone write official letter with reference number.1050/03/17 to south Achefer woreda health office and the administrative with reference number 446/18/05 were write a formal letter to public health facilities based on letters from IRB and north Gojam zone. Study participants were informed about the purpose and objective of the study. They had also told that they had every right to discontinue or refuse to participate. For the confidentiality of the information, the questionnaire was not containing the name of the study participants. Non-involvement otherwise were not affect the clinical care they might receive and there is no risk to the study participants because of this study other than taking their time for interview not more than 20-30 minutes. For a pregnant woman who had verbally consent to participate in the study, the interview was conducted using pretested interviewer administered questionnaires.

6. RESULT

Socio-demographic characteristics of the respondents

A total of 420 pregnant women participated in this study with a response rate of 99.8%. More than half, 272 (64.8%), of the respondents, were age >=25 years. The mean age of study participants was 27.79 years with standard deviation (SD) of 6.3. Two hundred sixty-four (62.9%) respondents were lived in rural and 178 (42.40%) women not read and write. Majority, 321 (76.4%), of the respondents had family size >3 and 258(61.40%) of the respondent were arriving at health institution ≤ 1hours. One hundred twenty two (29.0%) and beyond half 258(61.5%) of respondent's husband were not read & write and 61.43% were farmers respectively (Table: 2**).**

Table - 2 Socio-demographic characteristics of the pregnant women to assess late initiation of ANC among pregnant women, south Achefer public health facilities, Ethiopia, 2024 (N=420)

Variable	Characteristics	Frequency	Percent
Age	15-24	148	35.23%
	25-34	187	44.52%
	35_49	85	20.23%
Marital status	Married	411	97.85%
	Unmarried	9	2.14%
Place of residence	Rural	264	62.85%
	Urban	156	37.14%
Religion status	Orthodox	406	96.67%
	Muslim	14	3.33%
Educational status	Not read and write	178	42.38%
	Read and write	92	21.90%
	Primary school	81	19.28%
	Secondary school	34	8.09%
	Diploma and above	35	8.33%
Occupational status	House wife	345	82.14%
	Merchant	42	10.00%
	Employer	21	5.00%
	Other	12	2.85%
Husbands education(n=417)	Not read and write	122	29.05%
	Read and write	96	22.86%
	Primary school	96	22.86%
	Secondary school	57	13.57%
	Diploma and above	46	10.95%
Husbands occupation (n=417)	Farmer	258	61.43%
	Merchant	102	24.29%
	Employer	25	5.95%
	Daily Labor	32	7.62%
Family size	<=3	99	23.57%
	>3	321	76.43%
Time taken to arrive health center (hrs)	<=60minute	280	66.67%
	>60minute	140	33.33%
House hold level Annual income	Low level income	225	53.57%
	High level income	195	46.43%

Timing of antenatal care initiation of the study participants

Among 420 pregnant women included in this study, 279 (66.43%, 95%CI = 61.4_70.1%) participant was booked after 12 weeks of gestation for their first ANC visit. The data show that time of first ANC initiation ranges from 4th weeks to 36th weeks of gestation as

shown in fig 3. The mean gestational age of respondents at first visit was 16.97 weeks with the standard deviation of 7.15.

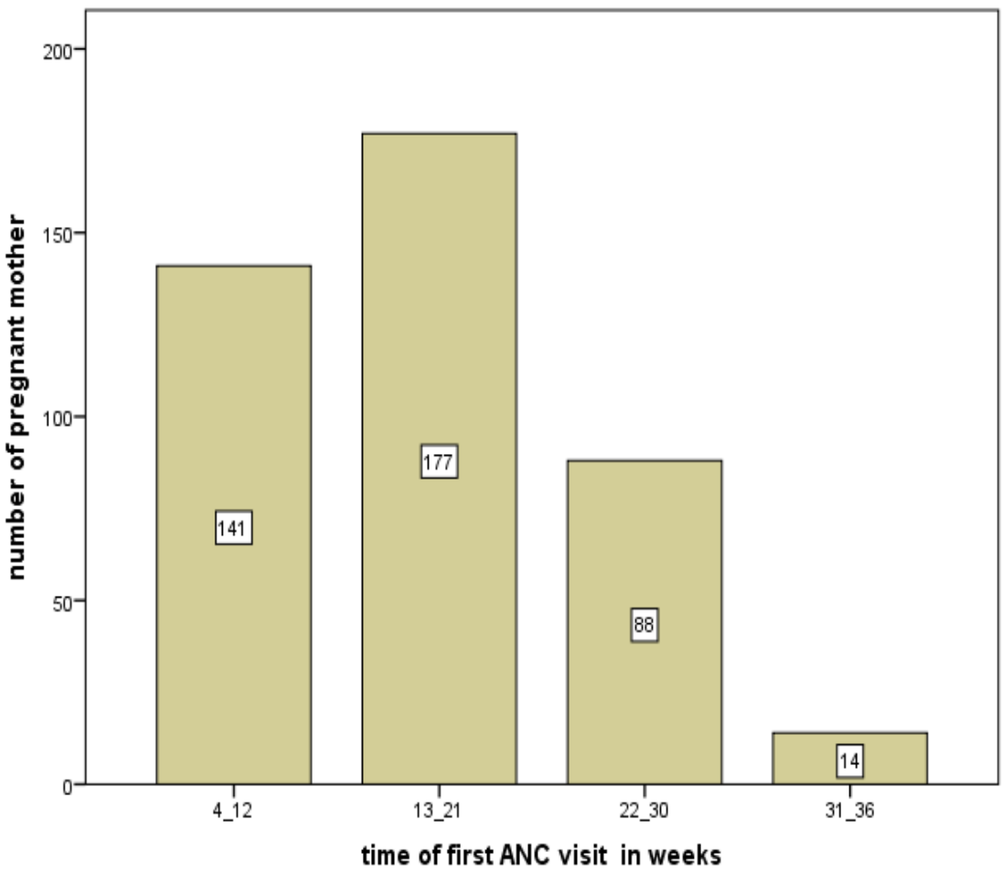

Figure 3 Timing of first visit for pregnant mothers in weeks at south Achefer districts from selected public health facilities, Ethiopia, 2024

Past obstetric history and service utilization of the respondents

Most, 336 (80.0%) of the respondents were multigravidia. Majority, 295(70.2%) of the respondents had disclosure status for their preceding pregnancy. Almost all, 410(97.62%) respondents were give birth and from these 95 (22.6%) of them were primiparous. Among 410 women who give birth 280 (88.7%) were delivered at health institution, only 49(11.7%) of those who delivered at health institution were delivered by cesarean section. (Table: 3).

Table 3 Obstetric history of pregnant women who were attending ANC at South Achefer district for selected public health facilities, November-December 2024 (n =420)

Variable	*Characteristics*	*frequency*	*percent*
Gravidity	Primgravidia	84	20.00%
	Multigravidia	336	80.00%
Parity	*primiparous*	95	22.62%
	Multiparous	325	77.38%
Place of previous delivery(n=413)	*Home*	133	31.67%
	health institution	287	66.67%
Mode delivery(n=413)	Cs delivery	49	11.67%

	Spontaneous vagina delivery	364	86.67%
Disclosure status	Yes	295	70.23%
	No	125	29.77%
Previous ANC follow up history >once	Yes	303	72.14%
	No	117	27.86%
Still birth	Yes	41	9.76%
	No	372	88.57%
Family planning utilization history	Yes	370	88.10%
	No	50	11.90%
Abortion history	Yes	59	14.04%
	No	361	85.96%
Pregnant women conference	Yes	177	42.14%
	No	243	57.86%
Spacing pregnancy	1-2 Years	78	18.57%
	>2years	335	79.76%

Knowledge of women about antenatal care

Out of the total 420 respondents, majority (70.48%) had good knowledge about ANC. Of them 417 (99.3%) know about ANC. The majority, 414 (98.65 %), of respondents rated that ANC contact is important for the mother as well as the fetus. Three hundred eighty six (91.9%) of the respondents perceived that at least 8 ANC contact were necessary for pregnancy. Around 200 (47.6%) of the participants had knowledge about the recommended time of ANC initiation (<=12wks). Also, 260 (61.9%) participants perceived that ANC is not only for history of illness but also for health pregnant mother. Four hundred four (96.1%) knew that pregnant mothers need supplementation in their pregnancy and 401(95.5%) of the respondents knew ANC can reduce infectious disease. Moreover, 403(95.95), perceived that appropriate ANC follow up can prevent feto-maternal anemia (Table**:** 4).

Table 4 Pregnant mother's Knowledge about ANC at south Achefer public health facilities, 2024, North Gojam Ethiopia (n=420)

Variable	description	frequency	percent
ANC beneficial for the mother	Yes	414	98.57%
	No	6	1.40%
ANC beneficial for the fetus	Yes	413	98.33%
	No	7	1.67%
Only mothers who had previous pregnancy complications will attend ANC follow	Yes	160	38.09%
	No	260	61.90%
Appropriate time to begin ANC after conception is <12weeks	Yes	200	47.61%
	No	220	52.38%
Woman needs to go for ANC>8 times throughout her pregnancy	Yes	386	91.90%
	No	34	8.10%
Pregnant mother needs supplementation during her pregnancy	Yes	404	96.19%
	No	16	3.80%
Maternal conditions risk for the fetus	Yes	394	93.80%

	No	26	6.20%
Antenatal care service reduces the infectious diseases	Yes	401	95.47%
	No	19	4.50%
Appropriate ANC follow up can prevent erythroblastosisfetalis	Yes	403	95.95%
	No	17	4.05%

Current pregnancy related factor

Out of 420 respondents, 259 (61.3%) had check their pregnancy by means of missed period. Majority, 276(65.7%) and 274(65.2%) of the respondents had history of illness in their current pregnancy and shortage of time with house hold activity respectively. One third of pregnant mothers respond that they didn't perceive appropriate time and purpose of first ANC visit by the time they come for follow up (Table 5).

Table 5 current obstetric history of the pregnant mothers at south Achefer health facilities North Gojam, Ethiopia 2024 (n=420)

Variable	***Description***	***frequency***	***percent***
Means of pregnancy recognition	Missed period	259	61.3%
	Urine test	161	38.3%
Planning of pregnancy	Planned	410	97.6%
	unplanned	10	2.4%
Who planned the pregnancy(n=410)	Myself	41	10.0%
	My husband	24	5.9%
	Both	345	84.1%
Illness of current pregnancy	Yes	276	65.7%
	No	144	34.3%
Shortage of time with house hold activity	Yes	274	65%.2
	No	146	34.8%
Decision power for ANC follow up	Yes	378	90.0%
	No	42	10.0%
Advised to start ANC	Yes	270	64.3%
	No	150	35.7%
Reason why they start ANC by this time	Family advised me	102	24.3%
	Previous experience	73	17.4%
	I don't know if I am pregnant	17	4.0%
	Didn't know right time and purpose	141	33.6%
	Perceiving appropriate time	87	20.7%

Health care-related problem

In this study, most, 265 (63.1 %) of the respondents for complete ANC service in the health center were wait <2 hours. Majority, 383(91.2%) of the respondents were comfortable, the service provided by health care provider at health center Table 6.

Table 6 health facilities related factors of the pregnant mother at south Achefer public health facilities, north Gojam, Ethiopia, 2024 (n=420).

Variable	*Description*	*Frequency*	*percent*
Waiting time	<2hours	265	63.1%
	2-3hours	123	29.3%
	>4hours	32	7.6%
Comfortable Service given by health provider at health center	Yes	383	91.2%
	No	37	8.8%
Do you have treat for ANC service	Yes	140	33.3%
	No	280	66.3%
Return more than once for any service	Yes	388	92.4%
	No	32	7.6%

Factors associated with late antenatal care initiation

Based on bivariate and multivariate logistic regression analysis: age, residence, maternal education and occupation, husband's education and occupation, time taken to arrive health facilities, family size, gravidity, parity, place of delivery, mode of delivery, pregnancy recognition, house hold activity, illness during pregnancy, reason for booking the current pregnancy by this time and history of abortion were selected as candidate variable with late ANC initiation.

Pregnant mothers who didn't read and write, being husbands occupation is farmer, being primiparous, missed period and didn't perceiving appropriate time <12weeks were significantly associated with late initiation of ANC. This study showed that pregnant mothers didn't read and write were 2.441 times more likely as compared to counterpart, pregnant whose husband were farmers were 3.549 times more likely being late for ANC initiation as compared to those whose husbands were daily labor (95%CI = 1.182-10.656), pregnant mother who were primiparous were 71% less likely for late ANC initiation as compared to those who were multiparous (95%CI= 0.090-0.936).

Pregnant mother who were check their pregnancy by means of missed period were 4.358 times more likely for late initiation as compared to those who were checked by urine test (95%CI =2.409-7.886), mothers who didn't know the right time of first ANC initiation and purpose were 2.762 times more likely to initiate late ANC as compared those mothers who perceiving appropriate time other variables were constant (95%CI=1.267, 6.020).

Therefore, pregnant mothers didn't read and write, being farmer's occupation, missed period and not perceiving appropriate time and purpose, were significantly associated by increasing late ANC initiation while primiparous were significantly associated by decreasing late ANC initiation. Moreover all those factors are described below in table 7 based on multivariate logistic regression analysis.

Table 7-Predictor variables to pregnant mother for late initiation of antenatal care at south Achefer woreda, north Gojam, Ethiopia, 2024 (multivariate logistic regression analysis.(N=420)

Variable	Characteristics	Timing of first ANC		COD (95%CI)	AOD(95%CI)	P_value
		late	early			
Age	15_24	99	49	0.842(0.472,1.502)	0.469(0.181,1.219)	0.120
	25_34	120	67	0.746(0.710,2.332)	0.546(0.297,1.169)	0.531
	>35	60	25	1	1	
Place of residence	Rural	194	70	2.315(1.52,3.513)	1.619(0.820,3.198)	0.165
	Urban	85	71	1	1	
Educational status	Not read and write	134	44	7.614(3.592,17.090)	**2.441(1.246,5.198)****	**0.021**
	Read and write	61	31	4.919(2.100,15.524)	1.025(0.416,2.525)	0.957
	Primary education	51	30	4.250(1.797,10.053)	0.442(0.110,1.769)	0.248
	Secondary education	23	11	5.227(1.872,14.593)	1.950(0.375,10.088)	0.076
	Diploma and above	10	25	1	1	
Time to arrive HC	<=1 hrs	177	103	0.640(0.410,0.999)	1.129(0.587,2.172)	0.717
	>1hrs	102	38	1	1	
Occupation	House wife	245	100	1.750(0.543,5.644)	2.110(0.754,5.907)	0.155
	Merchant	22	20	0.786(0.177,1.843)	1.075(0.113,10.253)	0.950
	Employer	5	16	0.223(0.049,1.026)	0.706(0.130.3.844)	0.774
	Other	7	5	1	1	
Family size	<=3	55	44	0.541(0.341,0.860)	0.863(0.406,1.836)	0.702
	>3	224	97	1	1	
Husbands education (n=417)	Not read and write	81	41	4.083(1.984,8.404)	0.498(0.225,1.102)	0.086
	Read and write	73	23	6.559(3.024,14.229)	0.440(0.187,1.033,)	0.059
	Primary education	69	27	5.281(2.469,11.296)	0.304(0.098.1.940)	0.051
	Secondary education	40	17	4.863(2.104,11.240)	0.873 (0.203,3.753)	0.855
	Diploma and above	15	31	1	1	
Husbands occupation(n=417)	Farmer	197	61	3.660(1.727,7.759)	**3.549(1.182,10.656)****	**0.024**
	Merchant	61	41	1.686(0.758,3.750)	3.856(0.497, 9.935)	0.197
	Employer	5	20	0.283(0.085,0.942)	1.605(0.675,3.818)	0.285
	Daily labor	15	17	1	1	
Gravidity	Primgravidia	47	37	0.569(0.349,0.928)	1.955(0.538,7.102)	0.309

	multigravidia	232	104	1	1	
Parity	Primiparous	53	42	0.553(0.346,0.883)	**0.290(0.090,0.936)****	**0.038**
	Multiparous	226	99	1	1	
Place of delivery	Home	97	36	1.497(0.951,2.357)	0.794(0.435,1.449)	0.452
	Health institution	180	100	1	1	
Mode of delivery (413)	Cs	25	24	0.463(0.253,0.846)	0.464(0.202,1.063)	0.069
	Spontaneous VD	252	112	1	1`	
Disclosure of pregnancy	Yes	182	113	0.463(0.253,0.846)	0.566(0.296,1.083)	0.086
	No	97	28	1	1	
Pregnancy recognition	Missed period	209	50	5.434(3.505,8.425)	**4.358(2.409,7.886)****	**0.000**
	Urine test	70	91	1	1	
Illness in pregnancy	Yes	172	104	0.572(0.366,0.893)	0.664(0.352,1.255)	0.208
	No	107	37	1	1	
House hold activity	Yes	194	80	1.740(1.144,2.647)	1.400(0.757,2.588)	0.283
	No	85	61	1	1	
Reason why they start by this time	Family advised	67	35	2.844(1.573,5.142)	1.799(0.823,3.932)	0.141
	Previous experience	40	33	1.801(0.960,3.379)	0.793(0.190,3.315)	0.751
	I didn’t know if I am pre.	12	5	3.566(1.154,11.015)	0.435(0.188,1.008)	0.052
	didn’t know appropriate	125	16	11.607(5.915,22.777)	**2.762(1.267,6.020)****	**0.011**
	Perceiving appropriate time	35	52	1	1	
Abortion history	Yes	44	15	1.573(0.842,2.937)	1.944(0.843,4.433)	0.119
	No	235	126	1	1	

****Significant (at p=0.05) and 1 reference category**

7. DISCUSSION

This study aimed to assess the magnitude and associated factors of late antenatal care initiation among pregnant women at selected public health institutions of south Achefer districts. The prevalence of late ANC initiation was (66.43%, 95%CI=61.4-71.2%) in this study was consistent with the study done in, southwest(66%), and mini EDHS(62.3) (29,35) Ilu-Ababora Zone (71.2%) and study in south west 70.0% (32,34). This might be due to the similarity in the design and setting of the study, socio-demographic, health service accessibility, and media exposure.

However, it's slightly higher than studies conducted in Debre-Markos 59.4% , Gambia 57.0%%() Ghana (44.8.0%), Addis Ababa(47.0%) and Harare town(34.3%) and Hawassa(57.7%) (14,25,28,30,31,33). A possible explanation for this might be due to a difference in socioeconomic, past obstetrics characteristics, sample size, and cut-off point in defining outcome variables (12 versus 16 weeks of gestation).

It is slightly lower than study conducted in mahal-signt district (74.6%). This difference might be due to sample size variation, information access and time period. Also, previous low ANC service utilization and late initiation during previous pregnancy by most of the respondent in this study might explain this difference.

Similarly, this finding was higher compared to finding from different parts of Ethiopia (EDHS2016 (42%) and tesfaye et.al systematic review 2017 (54%)) and Tanzania (22,23,24). This discrepancy might be due to the time variation between the study periods, socio-demographic difference, and utilization of different cut-off point in defining outcome variable and as evidenced by the fact that majority of pregnant women in this study had no formal education (64.3%) and residences in rural area (62.9%).

Those pregnant mothers who didn't read and write were higher odd of late booking of ANC initiation as compared to those pregnant mothers whose educational status was diploma and above. It is in line with the study in Ghana, debre-markos, Tanzania and Gambia. This may be due to educational status as a predictor of timely booking for ANC services, no formal education may not have adequate information on timely ANC booking and its significance and may not be able to make better health-seeking decisions on ANC services that will benefit them. This also suggests health promotion messages regarding the advantages of initiating ANC services early in the pregnancy may be written in local language (24,25,28).

Pregnant women who checked by missed period were 4.358 times more likely to be late for first ANC visit as compared to respondents who checked by urine test. This is supported by; Mothers who recognized their pregnancy through missed period were 3.641 times more likely to book for ANC late as compared to mothers who recognized their pregnancy by urine test as study conducted in Jimma Town. This might be due to;

low understanding about early initiation and not informed when to start antenatal care. Another explanation might those mothers who confirm pregnancy by urine test might be informed to initiate early antenatal care from health facilities by health care as compared with those who perceived pregnancy by missed period. This is in line with studies conducted in; South West Ethiopia:

Mothers who recognize their pregnancy through urine test might be more likely to practice health care seeking and more likely to accept modern medical care follow up than those who recognized via missed period (41). On the other hand, mothers who recognized pregnancy by missed period were most probably after missing one or two cycles and thereafter they might be reluctant to start ANC soon.

As the time of the first ANC visit varies from one respondent to another respondents: Pregnant mother who perceive appropriate time (>4month) of ANC were 2.762 times more likely to book late for antenatal care as compared to their counterpart. This study supported that the likelihoods of late ANC initiation were 8.58 times higher among women who perceived that the correct time of ANC initiation is after 12 weeks of gestation as compared to those who perceived that the correct time of ANC initiation is before 12 weeks of gestation study conducted in Addis Ababa.

This might be due to individual seeking and practice what they usually know and to their level of perception. Or it could be that pregnant women usually practice what they perceive. Those mothers may consider that the ideal time to visit ANC is when the pregnant mother has been physically confirmed by the family and a doctor. This is in line with study conducted in different part of Ethiopia (30,32, 38).

Being primiparous mother has lower odds of late ANC initiation as compared to multiparous mother. This may be related to their health seeking behaviors', have experienced pregnancy out come without complication previously and are less fearful unlike primiparous. This consistent the study in Tanzania multiparous (3 – 4) has increased Odds for late ANC initiation. This finding supports high odds of late ANC booking among multiparous women. The confidence built among multiparous women from previous pregnancy experiences on pregnancy identification, the period when complications are more likely to occur, and community support could be accounting for the late initiation in this group (14, 24, 25).

Pregnant mothers' husband's occupation farmer was 3.549 times higher odd of late ANC initiation as compared to daily labor. The possible reason for this may be due to double burden for household activity and field work with their husband and poor media accesse this in line with study in Ethiopia, informal occupation were higher odd of late ANC booking(24,26). More explanation in the contrary is due to information access for daily labor as they are movable and near to urban setting due to the nature of daily work.

8. Strength and Limitation of the study

Strength of the study

- Since a very limited study on the study area, the result of this study could serve as baseline data.
- Providing an understanding of some predictors that significantly determine late booking of first ANC initiation in the time of environmental conflict.

Limitation of the study

- Gestational age was determined based on pregnant women's reports of their LNMP. Hence, there might be recall bias when asking about experience.
- Since the study was conducted during the time of environmental conflict, there may be individuals lost to follow in the institution before and during the data collection; this might compromise the generalizability of the findings to some degree.

9. CONCLUSIONS:

We can conclude that late antenatal care initiation was high in the study area. This was due to pregnant mother note read and write, missed period, didn't perceive appropriate time and being husband's occupation farmer were found to be independently associated with increasing late initiation of first ANC visit, while being primiparous was associated with decreasing late antenatal care follow up.

10. RECOMMENDATION:

Amhara regional education office integrated with Amhara health bureau should have educational strategies that address pregnant women who didn't have formal education. For instance, messages on early initiation should be given to women even before they get pregnant, and these messages can be delivered at community, churches and mosques that can easily delivered to those who didn't read and write.

Woreda health office should strength health education at facility level in the reproductive age group how they check their pregnancy once missed period happened.

Health facilities should have regular program that health care providers should provide health education at facility level regularly with due attention to mother and her husband that could play great role in improving a women's health, eligibility of all pregnant mothers regardless of feeling pregnancy related medical problems. While providing health education, special consideration should be given for partners especially for farmers.

Health center should strengthen linkage between health centers and health post to address pregnant mother's conference regularly at Keble level and health facility level to aware appropriate first ANC visit time.

Health post should have supply for providing urine test at Keble health post and link them to health facilities for further follow up.

I also recommend future qualitative studies to get more nuanced insight into the problem of late booking.

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12. ANNEX

Annex 1 English version information sheet and Consent form

Greeting

Good Morning / Good after noon

My name is _____. I am a student at Bahir Dar University College of medicine and health sciences, department of health system management and health economics. This study is aimed to assess the magnitude and factors associated with late initiation of antenatal care among pregnant women attending antenatal care service at public health centers of south Achefer district, Amhara, Ethiopia, 2024. The results from this study will help different stake holders and health care providers design different feasible and accessible interventions to reduce the magnitude of late antenatal care service utilization in the district. And, since you met the criteria for the study participant selection, you are selected to be the participant for the study. The data contained in this interview will solely be used for this study, and your response will be kept confidential. For this purpose, on this interview, your name will not be written and there is no any means to check and link the study results to your responses. This study will take a maximum 30 minutes. With the interview, if there any problem or unclear to you, you can communicate openly and for any question/s from the interview, you have the right to give no answer or stop the interview, but your participation is highly important for the success of the study. So, we politely request your cooperativeness to participate the interview.

Do you agree to participate in this study? Yes, _____Continue. No _____

Thank you once again for your participation in the study.

Name of data collector _____ Signature_____

Name of supervisor_____ Signature_____

Annex2 Questionnaire of English version

Section 1: **Socio-demographic and economic information**			
S.No	Questions	Code	Go to
101	How old are you?	----------(year)	
102	What is your marital status?	1. Single 2. Married 3. Divorced 4. Widowed	
103	Where is your place of residence?	1. Rural 2. Urban	
104	What is your religion?	1. Orthodox 2. Catholic 3. Protestant 4. Muslim 5. others (----) specify	
105	What is your educational status?	1. Illiterate[cannot read and write] 2. Literate Read and write only 3. Primary Education (1-8) 4. Secondary Education (9-12) 5. Diploma (10+3) 6. Degree and above	
106	What is your Occupation?	1. House wife 2. Merchant 3. Government Employer.	
107	Estimated annual house hold income in Ethiopian Birr	----------?	
108	How long it takes for arriving to this health facility.	----------in hours?	
109	Family size	----------number	

Questions110 &111 asked if "102" is married			
110	What is husband educational status	1. Illiterate [cannot read and write] 2. Literate [able to read and write] 3. Primary [1-8] 4. Secondary [9-10] 5. Diploma (10+3) 6. degree and above	
111	What is Occupation of your husband?	1. Farmer 2. merchant 3. Government employee 4. Private employee 5.Daily labor 88. Others(specify) _____	
Section 2: questions related with past pregnancy			
201	Gravidity (how many times did you become pregnant)?	----------number?	
202	Had you ever given birth?	1.Yes 2.No	If no go to 209
203	If yes for question 202, how many times did you give birth	----------number?	
204	If yes for question 202, what was your birth spacing?	1. 1-2 years 2. Above 2 years	
205	If yes for question 202, was there any stillbirth?	1. Yes 2. No	
206	If yes for question 202, Where did you delivered vour last child?	1.home 2. health facility	
207	If yes for question 202, Have you given birth by CS?	1.yes 2. no	
208	If yes for question 202, Have you previous ANC	1. yes	

	follow up history?	2. no	
209	Do you attend ANC conference in your pervious pregnancy?	1. Yes 2. No	
210	Do you disclose your pregnancy for anyone before you come here for ANC initiation?	1. Yes 2. No	
211	Do use family planning before your current pregnancy	1. Yes 2. No	
Section 3 :Questions related with current pregnancy			
301	How do you know if you are pregnant or not?	1.missed period 2. urine test 3. By other method (specify) ----------?	
302	Is this pregnancy planned?	1. yes 2. no	If no go to 305
303	If yes for question "302" who planned the pregnancy?	1. You 2. Your husband 3. both 4. Specify other-------?	
304	If yes for question "302" had you any illness in this pregnancy?	1. yes 2. no	
305	Do you have shortage of time with household activity to attend ANC	1. Yes 2. No	
306	Do you have decision power to attend ANC on your current pregnancy?	1. Yes 2. No	
307	Is there anyone who advised you to start ANC?	1. yes 2. no	
308	Timing of first ANC visit by weeks?	----------week?	
309	For this pregnancy, why you started by this time?	1. my family advised me 2. from my previous experience	

		3. I don't know if I am pregnant 4. I don't know the right time and its purpose 5. Perceived appropriate time 88 other specify------?	
310	Do you ever have abortion?	1. Yes 2. No	If No Skip to '312'
311	If 'yes' for '311', no of spontaneous abortion	_____	
312	Do you have threat to attend ANC visit?	1.yes 2.no	
Section 4 :Questions related with knowledge on ANC			
401	Is antenatal follow up beneficial for the mother?	1.Yes 2.No.	
402	Is antenatal follow up beneficial for the fetus?	1.Yes 2.No	
403	Do you think a pregnant mother need to initiate ANC early only if she had complication in her previous pregnancy?	1.Yes 2.No	
404	Do you think the appropriate time to begin ANC after conception is <12weeks	1.yes 2.no	
405	Do you think a woman needs to go for ANC>8 times throughout her pregnancy?	1.Yes 2.No	
406	Do you think pregnant mother needs supplementation during her pregnancy	1. Yes 2. No	
407	Do you know maternal conditions risk for the fetus	1. Yes 2. No	
408	Is antenatal care service reduces the Transmission of HIV?	1. Yes 2. No	
409	Dou you think appropriate ANC follow up can prevent erythroblastosisfetalis	1. Yes 2. No	

Section 5 : health facility related factors				
501	Do you think ANC service is available throughout the working hours in this health facility	1.Yes 2 No 3.. I don't know		
502	What is the maximum waiting time you spend to complete checkup?	1. < 2 hours(short) 2. 2-3 hours(fair)		
503	Did you comfortable in the service given by health professional during ANC examination?	1.Yes 2 No		
504	Would you return to this facility for ANC service more than once?	1.Yes 2.No 3.I do not know		
505	Rate the following items of service in terms of your satisfaction	1.Staff approach	1. Highly satisfied 2. Satisfied 3. Medium 4. Not satisfied 5. Highly not satisfied	
		2.laboratory	1. Highly satisfied 2. Satisfied 3. Medium 4. Not satisfied	
		3.Waiting time	1. Highly satisfied 2. Satisfied 3. Medium 4. Not satisfied 5. Highly not satisfied	
		4. Privacy	1. Highly satisfied 2. Satisfied 3. Medium 4. Not satisfied 5. Highly not satisfied	

Thank you very much!

Annex3 Amharic consent form

ጤና ይስጥልኝ !

ስሜ----------ይባላል፡ ፡ ወደ እርስዎ የመጣሁት ህብረተሰብ ጤና ሁለተኛ ዲግሪ በባህርዳር ዩኒቨርሲቲ ህክምና እና ጤና ሳይንስ ኮሌጅ በህብረተሰብ ትምህርት ክፍል ስር በሚሄደውጥናት የሚጃ ስብሰባ አባል በመሆን ነው፡ ፡ የዚህ ጥናት ማጠይቅ የሚያተኩረውበአሜሪ ክልል በደቡብ አቸፈር ወረዳ ስር ባሉ የመንግስት ጤና ተቋማት ስር የእርግዝና ክትትል ለሚያደርጉ እናቶች የተዘጋጀ ሲሆን እርስዎ ለጥናቱ የሚያስፈልጉ ማስፈርቶችን አሟልተውበመ ኘትዎ የጥናቱ አባል አድርገ ነ ዎታል፡ ፡ በመሆኑም ይህ ማጠይቅ ሲዘጋጅ ተገ ቢ የሆኑ መረጃዎችን ለማግኘት ሲሆን ከእርስዎ የሚ ኘውመረጃ ለጥናትና ምርምር ተግባር ብቻ የሚውል ነው፡ ፡ ከእርስዎ የተገ ኙት ምላሾች ሚስጥራዊነ ታቸውየተጠበቁ መሆናቸወን እየገ ለጽኩ ለዚህምዓላማሲባል የእርስዎ ስምበማጠይቁ ላይ የሚጻፍና የ ጥናቱ የሜጨረሻ ወጪት የግል ማንነ ት ጋር የሚገ ናኝ መሆኑን ከወዲሁ አረጋግጣለሁ፡ ፡ ከዚህ በተጨማሪ ይህ ማጠይቅከ 30 ደቂቃ ያልበለጠጊዜ ከመሻማት ወጭምንምዓይነ ት ጉዳት የሚያደርስ ሲሆን ከጥናቱ ጋር በተያያዘ ለሚከሰቱ ማንኛወምጉዳዮች ከዚህ በታች በተቀጣጠውአድራሻ ሊያገ ኙን የ ሚቻሉ መሆኑን እያስገ ነ ዘብኩ በጥናቱ ላይ ያለመሳተፍና የ ሜቋረጥ መበትዎ ተጠበቀነ ው፡ ፡ የእርስዎ መሳተፍ ግን ከምንምበላይ ለጥናቱ ዓላማመሳካት ወሳኝ በመሆኑ በማጠይቁ እንዲተባበሩኝ ስል በታላቅ አክብሮትና ትህትና እጠይቃለሁ፡ ፡

በጥናቱ ለመሳተፍ ፈቃደኛነ ዎት? 1.አዎ 2.አይደለሁም

የ መረጃ ሰብሳቢውስም---------- ፊርማ----------ቀን

የ ተቆጣጣሪ ውስም---------- ፊርማ----------ቀን

Annex4.Quesionnarie for Amharic Version

ክፍል 1፡ ስነ - ህዝብ፤ ማህበራዊ እና ኢኮኖሚያዊ ጋር የተያያዙ ጥያቄዎች			
ተ.ቁ	ጥያቄ	በመላያመልስ	ዝለል
101	እድሜሽ ስንት ነ ወይ	----------	
102	የ ጋብቻ ሁኔ ታ	1.ያላገባች 2. በጋብቻ የምትኖር 3. አግብታ የፈታች 4. የ ሞተባት	
103	የ መኖሪያ ቦታሽ የ ትነ ወይ	1. ገጠር 2. ከተማ	
104	ሀይሜኖትሽ ምንድን ነ ወይ	1. አርቶዶክስ 2. ፕሮቴስታንት 3. መክሊም 4. ሌላ (ይጠቀስ)	
105	የ አንቺ የ ትምህርት ደረጃ?	1. ማንበብና መፃ ፍ የ ሚይችል 2. ማንበብና መፃ ፍብቻ 3. ከ 1-8ኛ የ ተማረች 4. ከ 9-12ኛ ክፍል የ ተማረች 5. ድፕሎማ(10+3) 6. ድግሪ እና ከዛበላይ	
106	ስራሽ ምንድን ነ ወይ	1. የ ቤት እማቤት 2. ነ ጋዴ 3. የ መንግስት ሰራተኛ 4. ሌላ (ይጠቀስ)----------	
107	የ ቤተሰብ አመታዊ ገ ቢ ስንት ይገ መታል?	----------(በብር ይቀመጥ)	
108	ጠፍ ጣቢያ ለመድረስ ምን ያህል ጊዜ ይወስድብሻል?	----------?	
109	የ ቤተሰብ አባላት ብዛት ስንት ነ ወይ	----------በቁጥር	
ጥያቄቁጥር 110 እና 111 ለአገቡ እናቶች ብቻ የ ሚሠየቅ			
110	የ ባለቤትሽ የ ትምህረት ደረጃ	1. ማንበብና መፃ ፍ የ ሚይችል 2. ማንበብና መፃ ፍ ብቻ 3. ከ 1-8ኛ የ ተማረ 4. ከ 9-12ኛ ክፍል የ ተማረ	

		5. ድፕሎማ(10+3) 6. ድግሪ እና ከዛበላይ	
111	የባለቤትሽ ስራ ምንድን ነው?	1. አርሶ አደር 2. ነጋዴ 3. የመንግስት ሰራተኛ 4. የቀን ሰራተኛ 5. ሌላ (ይጠቀስ)---------	
ክፍል2: ከባለፈውእርግዝና ጋር የተያያዙ ጥያቄዎች			
201	ስንት ጊዜ አርግዘሽ ታውቂያለሽ?	----------	
202	ወልደሽ ታውቂያለሽ?	1.አዎ 2.የለም	የለም ከሆነ ወደ ጥያቄ ቁጥር 209
203	አዎ ከሆነ ሜልስሽ ስንት ጊዜ ወለድሽ?	----------	
204	ጥያቄ ቁጥር 202 አዎ ከሆነ ሜልስሽ በምን ያህል አመት ልዩነት ወለድሽ?	1. 1-2 ዓመት 2. ከ2 ዓመትበላይ	
205	ጥያቄ ቁጥር 202 አዎ ከሆነ ሜልስሽ ሞቶ የተወለደ ነበረ?	1. አዎ 2. የለም	
206	ጥያቄ ቁጥር 202 አዎ ከሆነ ሜልስሽ የሜጨሻ ልጅሽን የትነዉ የወለድሽ?	1.ቤት 2. ጤና ቋማት	
207	ጥያቄ ቁጥር 202 አዎ ከሆነ ሜልስሽ በቀዶ ጥገና ወልደሻል?	1. አዎ 2. የለም	
208	ጥያቄ ቁጥር 202 አዎ ከሆነ ሜልስሽ ከአሁን በፊት ክትትል ነበረሽ?	1. አዎ 2. የለም	
209	ላለፈውእርግዝናሽ የነ/ጡፎ ኮንፈረንስ ወይይት አድርገሽ ታውቂያለሽ?	1. አዎ 2. አላወቅም	
210	ነ/ጡፎ መሆንሽን የነገርሽዉስዉነበር?	1. አዎ 2. አልነበረም	
211	ከእርግዝና በፊት የቤተሰብ ምጣኔ አገልግሎት ተጠቀሚነበርሽ?	1. አዎ 2. አልጠቀምም	
ክፍል 3:ከአሁኑ እርግዝና ጋር በተያያዘ የቀረቡ ጥያቄዎች			
301	እርግዝናሽን ያረጋገጥሽዉበምንድን ነው?	1. የወር አበባዬ ሲቀር 2. በሽንት ምርመራ 3. ሌላ ካለ ይጠቀሱ-----	

302	የአሁኑ እርግዝናሽ የታቀደነ ወን?	1.አዎ 2.አይደለም	
303	ለጥያቄ ቁጥር ‘’302’’ መልስሽ ‘’አዎ’’ ከሆነ ያቀደዉ ማንነበር?	1. እኔ 2. ባለቤቴ 3.ሁለታችንም 4. ሌላ (ይጠቀስ)--?	
304	ከእርግዝናውጋር በተያያዘ አሞሽያወቃል?	1.አዎ 2. የለም	
305	ከቤት ስራ ጋር በተያያዘ የ/ጠፎ ክትትል ለሜደረግ የጊዜ እጥረት አለብሽ?	1. አዎ 2. የለብኝም	
306	ከአሁኑ እርግዝናሽ ጋር በተያያዘ የነፍሰጠፎ ክትትል ለሜደረግ የመወሰን መበት አለሽ?	1. አዎ 2. የለኝም	
307	የነ/ጠፎ ክትትል እንድታደርጊ የሞረሽ ሰውአለ?	1. አዎ 2. የለም	መልስሽ“አዎ”ካልሆነ ወደተ.ቁ 309
308	ለመጀመሪያ ጊዜ ክትትል ስታደርጊ እርግዝናሽ ስንት ሳምንት ነበር?	----------በሳምንት?	
309	አሁን ላለው እርግዝናሽ በዚህ ሳዓት ክትትል እንድታደርጊ የሞረሽ ማን ነዉ?	1. የቤተሰብምክር 2. ከበፊቱ ተሞክሮ 3.ነ/ጠፎመሆኔን ስላላወቅሁ 4.ትክክለኛወን ሳዓት ስላላወቅሁትና ጥቅመን ስለማእወቅ 5.ትክክለኛው ሰዓት አሁን መሆኑን ስለተረዳሁ 88 ሌላ ካለ ይጥቀሱ------?	
310	ወሮጃ አጋጥሞሽ ያዉቃል?	1. አዎ 2. የለም	መልስሽ“አዎ”ካልሆነ ወደተ.ቁ 313
311	አዎ ከሆነ መልስሽ ምን ያህል ጊዜ በድንገት አስዎርዶሽ ያወቃል?	----------?	
312	የነ/ጠፎ ክትትል ለሚድረግ ስትመጭስጋት አለሽ?	1.አዎ 2.የለም	
ክፍል4 :ከእናትዮዋ እዉቀት ጋር የተያያዙ ሞከየቆች			
401	የነ/ጠፎ ክትትል ሜድረግ ለእናቲቱ ጥቅምይሰጣል ብላችሁ ታስባላችሁ?	1.አዎ 2.አይሰጥም	
402	የነ/ጠፎ ክትትል ሜድረግ ለፅንሱ ጥቅምይሰጣል ብላችሁ ታስባላችሁ??	1 አዎ 2.አይሰጥም	
403	ከባለፈው እርግዝና ጋር ችግር የገጠሞቹው እናቶች ብቻ ናቸው ቀድመው ክትትል መጀመር ያለባቸውብላችሁ ታስባላችሁ	1.አዎ 2.አይደለም	
404	ፅንስበተጀመረ በመጀመሪያዎች 12 ሳምንት ወስጥ ክትትል መጀመር	1.አዎ 2.አይደለም	

	ትክክኛ ጊዜ ነ ውብላችሁ ታስባላችሁ?			
405	አንዲት ነ /ጠፎ እናት ከ8 ጊዜ በላይ ክትትል ሚድረግ አለባት ብላችሁ ታስባላችሁ?		1.አዎ 2.አይደለም	
406	አንዲት ነ /ጠፎ እናት በርግዝና ወቅት ሞሚያ ክኒን ያስፈልጋታል ብላችሁ ታስባላችሁ?		1.አዎ 2.አይደለም	
407	የእናትዮዋ የጠፍ ሁኔታ ለፅንሱ ጠንቅ ነ ውብላችሁ ታስባላችሁ?		1.አዎ 2.አይደለም	
408	ነ /ጠፎ ክትትል ሚድረግ ከእናት ወደ ልጅ የሚሁላለፉ በሽታዎችን ይከላከላል ብላችሁ ታስባላችሁ?		1.አዎ 2.አይደለም	
409	ትክክለኛ የነ ፍሰጠፎ ክትት ለሚድረግ አዲስ ለሚፈጠረው ህፃን የደም ሜ ስን ይከላከላል ብላችሁታስባላችሁ?		1.አዎ 2.አይደለም	
ክፍል 5፤ **አጠቃላይ ጠፍ አገልግሎትን በተመለከተ**				
501	በዚህ ጠፍ ተቋም ወስጥ የቅድመ ወሊድ ክትትል በስራ ስዓት ሜኡ አገልግሎቱ ይስጣል ብለሽ ታስቢያለሽ ?	1.አዎ 2. አይሰጥም 3.አላወቅም		
502	የነ /ጠፎ ክትትል ለሜጨስ ግፋቢል ምን ያህል ሰዓት ወሰደብሽ?	1. ከ2 ሰዓት በታች 2. ከ2 እስከ 3 ሰዓት 3. ከ4 ሰዓት በላይ		
503	የቅድመ ወሊድ ክትትል ጊዜ በጠፍ ባለሞያዎች በሚደረግልሽ ህክምና ደስተኛነ ሽ?	1. አዎ 2. አይደለሁም		
504	ወደዚህ ጠፍ ተቋም ለቅድ መወሊድ ክትትል ከአንድ ጊዜ በላይ ማከሸልን?	1.አዎ 2.አልመላስም 3. አላወቅም		
505	የሜከተሉትን የአገልግሎት አሰጣጥ በእራስሽ የእርካታ ማጠን ግለጫው?	1.የ ባለሞያዎች አቀራረብ	1. በጣምረክቻለሁ 2. ረክቻለሁ 3. መካከለኛነኝ 4. አልረካሁም 5. በጣምአልረካሁም	
		2.የ ላቦራቶሪ ምርመራ	1. በጣምረክቻለሁ 2. ረክቻለሁ 3. መካከለኛነኝ 4. አልረካሁም 5. በጣምአልረካሁም	
		3.ምርመራው የ ሜፈጀውጊዜ	1. በጣምረክቻለሁ 2. ረክቻለሁ 3. መካከለኛነኝ	

			4. አልረካሁም 5. በጣምአልረካሁም	
		4.ገ ሚኖ አጠባበቅ	1. በጣምረክቻለሁ 2. ረክቻለሁ 3. መካከለኛነኝ 4. አልረካሁም 5. በጣምአልረካሁም	

እናመሰግናለን፡፡

Annex 5 Updated ANC contact schedule

contact	Gestational age of contact in weeks	Schedule of next appointment
first triminster		
1st	Up to 12	after 8 week
second triminster		
2nd	20	After 6 weeks
3rd	26	After 4 week
third triminister		
4th	30	4week
5th	34	4week
6th	36	2week
7th	38	2week
8th	40	

Table 8. Updated maternal centered antenatal care /contact schedule adapted from World health organization**(7)**

Declaration sheet

I, Meseret kumilachew kassie, declare that determine magnitude of late initiation ANC booking and its associated factor among pregnant women in south Achefer district north go jam Ethiopia, 2024, is my own work and all the sources used or quoted have been indicated and acknowledged by means of complete references, and that this work has not been submitted before for any degree at any institution.

Principal investigator

Name: **Meseret kumilachew Kassie** Signature----------date: _____

Advisor

Name----------Signature ----------date: _____

Name----------Signature ----------date: _____

BAHIR DAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF HEALTH SYSTEMS MANAGEMENT AND HEALTH ECONOMICS

Examiner's Approval Sheet

The undersigned, members of the board of examiners of the final thesis defense by **Meseret kumilachew**, have read and evaluated his or her thesis "To assess the magnitude and factors associated with late initiation of antenatal care among pregnant women attending antenatal care service at public health centers of south Achefer district, Amhara, Ethiopia, 2024" and evaluated the candidate. Therefore, I recommend that the student has fulfilled the requirements and hence can submit the thesis to the department.

Name of Examiner:_____ Signature: _____Date: _____

Final approval and acceptance of the thesis are contingent upon the submission of the final copy to the candidate's department through the office of the department graduate program coordinator. 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 "To assess the magnitude and factors associated with late initiation of antenatal care among pregnant women attending antenatal care service at public health centers of south Achefer district, Amhara, Ethiopia, 2024". By **Meseret kumilachew**

Department Head _____ Signature _____ Date_____

Declaration sheet

I, Meseret kumilachew kassie, declare that determine magnitude of late initiation ANC booking and its associated factor among pregnant women in south Achefer district north go jam Ethiopia, 2024, is my own work and all the sources used or quoted have been indicated and acknowledged by means of complete references, and that this work has not been submitted before for any degree at any institution.

Principal investigator

Name: **Meseret kumilachew Kassie** Signature _____ date: 03-04-2025

Advisor

Name: Habtamu A Signature _____ date: 03/04/2025

Name: Wubziem S/Amalex Signature _____ date: 03-04/2025

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BAHIR DAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF HEALTH SYSTEMS MANAGEMENT AND HEALTH ECONOMICS

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Name of Examiner: _____ Signature: _____ Date: 13/07/2024

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Department Head _____ Signature _____ Date 13/07/2024