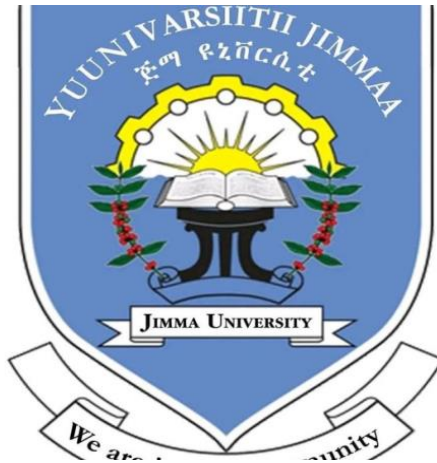


**Jimma University  
Institute of Health  
Faculty of Medical Science  
Department of Obstetrics and Gynecology**



**Prevalence and Associated Factors of Late Antenatal Care Initiation among Pregnant Women attending Antenatal Care at Jimma University Medical Center: A Cross-sectional Study, 2025**

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Year IV Resident, JU)

A Research paper to be submitted to Jimma University, Institute of Health, Faculty of Medical Science, Department of Obstetrics and Gynecology in partial fulfillment for Specialty Certificate in Obstetrics and Gynecology.

January, 2026

Jimma, Ethiopia

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January, 2026

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## *Abstract*

**Introduction:** Early antenatal care follow-up is the main strategy of preventing pregnancy related adverse outcomes; in which World Health Organization recommends first antenatal care visit should be offered within the first trimester. However, Low utilization and late booking is the predominant problem in most developing countries including Ethiopia. This study aimed to determine the prevalence and associated factors of late ANC initiation among pregnant women who initiate their antenatal care at Jimma university medical center

**Methods and Materials:** An institutional-based cross-sectional study design was conducted

Among 427 pregnant women, from September to November 2025. All eligible participants during the study period were included. Data were collected via face -to-face interviews, using a semi-structured questionnaire through trained data collectors. Data were analyzed with SPSS version 25, and descriptive statistics such as tables and texts were used to present the findings. Logistic regression with the 95% confidence interval (CI) was used to identify factors associated with the late initiation of antenatal care. Statistical significance was declared at  $P < 0.05$ .

**Results:** The prevalence of late-initiation antenatal care in this study was 66.6% (95% CI 62.1–71.1). Residence in rural areas (AOR 4.32, 95% CI 2.59–9.61), unplanned pregnancy (AOR 3.4, 95% CI 1.83-6.65 ), three or more alive children (AOR 6.42, 95% CI 1.19-34.6 ) and wrong perception about the time of ante-natal care initiation ( AOR 4.88, 95% CI 2.90-8.20) were associated with late initiation antenatal care in this study.

**Conclusion and Recommendation:** *Our study shows that, two-third of the study participants were initiated into ANC after the 12th week of gestation. Rural residence, unplanned pregnancy, having three or more alive children and wrong perception on the time of initiation of ANC were found to be associated with late initiation of ANC. Educating women about timing and benefits of early ANC initiation, involving partners and family members in discussions about pregnancy planning, improving family planning utilization to prevent unplanned pregnancy were recommended to build a supportive environment for pregnant mothers.*

**Key words:** *Antenatal care, late initiation, pregnant women, gestational age, trimester, Jimma, Ethiopia*

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## Abbreviations and Acronyms

ANC	Antenatal Care
AOR	Adjusted Odd Ratio
CBE	Community Based Education
CI	Confidence Interval
COPD	Chronic Obstructive Pulmonary Disease
COR	Crude Odd Ratio
CSA	Central statistical Agency
DM	Diabetes Mellitus
HCG	Human Chorionic Gonadotropin
HIV	Human immuno-deficiency Virus
HMIS	Health Management and Information System
HTN	Hypertension
JUMC	Jimma university medical center
LMICs	Low and Middle income countries
MCH	Maternal and Child Health
SPSS	Statistical Package for Social Science
WHO	World Health Organization

## CHAPTER ONE

### 1. Introduction

#### 1.1. Background

Antenatal care (ANC) is essential to ensure the best health conditions for both mother and baby during pregnancy. It is aimed at risk identification, prevention, and management of Pregnancy-related or concurrent diseases and health promotion (1). As a result, the timing of the initiation of the first antenatal care visit is paramount for ensuring optimal care and health outcomes for women and children (2). An early ANC visit offers the opportunity to deliver preventive measures, screenings, and tests that are most effective in the early stages of pregnancy. Moreover, early initiation of ANC enables accurate assessment of gestational age to allow for the precise treatment of preterm labor, screening for genetic and congenital disorders, and timely folic acid supplementation to reduce the risk of neural tube defects. In addition, early initiation of ANC can potentially capture non communicable diseases, such as diabetes mellitus, hypertension, and chronic renal disease, and provide guidance on modifiable lifestyle risks, such as smoking, alcohol consumption, drug abuse, obesity, malnutrition, and occupational exposures (2).

Several studies have shown the associated factors that Contributed to late-initiation antenatal care. These include maternal education, maternal age, pregnancy goal, wealth status/income, and parity, a history of abortion or stillbirth, marital status, media exposure, distance from the health facility, residence, and health insurance (3–6)

#### 1.2. Statement of the problem

Approximately 303,000 women and adolescent girls died from pregnancy and childbirth-related complications globally, in 2015. On the same year, 2.6 million babies were stillborn. Almost all of the maternal deaths (99%) and child deaths (98%) occurred in low- and middle-income countries. These maternal deaths could have been prevented if the pregnant women or adolescent

girls had been able to access quality antenatal care. Sixty percent of the stillbirths (1.46 million) occurred during the antepartum period and mainly due to untreated maternal infection, hypertension, and poor fetal growth .worldwide there is a big discrepancy in the prevalence of late ANC follow up among pregnant mothers, ranging from 27.5 to 88% in developed and developing countries respectively (7). Low prenatal coverage, few visits, and delayed initiation of antenatal follow up are the predominant problems throughout SSA including Ethiopia resulting in failure of accomplishment of the WHO recommendation.

Study was done in Kaya Health District, Burkina Faso, in 2020, on Prevalence and factors associated with late first Antenatal care. In this study 62.93% of women book their first antenatal care visit after the first trimester of their pregnancy (14).

In a study done in Jimma Zone Public Hospitals, Southwest Ethiopia, in 2020, the prevalence of pregnant women who has late initiated their first ANC age was 48% (9) .

### 1.3. Significance of the study

To the best of the my knowledge, no objective evidence currently demonstrates the magnitude of late initiation of antenatal care and its associated factors, especially based on the most recent definition of early initiation ANC in our study area.

As a result, the aim of this study is to fill that gap by assessing the extent of late initiation of antenatal care and its associated factors among pregnant women who visit antenatal clinic at Jimma University Medical Center (JUMC). The result of this study can guide the Gyn-Obs department in designing targeted interventions, improving counseling strategies, and optimizing service delivery to promote early ANC booking.

The result of this study will be distributed to the responsible bodies to fill the gaps on the timing and quality of antenatal care at JUMC. It also opens door for further research to be done on same topic in the future.

## Chapter two

### 2.1. Literature review

The timing of ANC initiation is crucial for reducing maternal and neonatal morbidity and mortality. The WHO guidelines emphasize that ANC should begin in the first trimester, ideally by 12 weeks of gestation, to maximize the benefits of early screening and interventions (1). Despite these recommendations, studies from different countries indicate that a significant proportion of women start ANC late, often after the first trimester.

#### Prevalence of Late Initiation of Antenatal Care

In a study done in **Public health Centers in Tigray, Ethiopia, in 2018**, the Prevalence of Late ANC booking were around 59% (3). In a study done in Jimma Zone Public Hospitals, Southwest Ethiopia, in 2020, a total of 409 clients were included in the interview, yielding 100% response rate(9). The prevalence of pregnant women who has late initiated their first ANC age was 48% (9). In a study conducted in **Gondar, North west Ethiopia, in 2021**, from a total of 392 pregnant mothers who followed ANC, only 36.2% of respondents attended their ANC at the recommended time (within the first trimester), while 63.8% were delay from the first ANC visit (after the first trimester) (10). Studies from other regions of Ethiopia reported comparable findings.

In a study conducted in **Ambo Town Health Facilities, Central Ethiopia, in 2016**, a total of 379 pregnant women were involved in the study with a response rate of 96.7% (11). in this study only 13.2 % of the respondents were booked for ANC service timely(within the recommended time; whereas the rest about 86.8% of the respondents were started the ANC service during their second and third trimesters which were late according to WHO recommended focused ANC service for developing countries (11). Similarly, In a Study done in **Hiwot Fana Comprehensive Specialized Hospital, Eastern Ethiopia, in 2023**, a total of 454 pregnant women who presented to an antenatal clinic for the first time during the study period were interviewed. Among the 454 pregnant women who participated in this study, 59.5% (95% CI 54.6–63.4) had a late initiation of antenatal care (12). High prevalence of late ANC initiation has also been documented outside Ethiopia.

In a Study done in Ndola, **Zambia**, in **2017**, a total of 305 pregnant women who presented to an antenatal clinic for the first time during the study period were studied. The Prevalence of Late ANC booking were around 86.5% (13). Similarly, Study was done in **Kaya Health District, Burkina Faso, in 2020**, on Prevalence and factors associated with late first Antenatal care. A total of 704 pregnant women were involved. In this study 62.93% (n=443) of women book their first antenatal care visit after the first trimester of their pregnancy (14). In a study done in Pyin-Oo-Lwin General Hospital, Mandalay region, Myanmar, in 2014, The prevalence of late initiation of ANC among study population was 56.2%(15) .

### Socio-Demographic Factors Associated with Late ANC Initiation

Several studies have identified socio-demographic characteristics as important determinants of late ANC initiation. Maternal age has been frequently associated with the timing of ANC initiation. A study conducted in Gondar, Northwest Ethiopia, found that women aged 31–34 years were less likely to delay ANC initiation compared to women younger than 23 years (10). Similarly, studies in Burkina Faso and Zambia reported that older maternal age was significantly associated with late ANC initiation (13, 14). In Ndola, Zambia, pregnant women aged 25–29 and 40–44 years were less likely to book ANC late compared to teenage mothers (13). Educational status and residence have also been identified as significant factors. Studies conducted in Ambo Town (11), Burkina Faso (14), and Myanmar (15) reported that women with lower educational attainment and those residing in rural areas were more likely to initiate ANC late. However, a study conducted in public health centers in Tigray found no significant association between socio-demographic variables such as maternal age, education, marital status, income, and residence with timely ANC booking (3), indicating variability in findings across settings.

Marital status and household socioeconomic status were found to influence ANC initiation in studies from Zambia and Burkina Faso, where unmarried women and women from lower socioeconomic households were more likely to initiate ANC late (13, 14).

## Obstetric and Reproductive Factors Associated with Late ANC Initiation

Obstetric-related factors play a significant role in influencing the timing of ANC initiation.

Parity was commonly reported as a determinant of late ANC initiation. Studies conducted in Jimma Zone (9), Zambia (13), Burkina Faso (14), and Myanmar (15) found that multiparous women were more likely to initiate ANC late compared to primiparous women. In the Jimma Zone study, women with two children were nearly six times more likely to start ANC late compared to those with three or more children (9) .

Unplanned or unwanted pregnancy was another consistently reported predictor of late ANC initiation. Studies from Jimma Zone (9), Hiwot Fana Hospital (12), and Myanmar (15) showed that women with unplanned pregnancies were significantly more likely to initiate ANC late than those with planned pregnancies.

Previous birth experience and lack of prior ANC exposure were also found to influence ANC timing. In Tigray, women with previous birth experience were more likely to initiate ANC early (3), while in Eastern Ethiopia, lack of ANC experience was associated with delayed initiation (12).

### Knowledge and Perception-Related Factors

Maternal knowledge and perception regarding ANC services were significant predictors of the timing of ANC initiation.

In Jimma Zone, pregnant women with inadequate knowledge about ANC services were four times more likely to initiate ANC late compared to those with adequate knowledge (AOR=4.186; 95% CI: 1.693–10.348) (9). Similarly, studies conducted in Ambo Town and Tigray reported that women who were informed about the correct timing of ANC booking were significantly more likely to initiate ANC early (3)

Incorrect perception regarding the appropriate time to initiate ANC was also identified as a major determinant of late ANC initiation in Hiwot Fana Comprehensive Specialized Hospital (12).

These findings highlight the importance of maternal awareness and health education in promoting timely ANC utilization.

### Institutional and Health Service–Related Factors

Institutional and health system factors have also been reported to influence the timing of ANC initiation.

In Jimma Zone public hospitals, women who traveled more than 60 minutes to reach a health facility were more than eight times more likely to initiate ANC late compared to those who arrived within 60 minutes (AOR=8.264; 95% CI: 2.929–25.514) (9). This finding underscores the impact of geographic accessibility on ANC utilization.

In Gondar, Northwest Ethiopia, the type of health facility was significantly associated with delayed ANC initiation, with higher odds of delay observed among women receiving ANC services in hospitals compared to those attending health centers (10). Additionally, women’s satisfaction with healthcare service quality was found to be associated with delayed ANC initiation in the same study (10).

### Summary of Literature Gaps

Although several studies have assessed the prevalence and determinants of late ANC initiation in Ethiopia and other developing countries, findings vary across regions and healthcare settings. Some studies report significant associations with socio-demographic factors, while others emphasize obstetric, knowledge-related, and institutional determinants. Moreover, limited facility-based evidence exists specifically for tertiary referral hospitals, highlighting the need for context-specific studies such as the present research.

## 2.2. Conceptual Framework

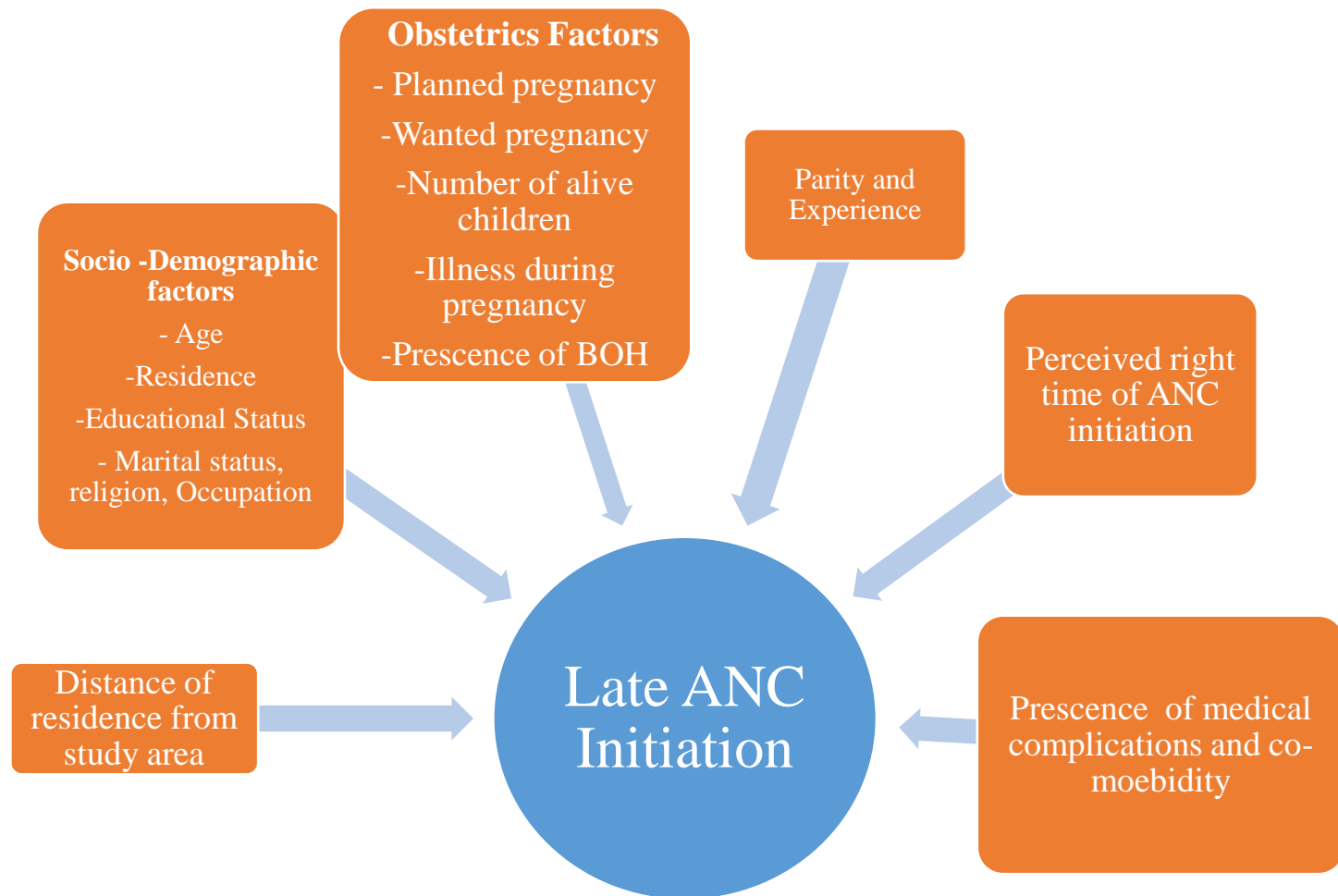


Figure 1.1 Conceptual framework developed after revising literature's on late initiation of Antenatal Care

## Chapter three

### 3. Objectives

#### 3.1. General objective

To assess the prevalence of late initiation of antenatal care and identify associated factors among pregnant women attending antenatal care at Jimma University Medical Center, Southwestern Ethiopia.

#### 3.2. Specific objectives

- ❖ To identify the socio-demographic factors associated with late initiation of Antenatal care
- ❖ To assess the obstetric and reproductive health-related factors contributing to late Antenatal care initiation.
- ❖ To assess medical and other related factors associated with late initiation of Antenatal care.

## Chapter four

### 4. Methods and materials

#### 4.1. Study area and period

The study was conducted in Jimma university medical center.

Jimma medical center is found in Jimma city, Oromia region, and Jimma city is located 354 kilometer (km) from the capital city of Ethiopia, Addis Ababa, in south west Ethiopia. Jimma medical center is one of the largest and the oldest public hospitals in Ethiopia and is the only referral and teaching hospital in the south west part of Ethiopia. It provides services for approximately 15,000 inpatient, 160,000 outpatients, 11,000 emergency cases, and 4500 deliveries per year from catchment area population of over 20 million people for tertiary level care. Gynecology and obstetrics is one of the departments in this medical center, which has different units like gynecology OPD, ANC clinic, labor and delivery, maternity ward and gynecology ward with many sub-units and each of them has supportive staffs, nurses, midwives, medical interns, residents and senior physicians.

#### 4.2. Study design

An institutional based cross sectional study design was employed.

### 4.3. Population

#### 4.3.1. Source population

All pregnant women who seek antenatal care services at Jimma University Medical Center were considered the source population.

#### 4.3.2. Study Population

All pregnant women who attended antenatal care at Jimma University Medical Center during the study period and met the inclusion criteria.

### 4.4. Inclusion and exclusion criteria

#### 4.4.1. Inclusion criteria

All pregnant women who initiated their antenatal care at JUMC during the study period were included.

#### 4.4.2. Exclusion criteria

Pregnant women who are severely ill (those who are unable to respond the questions due to the illness) and those in labor were excluded from the study.

### 4.5. Sample size and sampling technique

#### 4.5.1. Sample Size

To calculate the sample size, we used a single population proportion formula by using the prevalence of late initiation antenatal care 48% (9) from previous study conducted in Jimma zone Public Hospitals, with the assumptions of 95% confidence interval (CI) and maximum acceptable marginal error of 5%, an alpha level of 0.05 and none response rate of 10% to obtain a sample size 427.

$$\text{Single population proportion formula } \Rightarrow n = \frac{Z^2 \cdot p \cdot (1-p)}{d^2} = \frac{(1.96)^2 \cdot 0.48 \cdot (1-0.48)}{(0.05)^2}$$

$$= 384, \text{ we expect a 10\% non-response rate, } n_{\text{final}} = \frac{n}{1-0.1} = \frac{384}{0.9} = 427$$

#### 4.5.2. Sampling technique

The study subjects were recruited by using systematic random sampling technique after identification of the first study subject by simple random sampling method.

To describe this in details the first thing we did was determining my population (N) and sample size (n). So, to determine the population size we assessed the average daily newcomers for ANC initiation from charts on ANC and the average daily newcomers were around 20. Since my plan was to collect data over three months (65) working days, my population size is  $65 * 20 = 1300$  and my sample size is 427. The next step we did were determining the sampling interval (K).

$K = N/n = 1300/427 = 3$ , so we select every 3rd mother.

The first sample was selected using simple random sampling using a lottery method after assigning a number 1, 2 and 3. The remaining samples were collected using systematic random sampling (every 3<sup>rd</sup> mother after the previous selected mother).

#### 4.6. Study variables

In this study late initiation of antenatal care was the **dependent variable** and the **independent variables** include Socio-demographic factors (age, religion, marital status, educational status) Obstetric factors (parity, history of obstetric complication, history of Previous ANC visit and intention of pregnancy), enabling factors (accessibility of information about ANC and interaction with health professional) and Reinforcing factors (perception of mothers on the advantage of the ANC, timing of ANC visit).

## 4.7. Data collection

### 4.7.1. Data collection tool

A questionnaire was developed based on studies conducted in Ethiopia and Africa to assess the late initiation of antenatal care and its associated factors and was adapted to suit the local context. The questionnaire was pre-tested in 5% of the sample size at Jimma university medical center.

### 4.7.2. Data Collection Technique

The data was collected by midwives and medical interns, who were given a 2- day training on the study objectives, data collection tool, methods of data collection, procedures for checking the completeness of data, and how to maintain confidentiality ,With close supervision by third and fourth year residents and the principal investigator.

## 4.8. Operational definition

Early initiation for ANC is defined as a pregnant woman initiating antenatal care in the first 12 weeks of gestation (1). Late initiation for ANC is defined as a pregnant woman initiating antenatal care after 12 weeks of gestation (1).

## 4.9. Data quality control

From the very beginning, data collectors and supervisors were given a brief orientation on data extraction from patient chart as well as on inclusion/exclusion criteria. The supervisors and principal investigator had a day to day onsite supervision during the whole period of data collection. At the end of each day, each questionnaire were reviewed and checked for completeness, accuracy and consistency by the supervisors and principal investigator and corrective measure was taken together with the data collectors.

#### 4.10. Data processing and analysis

Data was consecutively collected using a semi-structured questionnaire through trained data collectors. Data were analyzed with SPSS version 25, and descriptive statistics such as tables, were used to present the findings

Analytical statistics was carried out, and the results presented using text, frequency tables, and graphs. The associations between dependent and independent variables were assessed using bivariate logistic regression analysis.

Variables with p-values  $<0.25$  in the bivariable analysis were entered into the multivariable analysis model. A multivariable logistic regression analysis model were built to assess the influence of possible potential confounding variables and the strength of association. The adjusted ORs and their 95% CIs was calculated to determine the statistically significant associations between independent and dependent variables.  $p < 0.05$  was considered statistically significant.

#### 4.11. Ethical issues

Ethical clearance was obtained from ethical review board for human studies of Jimma University and permission was obtained from the authorities of the hospital and submitted to the responsible authorities of the hospital to have permission for data collection. Written consent was obtained from each study participants. Confidentiality was assured by collecting data anonymously.

#### 4.12. Dissemination of result

The findings of this study will be presented to staff of JUMC, will be submitted to the advisor, JU research and graduate studies and CBE coordinating office and to publishers for possible evaluation and publication of the paper.

## Chapter Five: Result

### 5.1. Socio-Demographic Characteristics

In this study, a total of 427 pregnant women who presented to an antenatal clinic for the first time during the study period were interviewed. The mean age of those study participants was  $25.5 \pm 5.107$  years. Approximately 197 (46.1%) participants were within the age group of 25–29 years. Out of 427 participants, 367 (85.9%) lived in urban areas, 282 (66.0%) were housewives, and 419 (98.1%) were married ([Table 1](#)).

### 5.2. Prevalence of late initiation of antenatal care

Among the 427 pregnant women who participated in this study, 284 (66.6%) had a late initiation of antenatal care.

### 5.3. Obstetric, medical, and other related characteristics

Among the 427 women, 137(32.1%) were nulliparous and 290 (67.9%) were Para one and above. Approximately 88 (20.6%) women had three or more living children. Among the total study participants, 225(52.7%) respondents learned of their pregnancy from a urine human chorionic gonadotropin (HCG) test.

Approximately 23 (5.4%) participants had medical complications, of which hypertension and diabetes mellitus accounted for 7 (1.6%) and 4 (0.9%), respectively. Of the respondents 303(71%) of women planned for pregnancy and 298 (69.8%) had previous information about timing of antenatal care, 111 (26 %) traveled more than 10 km to the study area ([Tables 2, 3](#)).

Table 1: Socio-demographic characteristics of women who initiate their first ANC

Contact between September 1 and November 30, 2025 at JUMC

Variables	Category	Frequency	%
Age	15-19	24	5.6
	20-24	136	31.8
	25-29	197	46.1
	30-34	61	14.2
	>=35	9	2.1
Residence	Rural	60	14
	Urban	367	86
Marital Status	Single	8	1.8
	Married	419	98.2
	Divorced/Widowed		
Religion	Muslim	270	63.2
	Orthodox	122	28.5
	Protestant	34	7.9
	Catholic	1	0.2
Educational Status	Unable to read and write	41	9.6
	Able to read and write	66	15.4
	Primary education	134	31.3
	Secondary education	122	28.5
	Tertiary education	64	14.9
Occupation	House wife	282	66
	Self-employee	83	19.4
	Government -employee	47	11
	Farmer	3	0.7
	Student	3	0.7
	Others	9	2.1
Husband Education	Unable to read and write	13	3
	Able to read and write	66	15.4
	Primary education	83	19.4
	Secondary education	158	37
	Tertiary education	107	25
Husband Occupation	Self-employee	234	54.8
	Government-employee	105	24.5
	Farmer	56	13.1
	NGOs	3	0.7
	Others	29	6.6

Table 1

Table 2: Obstetric history of women who initiate their first ANC Contact between September 1 and November 30, 2025, at JUMC, Jimma, South western Ethiopia

Variables	Category	Frequency	%
GA at first visit (Weeks)	<=12	143	33.4
	13-27	224	52.5
	>=28	60	14.1
Planned	Yes	303	71
	No	124	29
Wanted	Yes	424	99.1
	No	3	0.9
Parity	Nullipara	137	32.1
	Para one and above	290	67.9
Number of alive children	No Children	147	34.4
	1-2	192	44.9
	>=3	88	20.6
Means of Pregnancy recognition	Urine test	225	52.7
	Missed menses	191	44.7
	Ultrasound	11	2.6
Illness during Pregnancy	Yes	47	11
	No	380	89
Presence of bad obstetric history	Yes	42	9.8
	No	385	90.2

Table 2

Table 3: Medical and other related characteristics of women who initiate their first ANC Contact between September 1 and November 30, 2025, at JUMC, Jimma, South western Ethiopia

Variables	Category	Frequency	%
Medical complications/comorbidity	Yes	23	5.4
	No	404	94.6
Specific medical complications	DM	4	0.9
	HTN	7	1.6
	HIV	2	0.5
	Chronic renal disease	2	0.5
	Asthma	1	0.2
	Others	7	1.6
Ability of decision to attend ANC	Yes	404	94.6
	No	23	5.4
Decision maker to start ANC	Mother	337	78.9
	Husband	44	10.3
	Health Professional	34	8
	Colleagues	4	0.9
	Others	8	1.8
Perceived right time of initiation of ANC	Before 12 weeks	191	44.7
	After 12 weeks	236	55.3
Previous information about the time of initiation of ANC	Yes	298	69.8
	No	129	30.2
Distance of residence from study Area ( JUMC) (KM)	≤10	316	74

Table 3

#### 5.4. Factors associated with late ANC initiation

##### 5.4.1. Binary Logistic regression analysis of associated factors

Binary logistic regression was used to identify factors associated with late initiation ANC. All the independent variables with a p-value <0.25 in bivariable logistic regression analysis, such as residence, religion, pregnancy planning, maternal education, maternal occupation, parity, number of living children, perceived right time to initiate ANC, previous information about timing of ANC

initiation and ability of decision to attend ANC were taken to multivariable logistic regression to control for confounding factors.

Table 4 Bivariable logistic regression analysis of associated factors of late initiation of antenatal care among pregnant women who initiate their first ANC Contact between September 1 and November 30, 2025, at JUMC, Jimma, South western Ethiopia

Variables	Category	Late initiation of ANC		COR (95% CI)	P-Value
		Yes (%)	No (%)		
Age	15-19	18 (75)	6(25)	1	
	20-24	90(66.1)	46(33.9)	0.65(0.24-1.75)	0.397
	25-29	127(64.4)	70(35.6)	0.60(0.23-1.59)	0.309
	30-34	44 (72.1)	17(27.9)	0.86(0.29-2.54)	0.789
	>=35	5(55.5)	4(44.5)	0.41(0.08-2.07)	0.286
Residence	Urban	240(65.4)	127(34.6)	1	
	Rural	55(91.6)	5(8.4)	6.62(2.59-16.9)	<b>0.000</b>
Marital Status	Married	278(66.3)	141(33.7)	1	
	Single	6(75)	2(25)	1.52(0.30-7.63)	0.612
Religion	Muslim	198(73.3)	72(26.7)	1	
	Orthodox	69(56.5)	53(43.5)	0.47(0.30-0.74)	<b>0.001</b>
	Protestant	16(47)	18(53)	0.32(0.15-0.66)	<b>0.002</b>
Educational Status	Able to read and write	53(80.3)	13(19.7)	0.83(0.30-2.31)	0.735
	Primary education	96(71.6)	38(28.4)	0.52(0.21-1.27)	0.153
	Secondary education	74(60.6)	48(39.4)	0.31(0.13-0.77)	<b>0.012</b>
	Tertiary education	27(42.1)	37(57.9)	0.15(0.05-0.39)	<b>0.000</b>
	Unable to read and write	34(82.9)	7(17.1)	1	
Occupation	House wife	200(70.9)	82(29.1)	1	
	Self-employee	55(66.2)	28(33.8)	0.80(0.47-1.35)	0.417
	Government -employee	21(44.6)	26(55.4)	0.33(0.17-0.62)	<b>0.001</b>
	Farmer	2(66.6)	1(33.4)	0.82(0.07-9.16)	0.872
	Student	2(66.6)	1(33.4)	0.20(0.01-2.29)	<b>0.198</b>
	Others	5(55.5)	4(44.5)	0.51(0.13-1.95)	0.328
Husband Education	Able to read and write	51(84.8)	15(15.2)	1.02(0.24-4.19)	0.978
	Primary education	65(78.3)	18(21.7)	1.08(0.26-4.35)	0.910
	Secondary education	102(64.5)	56(35.5)	0.54(0.14-2.06)	0.373
	Tertiary education	56(52.3)	51(47.7)	0.32(0.08-1.26)	0.306
	Unable to read and write	10(76.9)	3(23.1)	1	
Husband Occupation	Self-employee	164(70)	70(30)	1	
	Government-employee	63(60)	42(40)	0.64(0.39-1.63)	0.369
	Farmer	41(73.2)	15(26.8)	1.16(0.60-2.24)	0.644
	NGOs	2(66.6)	1(33.4)	0.85(0.07-9.56)	0.898
	Others	15(53.5)	13(46.5)	0.57(0.16-1.81)	0.314

Table 4

Table 5 Bivariable logistic regression analysis of associated factors of late initiation of antenatal care among pregnant women who initiate their first ANC Contact between September 1 and November 30, 2025, at JUMC, Jimma, South western Ethiopia

Variables	Category	Late initiation of ANC		COR (95% CI)	P-Value
		Yes (%)	No (%)		
Planned	Yes	189(62.3)	114(37.7)	1	
	No	108(87)	16(13)	4.87(2.74-8.63)	<b>0.000</b>
Wanted	Yes	280(66.2)	144(33.8)	1	
	No	2(75)	1(25)	0.85(0.07-9.56)	0.898
Parity	Nullipara	81(59.1)	56(40.9)	1	
	Para one and above	203(70)	87(30)	0.62(0.40-0.94)	<b>0.027</b>
Number of alive children	No Children	88(59.1)	59(40.9)	1	
	1-2	124(64.6)	68(35.4)	1.22(0.78-1.90)	0.374
	≥3	72(81.8)	16(18.2)	3.01(1.60-5.68)	<b>0.001</b>
Means of pregnancy recognition	Urine test	152(67.5)	73(32.5)	1	
	Missed menses	127(66.5)	64(33.5)	2.38(0.70-8.10)	0.342
	Ultrasound	5(45.5)	6(54.5)	2.49(0.73-8.45)	0.261
Illness during pregnancy	Yes	34(72.3)	13(37.7)	1	
	No	250(65.8)	130(34.2)	0.73(0.37-1.44)	0.371
Presence of bad obstetric history	Yes	29(69)	13(31)	1	
	No	255(66.2)	130(33.8)	0.87(0.44-1.74)	0.71
Medical Complication /Comorbidity	Yes	14(63.6)	8(36.4)	1	
	No	270(66.6)	135(33.4)	0.87(0.35-2.13)	0.76
Ability of decision to attend ANC	Yes	264(65.3)	140(34.7)	1	
	No	20(86.9)	3(13.1)	3.53(1.03-12.1)	<b>0.044</b>
Decision maker to attend ANC	Mother	229(67.9)	108(32.1)	1	
	Husband	26(59)	18(41)	0.68(0.35-1.29)	0.252
	Health Professional	18(52.9)	16(47.1)	0.53(0.26-1.08)	0.381
	Others	7(87.5)	1(12.5)	3.3(0.40-27.1)	0.267
Perceived right time of ANC Initiation	Before 12 Weeks	88(46)	103(54)	1	
	After 12 weeks	196(83)	40(17)	5.73(3.68-8.93)	<b>0.000</b>
Previous information about time of ANC initiation	Yes	186(62.4)	112(37.6)	1	
	No	98(75.9)	31(24.1)	0.52(0.32-0.83)	<b>0.007</b>
Distance of residence from study Area(KM)	≤ 10 KM	208(65.6)	109(34.4)	1	
	>10KM	76(69.1)	34(30.9)	1.17(0.73-1.86)	0.506

Table 5

#### 5.4.2. Multi-variable Logistic regression analysis of associated factors

From all the associated factors that undergo binary logistic regression, those with p-value < 0.25 were taken to multivariable logistic regression to control for confounding factors.

In the multivariable logistic regression, Residence in rural areas (AOR 4.32, 95% CI 2.59–9.61), unplanned pregnancy (AOR 3.4, 95% CI 1.83-6.65 ), three or more alive children (AOR 6.42, 95% CI 1.19-34.6 ) and wrong perception about the time of ante-natal care initiation ( AOR 4.88, 95% CI 2.90-8.20) were significantly associated with late initiation antenatal care in this study .

Table 6 Multi-variable logistic regression analysis of associated factors of late initiation of antenatal care among pregnant women who initiate their first ANC Contact between September 1 and November 30, 2025, at JUMC, Jimma, South western Ethiopia

Variables	Category	Late initiation of ANC		AOR (95% CI)	P-Value
		Yes (%)	No (%)		
Residence	Urban	240(65.4)	127(34.6)	1	
	Rural	55(91.6)	5(8.4)	4.32(2.59-9.61)	0.041
Religion	Muslim	198(73.3)	72(26.7)	1	
	Orthodox	69(56.5)	53(43.5)	0.64(0.36-1.14)	0.135
	Protestant	16(47)	18(53)	0.48(0.19-1.18)	0.110
Educational Status	Able to read and write	53(80.3)	13(19.7)	1.00(0.34-2.97)	0.985
	Primary education	96(71.6)	38(28.4)	0.64(0.25-1.66)	0.365
	Secondary education	74(60.6)	48(39.4)	0.56(0.21-1.45)	0.233
	Tertiary education	27(42.1)	37(57.9)	0.34(0.10-1.17)	0.089
	Unable to read and write	34(82.9)	7(17.1)	1	
Occupation	House wife	200(70.9)	82(29.1)	1	
	Self-employee	55(66.2)	28(33.8)	1.09(0.57-2.09)	0.780
	Government -employee	21(44.6)	26(55.4)	0.91(0.37-2.27)	0.855
	Farmer	2(66.6)	1(33.4)	1.10(0.07-16.13)	0.945
	Student	2(66.6)	1(33.4)	0.53(0.03-7.86)	0.650
	Others	5(55.5)	4(44.5)	2.07(035-12.04)	0.414
Planned	Yes	189(62.3)	114(37.7)	1	
	No	95(76.6)	29(23.4)	3.49(1.83-6.65)	0.000
Parity	Nullipara	81(59.1)	56(40.9)	1	
	Para one and above	203(70)	87(30)	0.32(0.06-1.65)	0.177
Number of alive children	No Children	88(59.1)	59(40.9)	1	
	1-2	124(64.6)	68(35.4)	3.79(0.74-19.1)	0.107
	≥3	72(81.8)	16(18.2)	6.42(1.19-34.6)	0.030
Ability of decision to attend ANC	Yes	264(65.3)	140(34.7)	1	
	No	20(86.9)	3(13.1)	1.71(0.40-7.26)	0.46
Perceived right time of ANC Initiation	Before 12 Weeks	88(46)	103(54)	1	
	After 12 weeks	196(83)	40(17)	4.88(2.90-8.20)	0.000
Previous information about time of ANC initiation	Yes	186(62.4)	112(37.6)	1	
	No	98(75.9)	31(24.1)	1.11(0.60-2.04)	0.72

Table 6

## 6 .Discussion

In this study, the proportion of late ANC initiation among pregnant mothers was 66.6%. Women living in rural areas, unplanned pregnancy, having three or more children and wrong perception about the time of ANC initiation were associated with late initiation of ANC.

This study revealed that two-third of respondents initiated ANC after the recommended time.

This result is consistent with other studies conducted in Gondar (10), Dilla (16), Debre-Markos (17) , Kembata (18), South-eastern Tanzania (6) and Burkina Faso (14). This shows the issue of inadequate ANC utilization among pregnant women in low and middle income countries like Ethiopia, which could hinder efforts to meet the Sustainable Development Goal of reducing maternal and perinatal morbidity and mortality.

On the other hand, the finding from this study regarding the magnitude of late initiation of antenatal care was higher than those reported in studies conducted in Jimma zone public hospitals (9), Central zone of Tigray (3), Dire Dawa (19), Addis Ababa (20), Hiwot Fana hospital in Harar (12), Cameroon(5) and Myanmar(15). This can be explained, since Addis Ababa is a capital city better awareness and information accessibility than the other parts of the country. Another reason for the difference in the outcomes could be the study done Jimma previously, considered mothers to be late for initiation of ANC if they presented after 16 weeks of gestation, whereas this study defined late initiation as occurring after 12 weeks of gestation, in line with the latest WHO classification.

This study showed that the magnitude of late initiation is lower than that found in studies conducted in Debre Birhan (4), Wollega (21), Ambo (11), Southern Ethiopia (8) and Zambia Nodla district (13). The possible explanation for this observed difference might be due to study population composition in which proportion of mothers residing in rural areas of current study were lower than other studies. Disparity may be attributed to differences in socio-demographic factors, study setting, and periods in which the study was conducted.

According to this study, mothers who resides in rural areas had 4.3 times higher odds of initiating ANC late than urban mothers. This finding is consistent with the studies done in Debre-Markos (17), Ambo (11), Burkina Faso (14) and Myanmar (15).The possible reasons might be better educational status and availability of health care facilities and having a better chance of health information in urban areas than rural areas. Other possible explanations include traditional beliefs that discourage early disclosure of pregnancy, reliance on traditional care and reduced autonomy among rural women, who may need permission from their husbands before initiating ANC.

This study shows that there is significant association between unplanned pregnancies and late initiation of ante-natal care. According to this study mothers with unplanned pregnancies had 3.4 times higher odds of initiating ANC late compared to mothers with planned pregnancies. This finding is in agreement with findings from studies done in Debre birhan (4), Gonder (10), Addis Ababa (20), Harer hiwot fana hospital (12), Kembata (18), Rwanda (22) and Myanmar (15). The possible reasons for this could include a lack of support from partners or families, which may reduce their health-seeking behavior. In addition, women with unplanned pregnancies may initially attempt to deny their pregnancies, to themselves and to others, leading to delayed motivation for early ANC. Furthermore, Social and cultural factors strongly influence when and how women recognize an unplanned pregnancy and seek reproductive health services such as emergency contraception, safe abortion or antenatal care. These factors shape the knowledge, attitudes, autonomy and decision making power and access to care.

Our analysis showed that mothers with three or more living children had significantly higher odds of late ANC initiation compared with mothers who had no living children. This finding is consistent with studies from Debre birhan (4), Southern Ethiopia (8), Kembata (18), Rwanda (22) and Zambia (13).This might be because young women with their first pregnancy and childbirth are more careful about their pregnancy and therefore require institutional care more than multigravida women. On the other hand women who already gave birth to three or more alive children already developed confidence due to the experience and knowledge accumulated from previous pregnancies and births and may consider antenatal care less important.

This study shows that, those women who perceived that ANC initiation should occur After 12 weeks were 4.8 times more likely to initiate ANC late. This finding is consistent with those findings from studies done in Debre Markos (17), Southern Ethiopia (8), Harer Hiwot fana

hospital (12), Kembata (18) and Zambia Ndola district (13).The possible reason might be decreased exposure for information related to ANC initiation time. The lack of effective community health programs to educate women about the importance of early antenatal visits, lack of information on the purpose of early antenatal care, and the tendency to stick to the usual wrong practices and perceptions about the timing of ANC could explain this misperception (12).

## Strength and limitation of the study

Being a prospective face-to-face interview of participants and the outcome classification based on the recently recommended WHO ANC contact guidelines were strengths of this study.

However, there are limitations. Inability to establish temporal or causal relationships because of the study design used. The study was conducted at a single tertiary hospital, which may not accurately reflect the actual rate of late initiation antenatal care in the region. In addition Confounding factors may not be fully controlled (Some potential confounders like cultural beliefs, partner support, quality of previous ANC experiences, health system barriers) have not been measured.

## 7. Conclusion and Recommendation

### 7.1 Conclusion

This study demonstrated that late initiation of ANC remains highly prevalent among pregnant women attending their antenatal care at jimma university medical center. Factors such as unplanned pregnancy, rural residency, lack of awareness about time of initiation of ANC and having 3 or more kids at home were significantly associated with delayed booking. These finding highlights the need for targeted interventions to improve early ANC utilization.

## 7.2 Recommendation

To improve the timing of ANC initiation within the recommended time, coordinated actions are required from different stakeholders at various levels of the health system.

**Health administrators and policy makers** needs to Strengthen and expand maternal health education programs through local media and health extension workers , particularly targeting rural populations, Promote and scale up family planning services to reduce unplanned pregnancies and Encourage intersectoral collaboration (health, education, media, women and social affairs) to enhance awareness of maternal health services.

**Health Professionals (Facility Level)** should strengthen counseling during all reproductive health contacts, including family planning, postnatal care, abortion care, and general outpatient visits, with emphasis on the importance of initiating ANC within the first trimester. They also need to provide clear, consistent, and culturally appropriate information on the recommended timing and benefits of early ANC, addressing common misconceptions identified in this study. They should give special attention to multiparous women, who may underestimate the importance of early ANC due to previous pregnancy experiences.

**Community Health Workers (Health Extension Workers)** needs to conduct regular community based education sessions focusing on early pregnancy identification, correct timing of ANC initiation and risks associated with delayed ANC. They should also identify newly pregnant women early through home-to-home visits and actively link them to nearby health facilities.

**For future researchers** community-based studies are recommended to establish causal relationships between identified factors and timing of ANC initiation. Further research should assess health system–related factors, such as service readiness, provider attitudes, and facility accessibility, which were not fully explored in the current study.

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## Annex

### Patient Information and Consent Form

#### Part 1. Information Sheet

We are planning to study the prevalence and associated factors of late initiation of antenatal care. Our study aims to know the magnitude of late ANC initiation and to identify the contributing factors. So that we will try to work on these factors together with other responsible bodies to increase early initiation of antenatal care and to improve quality of antenatal care.

With your permission, we would like to include you in this study. We will ask you some questions and we will gather all necessary data from your medical record but will not include any information relating to your personality e.g. your name or where you live. If you are not willing you do not have to take part in this study; your participation is voluntary. If you decide not to take part, you will still get all the available health care from the facility. If you decide to take part and then change your mind later, you may do so, at any time, without losing any of your rights as a client. If you agree to participate in the study, we will ask you to read and sign the consent form.

#### Part 2. Consent Form

I, the undersigned, confirm that, as I give consent to participate in the study, it is with a clear understanding of the objectives and conditions of the study and with the recognition of my right to withdraw from the study if I change my mind.

I have also been assured that I can withdraw my consent at any time without penalty or loss of the benefit of treatment. The study has been explained to me in the language I understand.

Name of client: .....

Client's signature: .....

Date: .....

Name of data collector: .....

Signature of the data collector: .....

## 1. Proforma for data extraction

Created a Proforma for data retrieval on the prevalence of late initiation of antenatal care and associated factors in pregnant women who come for first ANC visit to Jimma medical center, Jimma, Southwest, Ethiopia.

This Proforma should only be used for mothers who come for first ANC visit during the study period and only for those who fulfill the inclusion criteria and none of exclusion criteria.

### Questionnaire

#### PART-I Socio- demographic data

Variables	Category
1. Age / Umurii/ ዕድሜ	15-19 20-24 25-29 30-35 ≥35
2. Residence/ Iddoo Jireenyaa/ ሞኖረያ ቦታ	Urban /Rural
3. Marital Status/ Haala Gaa'ilaa/ የጋብቻ ሁኔታ	Single/Married/Divorced
4. Religion / Amantii/ሃይማኖት	Muslim/Orthodox/Protestant/Catholic/others
5. Educational Status/ Sadarkaa Barnootaa/ የትምህርት ደረጃ	Unable to read and Write/able to read and write/primary Education/secondary/tertiary education
6 Occupation/ Hojii/ ሥራ	Housewife/ Farmer/Self-employee/

Government employee/Employee/Student

7. Husband Education/ Sadarkaa Barnootaa Abbaa Warraa/ የባል የትምህርት ደረጃ

Unable to read and write/able to read and write/primary

Education/secondary/tertiary education

8 Husband Occupation/Hojii Dhirsa/ የባል ሥራ

Farmer/Self-employee/

Government employee/

NGOs Employee/Student

PART-II Obstetric Data

**Variables**

**Category**

GA at first visit (in weeks)

≤ 12/ >12

**Umurii Ulfaa yeroo daawwannaa jalqabaa (torbanoota)**

በሙጃመሪያ ጉብኝት የእርግዝና ዕድሜ (በሰምንታት)

Planned pregnancy/Ulfaa Karoorfame/የታቀደእርግዝና

Yes/No

Wantedpregnancy/UlfaaBarbaadame/የተፈለገእርግዝና

Yes/No

Parity/Baay'ina Dhaloota/የወሊድብዛት

Nullipara/Para-I and above

Number of alive children/Baay'ina ijoollee lubbuudhaanjiran/የሕያዋንልጆችብዛት

No

children/12/≥3

Means of pregnancy recognition/Karaa itti ulfa beekame/እርግዝናየተገኘበትመንገድ

urine test/missed menses/ultrasound

Illness during current pregnancy/Dhukkuba yeroo ulfa ammaa jiru/ በአሁኑ እርግዝና ወቅት ያጋጠመ ህመም

Yes/No

Presence of bad obstetric history/Seenaa ulfaa fi da'umsaa badaa jiraachuu/የመጥፎ የወሊድ ታሪክ መኖር

Yes/No

PART-III Medical and Other related Data

**Variables**

**Category**

Medical Complication/Co morbidity/Rakkoolee fayyaa / Rakkoolee yaalaa/የጤና ውስብስቦች

Yes/No

- If yes, what specific medical Complication/**Yoo eeyyee ta'e, rakkoolee mudatan ibsaa/አዎ ከሆነ፣ ምን ዓይነት ችግሮች**

DM/HTN/HIV/Epilepsy/Chronic renal

Disease/Asthma/COPD/others

Ability of decision to attend ANC/Dandeettii murteeffannaa tajaajila ANC hordofuu/የእርግዝና

ክትትል ለመከታተል ውሳኔ የመስጠት ችሎታ

Yes/No

DecisionmakertostartANC/NamamurteetajaajilaANCjalqabuukennu/የእርግዝና ክትትል ለመጀመር

ውሳኔ የሚሰጥ ሰው

Husband/mother/Colleague/Health

Professional/others

Perceived right time of initiation of ANC/ Yeroo sirrii jalqabbii tajaajila ANC akka itti ilaalamu/ እርግዝና

ክትትል (ANC) ለመጀመር ተመራማሪ የሚታይ ትክክለኛ ጊዜ

Before 12 weeks

After 12 weeks

Previous information about time of initiation of ANC/ Odeeffannoo duraan waa'ee yeroo tajaajila

ANC jalqabuu argame/ ስለ ANC መጀመሪያ ጊዜ ቀድሞ የነበረ መረጃ Yes/No

Distance of residence from study area (JUMC) in KM/ Fageenya iddoo jireenyaa irraa gara

JUMCtti (KM)/ ከመኖሪያ ቦታ እስከ JUMC ርቀት (ኪ.ሜ.) < 10KM

>10KM