

# Magnitude of late initiation of antenatal care and its associated factors among pregnant women attending antenatal care in Woldia Public Health Institution, North Wollo, Ethiopia.

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## Research article

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# Abstract

**Background:** The World Health Organization states that every pregnant woman is at risk of complications. Antenatal care is vital to reduce complications and more likely to be effective if women begin receiving care in the first trimester of pregnancy and continue to receive care throughout pregnancy. The maternal mortality ratio in Ethiopia was estimated at 412 deaths per 100,000 live births in 2016.

**Methods:** Institutional based cross-sectional study design was used. Data collection was collected using an interviewer-administered questionnaire. A systematic sampling technique with proportional allocation was used to get the final 390 study participants. Data was entered, cleared, and analyzed with Statistical Package for Social Sciences Version (SPSS) 20. Descriptive measures were presented with frequencies, tables, and diagrams. A binary logistic regression model was used to identify predictors of late antenatal care initiation.

**Results:** The prevalence of late antenatal care initiation was 59.5% with 95% CI [54.6–64.1]. Residence of the mother [AOR = 5; 95% CI:(1.423, 17.86)], Paying for health services [AOR = 13.9;95% CI 3.531, 54.86], Planned for pregnancy [AOR = 13.4; 95% CI:4.018, 44.487], Counseled for ANC [AOR = 13.6; 95% CI:6.090, 63.127] and number of lifetime pregnancies (gravidity) [AOR = 5.5; 95% CI:2.077, 14.36] were factors significantly associated with late initiation of ANC.

**Conclusion:** More than 50% of women attended antenatal care follow-up late from the recommended time of initiation. Residence, payment for pregnancy-related health services, plan for pregnancy, counseling, and advice regarding antenatal care follow-up and gravidity were factors significantly associated with late antenatal care initiation.

## Background

The antenatal care (ANC) provision or regular check-ups during pregnancy through the public health services in modern obstetrics was started during the late 1930s in the United Kingdom and Northern Ireland [1]. ANC is important for the survival and wellbeing of both the mother and the infant. Skilled care during pregnancy is an important intervention in reducing maternal and neonatal morbidity and mortality [2].

World Health Organization (WHO) recommends a minimum of eight contacts: five contacts in the third trimester, one contact in the first trimester, and two contacts in the second trimester, While many African countries are still struggling to achieve high coverage of four antenatal visits [3].

Antenatal care is more likely to be effective if women begin receiving care in the first trimester of pregnancy and continue to receive care throughout pregnancy, according to accepted standards of periodicity [4]. The universal recommendation for the first ANC initiation is in the first trimester. According to WHO the first trimester is the best time for a mother to book her pregnancy [5].

WHO ANC model states that every pregnant woman is at risk of complications and recommends early ANC visits. The visit is used to segregate pregnant women into two groups based on the previous history of pregnancy, current pregnancy state, and general medical conditions. Those eligible to receive routine ANC

(basic component) and those who need special care based on their specific health conditions or risk factors on average account for 25% of all pregnant women initiating ANC [6].

Worldwide there's an enormous discrepancy within the prevalence lately ANC follow up among pregnant mothers, starting from 27.5 to 88% in developed and developing countries respectively [7]. In Latin America, the Caribbean, the Middle East, and North Africa, two-thirds of women present for antenatal care visit in the first trimester, while in sub-Saharan Africa, where women presenting for antenatal care are most likely to wait until the second trimester and a relatively substantial proportion present only in the third trimester. Although women in sub-Saharan Africa make their first antenatal visit rather late in pregnancy, they nonetheless tend to report more than one visit [8].

The South African National Department of Health recommended that women should visit the ANC clinic as soon as they realize that they are pregnant and definitely before 20 weeks of gestation. The ANC services should start with women's first visit irrespective of gestational age. Antenatal Care guidelines recommend that pregnant women should start their ANC visit at 12 weeks of gestation. Despite the provision of free ANC services, South Africa is still performing poorly compared to other middle-income countries [9].

In Ethiopia, only 20% of women had their first ANC during the first trimester, 26% during their fourth to the fifth month of pregnancy, and 14% during their sixth to the seventh month of pregnancy. Two percent of women did not receive any ANC until the eight months of pregnancy or later [2].

Poor and inadequate quality of care was a strong predictor for late ANC initiation, community-based information, health education and communication on ANC services, socio-economic and individual perception and knowledge of ANC services are major contributors to start ANC visit late in time [10].

Maternal knowledge on early ANC visit, planned pregnancy and parity were factors associated with early ANC visit, mothers of age, media access, advise to initiate ANC during the recommended time after amenorrhea, residence, husband's occupation, [11–14].

The maternal mortality ratio in Ethiopia was estimated at 412 deaths per 100,000 live births in 2016 (17). These maternal deaths could have been prevented if the pregnant women or adolescent girls had been able to access quality antenatal care (ANC) (it includes early initiation of 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 [6].

Pregnant women should be offered infection early in ANC since appropriate ANC interventions can reduce mother-to-child transmission of HIV infection due to offered screening for HIV at ANC. Screening for syphilis should be offered to all pregnant women at an early stage. In pregnant women with untreated syphilis, 70–100% of infants will be infected and one third will be stillborn [6]. Pregnant women also offered iron and folic acid supplementation in early pregnancy for those who are at risk of nutritional deficiency until 12 weeks of gestation reduces the risk of a baby born with neural tube defects such as anencephaly and spinal bifida [15].

Despite ANC is provided free of charge and there is increased accessibility; low utilization and late booking is still a major problem [16, 17]. According to the Ethiopian Demographic Health Survey 2016 (EDHS), only 20% of mothers start ANC early as per the recommendation [18].

Even though there is good health service coverage in Ethiopia, women come late for ANC follow up. Besides, there is a scarce study on magnitude and associated factors for late ANC among women attending ANC at Woldia town public health institutions, Northern Ethiopia. Therefore, this study aimed to assess the magnitude and factors associated with late initiation of ANC visit at Woldia public health institutions.

## Methods

### Study area and period

The study was conducted at Woldia public health institutions. Woldia town is the capital city of North Wollo Zone. It is located 520 Km away from the capital city Addis Ababa and 360 Km from the Regional capital city Bahir Dar. Based on the 2007 national census conducted by the Central Statistical Agency of Ethiopia (CSA), it has a total population of 46,139, of whom 23,000 are men and 23,139 women. Currently, Woldia town has one governmental general hospital and two health centers (Woldia Health center (HC) and Gonder berr HC). The study was conducted from May 01 to June 01, 2019.

### Study design

A facility-based cross-sectional study was conducted.

### Source and study population

The source population was all pregnant women attending antenatal care visits at Woldia town public health institutions. Whereas the study population was sampled pregnant women attending ANC at Woldia town Public Health institutions.

### Sample size and sampling procedure

#### Sample size

The final sample of the study was determined with the assumptions of a 95% confidence level, 5% margin of error. The sample size was calculated for the prevalence and the factors and the sample size calculated for the prevalence yields the largest and selected.

Using the formula

$$n = \left( z \frac{\alpha}{2} \right)^2 p(1 - P) / d^2$$

Where n = the desired sample size

Z = level of significance at 95% confidence interval

P = is the prevalence of late ANC visit (taken from a study conducted at public health centers of Debre Markos = 59.4%

q = 1- p

d = margin of error

Accordingly;

$$n = (1.96)^2 \frac{0.594(1 - 0.594)}{(0.05)^2} = 378$$

By adding 3% non-response rate  $378 + 12 = 390$

## **Sampling procedure**

First, the sampled number of pregnant mothers required for this study=390 allocated proportionally at each of the three public health institutions based on the number of antenatal care services delivered From January 01 to April 30 (fig.1).

## **Inclusion and Exclusion Criteria**

### **Inclusion criteria**

Pregnant mothers attending antenatal care visits at the time of data collection were included.

### **Exclusion criteria**

Mothers who do not respond due to severe medical or mental illness were excluded

## **Study variables**

### **Dependent variables**

Late initiation of ANC

### **Independent variables**

#### **Socio-demographic factors**

Women's age, residence, income, women's educational status, marital status, husband's educational status, occupation of the mother, occupation of the husband.

#### **Obstetrics factors**

Parity, gravidity, previous history of ANC, unplanned pregnancy

#### **Partner related factors**

Knowledge of ANC, partner involvement in decision-making

## **Data collection tools and techniques**

Data were collected using an interviewer-administered questionnaire. The questionnaire was adopted by reviewing the literature. The questionnaire was first prepared in English and then translated to the local language Amharic. The data collection was conducted by trained Midwives.

## **Data Quality control**

A pretest was done by taking 5% of the sample from the Kobo Hospital, one week before data collection to check whether the questionnaire was correct and consistent. Data was cleared and checked for completeness and consistency by the principal investigators. The training was given for data collectors regarding the purpose of the research and issues associated with the questionnaire including the method and steps of data collection, the contents of the questionnaire, proper coding of the response variables.

## **Data Processing and analysis**

Data was entered into EPI info version 3.5.1 for data exploration and cleaning. The cleaned data was exported to SPSS version 25 for statistical analysis. Descriptive statistics were used to summarize categorical variables. Both bivariate and multivariable analyses were performed using logistic regression and adjusted odds ratios (AOR) with 95% confidence intervals for factors associated with late initiation of antenatal care. P-value < 0.05 was considered statistically significant.

## **Results**

### **Sociodemographic characteristics of participants**

The mean age of the mother was 28 years (SD  $\pm$  5.4). More than half of the respondents 213(54.6%) were residents of urban areas. Of the total mothers, 228(58.5%) were Orthodox Christians. The majority of the mothers were 357(91.5%) Amhara ethnic group. Of the total 390 mothers, 339 (86.9%) were married mothers (Table 1).

Table 1  
Sociodemographic characteristics of mothers attending ANC at Woldia town public health institutions, 2019.

S.N	Socio-demographic Characteristics	Category	Frequency	Percent
1	Age	18–24	102	26.1
		25–34	232	59.5
		>=35	56	14.3
2	Residence	Urban	213	54.6
		Rural	177	45.4
3	Religion	Orthodox	228	58.5
		Muslim	132	33.8
		Protestant	25	6.4
		Catholic	5	1.3
4	Ethnicity	Amhara	357	91.5
		Tigrie	28	7.2
		Others	5	1.3
5	Marital status	Single	23	5.9
		Married	339	86.9
		Widowed	18	4.6
		Divorced	10	2.6
6	Maternal Educational status	Read and write only	92	23.6
		Cannot read and write	103	26.4
		Primary	63	16.2
		Secondary	70	17.9
		Collage and above	62	15.9
7	Husband educational status	Cannot read and write	57	16.8
		Read and write only	66	19.5
		Primary	31	9.1
		Secondary	90	26.5
		Collage and above	95	28.0
8	Maternal	Government	85	21.8

S.N	Socio-demographic Characteristics	Category	Frequency	Percent
	Occupation	Private	30	7.7
		Daily laborer	11	2.8
		Housewife	222	56.9
		Merchant	30	7.7
		Others	12	3.1
9	Husband Occupations	Government	121	35.7
		Private	71	20.9
		Daily laborer	49	14.5
		Merchant	90	26.5
		Others	8	2.4
10	Family income	≤ 2000 birr	62	15.9
		2,001–4,000 birr	172	44.1
		> 4,000 birr	156	40
11	Distance from health facility	< 30 minutes	105	26.9
		30–59 minutes	170	43.6
		1–3 hours	80	20.5
		> 3 hours	35	9.0

## Obstetric factors

Of the total respondents, 295(75.6) were multigravida. The majority of the respondents 230 (60.0%) had less than two alive children, 175(44.9%) had a history of ANC before the current pregnancy. Nearly a quarter of the respondents 108 (27.7%) did not have a plan for the current pregnancy (Table2).

Table 2  
Obstetric factors of mothers attending ANC at Woldia town public health institutions, 2019.

S.N	Obstetrics factors	Variable	Frequency	Percent
01	Gravidity	Primigravida	95	24.4
		Multigravida	295	75.6
02	Parity	Primipara	180	46.2
		Multipara	210	53.8
03	Number of alive children	0–2	230	60.0
		3 to 5	139	35.6
		> 5	21	5.4
04	Previous ANC	Yes	175	44.9
		No	215	55.1
05	Payment for health service	Yes	52	13.3
		No	338	86.7
07	Is pregnancy planned?	Yes	282	72.3
		No	108	27.7
09	Counseled for ANC follow-up	Yes	247	63.3
		No	143	36.7
10	Counseled by	HEWs	109	44.1
		Media	44	17.8
		Family	52	21.1
		Others	42	17.0
11	ANC for current pregnancy	Before 12 weeks	158	40.5
		After 12 weeks	232	59.5

## Partner related characteristics

From the total respondents, nearly a quarter of 95(24.4) of their husbands had no plan for the current pregnancy. Around 226 (57.9%) of husbands of respondents did not know when to start ANC follow up by their wives. One hundred and fifty-eight (40.5%) of the respondents had come for ANC with their husbands (Table 3).

Table 3  
Partner related characteristics of mothers attending ANC at Woldia town public health institutions, 2019.

S.N	Variable	Responses	Frequency	Percent
1	Pregnancy planned by husband	Yes	295	75.6
		No	95	24.4
2	Your husband knows when to start ANC	Yes	164	42.1
		No	226	57.9
3	If, yes when to start	Before 12 weeks	68	41.5
		After 12 weeks	96	58.5
4	Your husband come with you for ANC	Yes	158	40.5
		No	232	59.5

## Factors associated with the time of ANC initiation

Mothers who reside in urban areas were five times more likely to initiate ANC early than rural residents. Payment for health services, Plan for pregnancy, Counseled for ANC, and the number of lifetime pregnancies was factors significantly associated with late initiation of ANC(Table 4).

Table 4

Factors associated with late initiation of ANC among mothers attending ANC at Woldia town public health institutions, 2019.

No	Questions	Responses		COR(95%CI)	AOR(95%CI)
		No	Yes		
Factors					
Residence of the mother	Urban	103	110	2.077(1.369,3.150)	5.042(1.423,17.86)*
	Rural	55	122	1	1
History of ANC	Yes	89	87	2.150(1.424,3.245)	A
	No	69	145	1	1
History of payment for health services	Yes	41	11	7.040(3.488,14.209)	13.9(3.53, 54.86)**
	No	117	221	1	1
Is pregnancy planned?	Yes	139	143	4.553(2.633,7.873)	13.4(4.02, 44.49)**
	No	19	89	1	1
Counseled for ANC follow up	Yes	127	120	3.824(2.391,6.115)	13.6(6.09, 63.13)**
	No	31	112	1	1
Do your husband come for ANC for current pregnancy	Yes	80	78	0.494(0.325,0.747)	A
	No	78	154	1	1
Gravidity	Primgravida	47	48	1.62(1.02,2.58)	5.461(2.07,14.36)*
	Multigravida	111	184	1	1
Parity	Multipara	65	115	0.711(0.473,1.070)	A
	Primipara	93	117	1	

COR: crude odds ratio. AOR: adjusted odds ratio. CI: Confidence Interval. \*statistically significant variables at  $p < 0.05$ . \*\*Statistically significant variables at  $p < 0.001$ . <sup>a</sup> Not significant in stepwise backward logistic regression.

## Discussion

The findings of this study revealed that the prevalence of late antenatal care initiation among study subjects was 59.5%. This finding was greater than a study conducted in Colombia (29.7%)[14], which might be attributable to demographic and cultural differences. The finding was less than a study conducted at Debrebirhan health institutions (73.8%) [17], Gonder town (64.9%) [22], and study conducted at Southern Ethiopia (79.8%) [21]. this might be attributable to the difference in the time of the study.

In this study, mothers from the urban residence were nearly five times more likely to initiate ANC at and before 12 weeks of gestation. This finding is in line with a study conducted in Zambia, EDHS 2016 [19, 24], this is because of the differences in the awareness level and access to health services among rural and urban mothers.

Mothers who had a history of payment-related health services were nearly 14 times more likely to initiate ANC late than those who had not paid, attributable to those who had paid previously for health services might fear the fee and come late for antenatal care. This finding also revealed that those mothers who had planned for the current pregnancy were 13 times more likely to initiate ANC before /at 12 weeks of gestation than those mothers who had no plan. This finding was in line with the study conducted at Debrebirhan health institutions [17], Southern Ethiopia, Addis Abeba [21, 23] It is because of mothers who did not have a plan for their pregnancies, might know their pregnancy status late, or do not want to disclose their pregnancy status.

According to this study mothers who had counseled and advised regarding ANC were 13.5 more likely to initiate ANC before/at 12 weeks of gestation than those mothers who did not. The finding is in line with a study conducted at Addis Abeba [23]. This is because of mothers who were advised on antenatal care follow-up understood the significance of initiating antenatal care follow up early.

The findings of this study also show that primigravida mothers were 5.5 times more likely to initiate ANC before/at 12 weeks of gestation than multigravida mothers. The finding was similar to the study conducted at Tanzania [20] and Southern Ethiopia [21]. This might be due to mothers who did not have previous exposure for pregnancy fear the risks and seek immediate health care.

## Conclusion

Our study showed that 59.5% of mothers attended antenatal care follow-up late from the recommended time of initiation. Residence, payment for pregnancy-related health services, plan for pregnancy, Counseled, and advised regarding antenatal care follow-up and gravidity were factors significantly associated with antenatal care initiation.

## Abbreviations

AOR Adjusted Odd Ratio

ANC Antenatal Care

COR Crude Odd Ratio

EDHS Ethiopian Demographic Health Survey

HC Health Center

SPSS Statistical Package for Social Sciences

## Declarations

### Ethics approval and consent to participate

Ethical clearance was obtained from Woldia University, an Ethical review committee. Written informed consent was obtained from study participants. Written consent was obtained before data collection and confidentiality of the information was maintained throughout the study by excluding names as identification in the study.

### Consent for publication

Not applicable

### Availability of data and materials

The original data for this study are available from the corresponding author on reasonable request.

### Competing Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

### Funding

No funding available for this study.

### Authors' Contributions

**AA** conceived the research idea, designed the study, collected data, analyzed it, interpreted the result, and prepared the manuscript for publication. **ST** collected data, reviewed the draft of the manuscript, and checked for grammatical and spelling errors. All authors have read and approved the manuscript before sending it for the publication.

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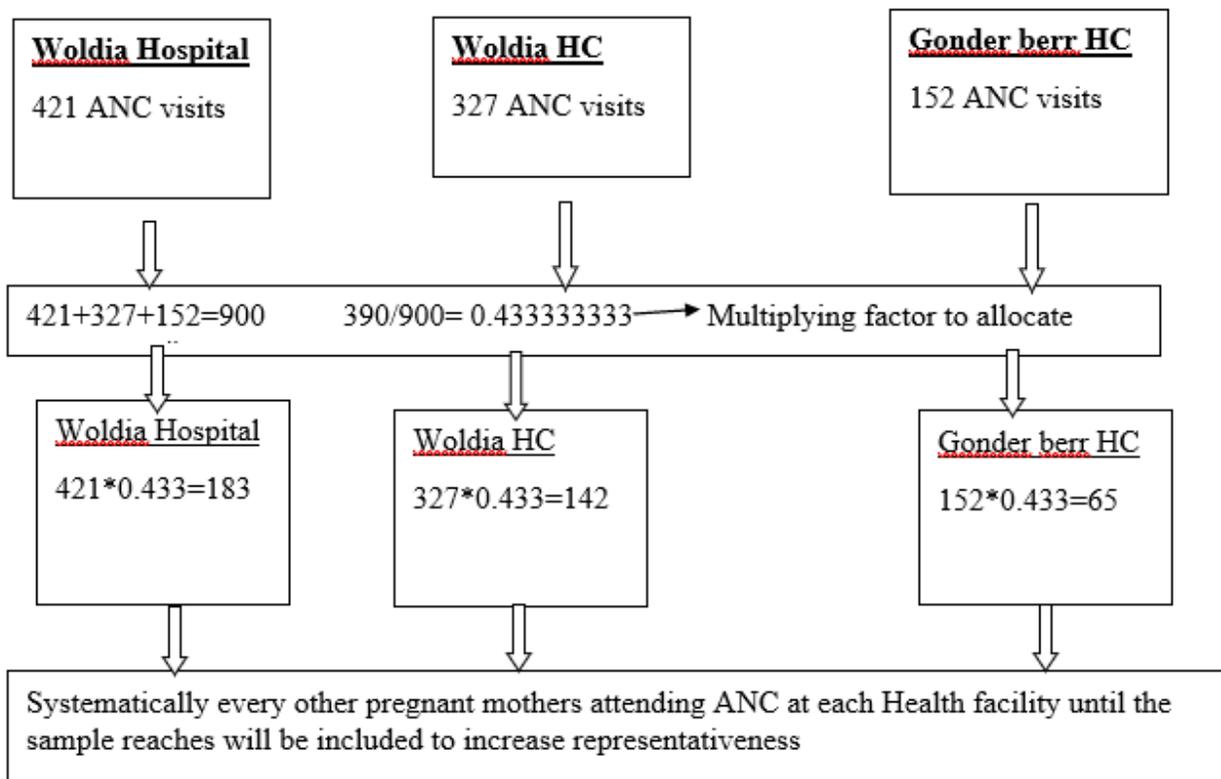
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## Figures



**Figure 1**

sampling procedures to assess the magnitude and factors associated with ANC among pregnant mothers attending ANC at public health institutions of Woldia town, 2019.

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Questionnaires.docx](#)