

# Initiation of Antenatal Care and Associated Factors among Pregnant Women in Public Health Centers in Addis Ababa, Ethiopia

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## ABSTRACT

**Introduction:** Antenatal care (ANC) refers to the care that is given to an expectant mother from the time that conception is confirmed until the beginning of labor and also initiation of antenatal care visits is an essential component of services to improve maternal and new born health. Pregnancy related complication can be minimized if antenatal care is received timely or early in the pregnancy, during the first 16 weeks of gestation for the first time and continued until delivery. Pregnancy related complication is preventable. Studies show high maternal death prevalence worldwide and every day, approximately 830 women die from preventable causes related to pregnancy and child birth. Therefore, this study aims to assess initiation of antenatal care and associated factors among pregnant women in public health centers in Addis Ababa.

**Materials and Methods:** Facility based cross-sectional study was conducted among 670 pregnant women in public health centers in May, 2019 in Addis Ababa. Multistage sampling technique was used to select study participants. Data was analyzed using SPSS version 23. Binary logistic regression analysis was computed and variables with p-value  $\leq 0.05$  was considered as statistically significant to the dependent variable.

**Results:** A total of 670 pregnant women participated in the study with 100% response rate among all study participants, 274 (40.9%) booked for the first ANC early, before 16 weeks of gestation. The result showed that age (AOR= 0.20, 95% CI 0.10-0.40), education status (AOR= 1.26, 95%CI: 1.15-4.60), gravida (AOR= 2.10, 95% CI: 1.06-4.23), history of abortion (AOR= 0.43, 95% CI: 0.21-0.87), types of pregnancy (AOR = 3.14, 95% CI: 1.05-4.37) and knowledge (AOR= 4.18, 95% CI: 1.06-5.50) were significantly associated with initiation of antenatal care.

**Conclusions:** The study showed that less than half of the pregnant women had early initiation of ANC in public health centers in Addis Ababa. This study indicated that age, educational status, gravida, types of pregnancy, history of abortion and knowledge were factors significantly associated with initiation of ANC. Hence, health education about ANC to enhance awareness is required for pregnant women.

**Keywords:** Antenatal care, Initiation, Pregnant women, Addis Ababa, Ethiopia

## LIST OF ABBREVIATIONS

ANC: Ante Natal Care; AOR: Adjusted Odd Ratio; COR: Crude Odd Ratio; EDHS: Ethiopian Demographic Health Survey; FMOH: Federal Ministry of Health; SPSS: Statistical Package for Social Sciences; UN: United Nations; WHO: World Health Organization; STI: Sexual Transmitted Infection

## BACKGROUND

Antenatal Care (ANC) is refers to the care that is given to an expectant mother from the time that conception is confirmed until

the beginning of labor. Antenatal care model recommends that all pregnant women should have eight contact with a health provider throughout pregnancy. The 1<sup>st</sup> contact 16weeks (during first trimester), 2<sup>nd</sup> and 3<sup>rd</sup> contact 20,26 weeks respectively (during second trimester) and 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup> contact 30,34,36,38,40 weeks respectively (during third trimester). This should be initiated with a first contact at less than 16 weeks gestational age. This new model aims to provide pregnant women with respectful, individualized, person-centered care at every contact, with implementation of effective clinical practices (interventions and tests), and provision of relevant and timely information, and

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psychosocial and emotional support, by practitioners with good clinical and interpersonal skills within a well-functioning health system [1]. Early initiation of ANC visits enables health care providers to diagnose early pregnancy related complications and institute timely and appropriate interventions [2].

Globally, each year about 210 million women become pregnant, of these only 71% ever receive any ANC and 135 million have live births [3]. Globally, 287,000 women die annually due to pregnancy related complication, of which 99% occurring in the developing world and 1% in developed countries [4].

Each year in Africa 30 million women become pregnant, and about 250,000 of them die from pregnancy-related causes and in sub-Saharan Africa in 2010 there were an estimated (162,000) maternal deaths with maternal mortality rate (MMR) of 500 per 100,000 live births [4]. Ethiopia is one of the six countries that contributes to >50% of all maternal deaths globally [5]. Receiving sufficient number and timely ANC visit helps to improve maternal health outcomes but in sub-Saharan Africa the ANC utilization is low; the pregnant women who have at least one ANC visit were 69%, at least four ANC visit were 44% and pregnant women who gets ANC within 0-3 months of pregnancy were only 20%, which is low coverage comparing to other parts of the world [6].

In Ethiopia about 22,000 women die each year as a consequence of complications happen during pregnancy or childbirth, and more than 500,000 women suffer from pregnancy-related disabilities [7]. Data from Ethiopia also show that about 83% of pregnant women nationally [2] and 59.8% of pregnant women in the capital city, Addis Ababa, initiate their first visits late also the Ethiopian demographic and health survey conducted in 2016 indicated that 20% of pregnant women start antenatal care in the first trimesters [8].

If the care offered to women during pregnancy improve and initiates ANC early it becomes global reduction of maternal mortality ratio (MMR) and a positive pregnancy outcome can only achieved [5]. ANC is a necessary component of maternal health in order to identify complications and danger signs during pregnancy. Regular ANC visits can provide some benefits for the women such as a strong relationship between women and the health care provider that can result in reducing complications during pregnancy. According to the United Nations Millennium Development Goals, every year, at least half a million women and girls needlessly die as a result of complications during pregnancy, childbirth or the six weeks following delivery. Almost all (99%) of these deaths occur in developing countries [9]. Only 20% of women had their first ANC during the first trimester also among regions, ANC coverage from a skilled provider is in Addis Ababa (97%).

It has been estimated that 25% of maternal deaths occur during pregnancy. The mother who does not attend early ANC miss the opportunity to receive health information and interventions such as early detection of HIV, malaria, and anemia prophylaxis, and prevention or management of complications [1]. When failure to attend ANC earlier result mothers lack of service include identification and management of obstetric complications such as preeclampsia, tetanus toxoid immunization, intermittent preventive treatment for malaria during pregnancy, and identification and management of infections including HIV (mother-to-child transmission), syphilis and other sexually transmitted infections (STIs) [10].

Pregnancy related complication is preventable. Studies show high maternal death prevalence worldwide and every day, approximately

830 women die from preventable causes related to pregnancy and child birth. Those countries signed sustainable development goals (SDG) are expected to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030 [11], so initiation of ANC is one of the priority agenda and Ethiopia is one of the country signed SDG.

In Ethiopia Only 20% of women had their first ANC visit during the first trimester [2]. It indicates initiation of antenatal care is low and there is a limited research on the factors that affect early initiation of ANC. Identifying associated factors with initiation of ANC in Addis Ababa is important in prevention of maternal and child mortality burden. Therefore, the aim of this study was to assess initiation of antenatal care and associated factors among pregnant women attending antenatal care in public health centers, Addis Ababa, Ethiopia.

## METHODS AND MATERIALS

### Study design and setting

Institutional-based cross sectional study was conducted in Addis Ababa. Addis Ababa is the diplomatic capital of the African union and capital city of Ethiopia. It has ten sub-cities and 116 districts. The city has an estimated total population of 3,384,596 people [12] which is divided into ten sub-cities. There were 98 government health centers with in the ten sub-cities which are divided in to 116 districts. Yeka, Nifasilk and Gulala three of the ten sub-cities of Addis Ababa. Yeka, Nifasilk and Gulala has 15, 10, 10 health centers each sub-city and with estimated population of 465,505, 424,215, 359,933 each sub-city respectively. The study was taken place in ten Addis Ababa public health centers October/18 to November/28 2018.

### Study Population

The study of population was all pregnant women attending first ANC in public health centers in Addis Ababa.

### Sample size determination and sampling procedure

The sample size for was determined using a single population proportion formula by considering the following statistical assumptions: 95% confidence interval (CI), 40.2% proportion [13], 5% marginal error, 1.5 design effect and 10% non-response rate. The sample size for this study was 670. Multistage sampling technique was used to select the study participants. Three sub-cities were selected by simple random sampling technique. There were 15, 10, 10 health centers in the selected Yeka, Gulala and Nifasilke Sub City respectively which give ANC service. Ten health centers were selected using simple random sampling technique and by proportionate allocation 670 study participants were recruited from the selected health centers using systematic random sampling technique.

### Data collection tool, procedures and quality assurance

The data were collected using interviewer administered structured questionnaire. The questionnaire was first developed in English and later translated to Amharic, local language. Before the start of actual data collection, the questionnaire was pretested for its completeness on 5% randomly selected women from health centers that were not included in the study and the necessary amendments were made. Three nurses with substantial experience in data collection were recruited and trained for one day prior to the data collection time. The collected data were checked regularly

for completeness and clarity. Supervision carried out throughout data collection period.

### Data management and analysis

After obtaining the raw data, it was coded and entered to a computer using Epi-Data version 3.1 statistical software. The data entry was done by the principal investigator to minimize errors. The collected data was cleaned and exported to SPSS version 23.0 software for analysis. Participants' socio-demographic characteristics and other variables were described using relevant descriptive statistics. Univariate binary logistic regression analysis was done at 25% level of significance to screen out potentially significant independent variables and using significant independent variables multivariable binary logistic regressions analysis was performed at 5% level of significance to see the association between the dependent and independent variables. To check the adequacy of the final model Hosmer-Lemeshow goodness of fit test was used and the model fitted well ( $p=0.8$ ). The assumption of multi-collinearity was checked and no multi-collinearity detected. For binary logistic regression 95% confidence interval was computed and a variable with  $p$ -value  $<0.05$  was considered as statistically significant to the dependent variable.

## RESULTS

### Socio-demographic characteristics of the study participants

Sixteen hundred seventy pregnant women were participated in the study making the response rate of 100%. Almost more than half, 342 (51.0%) of the study participants were in the age group of 19-25 years and the mean age was 23.35 years. Most respondents, 357 (53.3%) were single followed by married, 293 (43.7%). Regarding education status of the study participants, 263 (39.3%) had primary education level and 280 (41.8%) of the study participants were private employees (Table 1).

### Obstetric factors

More than half of the study participants, 442 (66.0%) were multi-gravida and majority of the study participants, 654 (97.6%) were multi-para. More than half of the study participants, 428 (63.9%) had no history of abortion. Almost half of the study participants, 337 (50.3%) had planned pregnancy and more than half of the study participants, 344 (51.3%) were knowledgeable (Table 2).

### Knowledge and attitude on ANC

More than half of the study participants, 344 (51.3%) were knowledgeable about ANC and majority of study participants, 428 (62.9 %) had favorable attitude towards ANC (Table 3).

### Initiation of ANC

Out of the 670 pregnant women, 274 (40.9%, 95% CI 36.9, 44.6) had early initiation of ANC whereas the rest, 396 (59.1%, 95% CI 55.4, 63.1) had late initiation of ANC.

#### Factors associated with early antenatal Care

At 25% level of significance, univariate analysis of binary logistic regression age, educational status, occupation, marital status, gravida, history of abortion, types of pregnancy and knowledge were significantly associated with initiation of ANC. However, at 5% level of significance multivariable binary logistic regression analysis age, education status, gravida, history of abortion, types of pregnancy and knowledge were found to be significantly associated with initiation of ANC.

In this study, age was significantly associated with initiation of ANC, pregnant women who were in the age group 26-35 years and  $\geq 36$  years were 80% and 88% less likely to have early initiation of ANC than who were in the age group of 19-25 years respectively (AOR= 0.20, 95% CI 0.10-0.40 and AOR= 0.12, 95%CI: 0.02-0.68).

**Table 1:** Socio demographic characteristics of the study participants at Public Health Centers in Addis Ababa, 2019. (n=670).

Variables	Frequency	Percent (%)
<b>Age category</b>		
≤18	97	14.5
19-25	342	51.0
26-35	220	32.8
≥36	11	1.6
<b>Marital status</b>		
Single	357	53.3
Married	293	43.7
Divorced	19	2.8
Widowed	1	.1
<b>Education status</b>		
No formal education	153	22.8
Primary	263	39.3
Secondary	161	24
Higher education	93	13.9
<b>Occupation</b>		
Merchant	9	1.3
Government employee	56	8.4
House-wife	190	28.4
Student	135	20.1
Private employee	280	41.8

**Table 2:** Obstetric history of pregnant women attending Antenatal Care (ANC) in selected Public Health Centers in Addis Ababa, 2019. (n=670).

Variables	Frequency		Percent (%)
	Gestational age (in weeks)		
≤16	274		40.9
≥6	396		59.1
<b>Gravidity</b>			
Primi-gravida	228		34.0
Multi-gravida	442		66.0
<b>Parity</b>			
Primi-para	16		2.4
Multi-para	654		97.6
<b>History of abortion</b>			
No	428		63.9
Yes	242		36.1
<b>Types of pregnancy</b>			
Unplanned	337		50.3
Planned	333		49.7

**Table 3:** Knowledge and attitude on ANC among the study participants in Public Health Centers in Addis Ababa, 2019, (n=670).

Variables	Frequency		Percent (%)
	Knowledge		
Not Knowledgeable	326		48.7
Knowledgeable	344		51.3
<b>Attitude</b>			
Unfavorable Attitude	242		37.1
Favorable attitude	428		62.9

**Table 4:** Univariate and multivariable analysis for factors associated with initiation of Antenatal Care among Pregnant women in Public Health Centers, Addis Ababa, 2019. (n=670).

Variables	Initiation of ANC		COR (95% CI)	AOR (95%CI)	P-value
	Early	Late			
<b>Age in years</b>					
≤18	4	93	7.21 (2.57-9.24)	1.07 (0.26-4.39)	0.92
19-25	81	261	1	1	
26-35	189	40	0.06 (0.04-0.15)	0.20 (0.10-0.40)	0.01*
≥36	9	2	0.06 (0.01-0.32)	0.12 (0.02-0.68)	0.02*
<b>Education status</b>					
No formal education	8	145	4.79 (2.21-10.36)	0.85 (0.66-1.17)	0.24
Primary	55	208	1	1	
Secondary	130	31	0.06 (0.03-0.10)	0.37 (0.19-0.71)	0.01
Higher education	81	12	0.39 (0.02-0.08)	1.26 (1.15-4.60)	0.01*
<b>Gravida</b>					
Primi-gravida	132	96	0.34 (0.24-0.47)	2.10 (1.06-4.23)	0.01*
Multi-gravida	142	300	1	1	
<b>Abortion</b>					
No	242	186	0.12 (0.08-0.19)	0.43 (0.21-0.87)	0.01
Yes	32	210	1	1	
<b>Types of pregnancy</b>					
Planned	260	73	0.01 (0.00-0.02)	3.14 (1.05-4.37)	0.01*
Unplanned	14	323	1	1	
<b>Knowledge</b>					
Knowledgeable	264	80	0.01 (0.00-0.02)	4.18 (1.06-5.50)	0.02*

Not knowledgeable	10	316	1	1	
<b>Occupation</b>					
Merchant	7	2	0.15(0.03-0.74)	0.68(0.11-4.19)	0.67
Government employee	39	17	0.23(0.12-0.43)	2.17(0.88-5.32)	0.95
House-wife	114	76	0.35(0.24-0.51)	0.99(0.47-2.05)	0.98
Student	17	118	3.68(2.09-6.47)	0.52(0.32-4.46)	0.64
Private employee	97	183	1	1	
<b>Marital status</b>					
Single	35	322	0.10(0.01-2.10)	0.65(0.01-2.10)	1.01
Married	226	67	4.5(0.24-5.32)	1.75(0.02-1.92)	1.2
Divorced	12	7	0.8(0.01-3.12)	0.31(0.22-3.12)	0.9
Widowed	1	0	1	1	

The pregnant women who had higher education were 1.26 times more likely to have early initiation of ANC than pregnant women who had primary education (AOR= 1.26, 95%CI: 1.15-4.60) and pregnant women who had secondary education were 63% less likely to have early initiation of ANC than pregnant women who had primary education (AOR=0.37, 95%CI: 0.19-0.71).

Pregnant women who were primi-gravida were 2.1 times more likely to have early initiation of ANC than pregnant women who were multi-gravida (AOR= 2.10, 95%CI: 1.06-4.23).

Pregnant women who had no history of abortion were 57% less likely to have early initiation of ANC than pregnant women who had history of abortion (AOR= 0.43, 95%CI: 0.21-0.87).

Pregnant women who had planned pregnancy were 3.1 times more likely to have early initiation than pregnant women who had unplanned pregnancy (AOR= 3.14, 95%CI: 1.05-4.37).

Pregnant women who were knowledgeable about ANC were 4.18 times more likely to have early initiation of ANC than pregnant women who were not knowledgeable (AOR= 4.18, 95%CI: 1.06-5.50) (Table 4).

## DISCUSSION

Antenatal care is more beneficial in preventing adverse pregnancy outcomes when received early in pregnancy and continued until delivery [1]. Early detection of problems in pregnancy leads to timely referrals for women in high-risk categories or with complications; this is particularly true in Ethiopia. According to this study, 274 (40.9%) of the pregnant women initiated early ANC within the recommended time and the rest 396(59.1%) initiated late. This study consistent with studies conducted in Arba-Minch. Similarity of both studies conduct in institutional based study also the minimal variation between those two-study finding could be due to the time variation of the study.

Pregnant women who were in the age group 26-35 years and  $\geq$  36 years were 80% and 88% less likely to have early initiation of ANC than who were in the age group of 19-25 years respectively. This study consistent with studies conducted in Arba Minch [14]. Similarity of both studies conduct in institutional based study also the difference between those two-study finding could be due to area of the study conducted.

The pregnant women who had higher education were 1.26 times more likely to have early initiation of ANC than pregnant women who had primary education and pregnant women who had secondary education were 63% less likely to have early initiation

of ANC than pregnant women who had primary education. This might be due to the fact that as education level increases awareness of every aspects increase. This finding is consistent with studies conducted in, Uganda, Addis Ababa [15].

Pregnant women who were primi-gravida were 2.1 times more likely to have early initiation of ANC than pregnant women who were multi-gravida. This might be primi-gravida women are more carefully about their pregnancy because no delivery exposure before, everything new for her than pregnant women who were multi-gravida. This study consistent with studies conducted in Arba-Minch [16]. Similarity of both studies conduct in institutional based study also the difference between those two-study finding could be due time of the study conducted.

Pregnant women who had no history of abortion were 57% less likely to have early initiation of ANC than pregnant women who had history of abortion. This might be there was no previous exposure for bad obstetric complications than pregnant women who had previous history of abortion. This study consistent with studies conducted in Vietnam, Addis Ababa [12,17]. Similarity of both studies conduct in institutional based study also the difference between those two-study finding could be due to time of the study conducted.

Pregnant women who had planned pregnancy were 3.1 times more likely to have early initiation of ANC than pregnant women who had unplanned pregnancy. The possible justification might be, it is believed that, wanted pregnancies are more cared by the women and other significant individuals, which enables the women to book early for ANC. This study consistent with studies conducted in Addis Ababa [18] Similarity of both study same socio demographic characteristics also the difference between those two study finding could be due to time of the study conducted.

Pregnant women who were knowledgeable about ANC were 4.18 times more likely to have early initiation of ANC than pregnant women who were not knowledgeable. This is might be due to knowledge on the importance of timely initiation is important predictor for early initiation of ANC. This study consistent with studies conducted in Arba-Minch [14].

## CONCLUSION

The study showed that less than half of the pregnant women had early initiation of ANC in public health centers in Addis Ababa. Age, educational status, gravida, types of pregnancy, history of abortion and knowledge were factors significantly associated with initiation of ANC. Hence, strengthening health education to



enhance awareness of the community about the importance of early ANC initiation and the consequence of late ANC initiation through various approach like mass media is very crucial.

## DECLARATIONS

### Ethics Approval and consent to participate

The study protocol was reviewed by Institutional Review Board (IRB) of GAMBY Medical and Business College and Addis Ababa Health Bureau and ethical clearance was obtained. The study participants also informed that participation was voluntarily and written informed consent was obtained from participants telling that they have the right not to respond. This study had no any risk for study participants. The confidentiality of participant related data was maintained by avoiding possible identifiers such as name, only identification number was used as a reference then after the whole data collection process, the questionnaire a was kept safe throughout the whole process of the research work.

### Consent to Publication

The consent for publication was obtained from each study participant during data collection.

### Availability of data and materials

All relevant data are available within the manuscript

### Competing interest

The authors declare that they have no competing interest.

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### Authors' contributions

Both authors meet the ICMJE criteria for co-authorship, providing substantial intellectual contributions for the manuscript. Both authors contributed to data analysis, drafting and revising the article, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

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