

Delay On First Antenatal Care Visit And Associated Factors Among Pregnant Women Attending Antenatal Care In Boditi Town, Southern Ethiopia: 2019

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Abstract

Background: The burden of maternal mortality is the issue of both developed and developing countries. Especially in sub-Saharan Africa, including Ethiopia, the problem magnifies due to poor quality of maternal health care services. This study was targeted to assess magnitude and associated factors of delay on first ANC visit among pregnant women attending ANC in Boditi Health Center, Boditi town, Southern Ethiopia: 2019.

Methods: Facility based cross-sectional study with systematic random sampling technique was employed to select 283 pregnant women enrolled in antenatal care unit at Boditi Health Center, Boditi town from April 1-30, 2019. Descriptive, bivariate and multivariable logistic regression methods were used to analyze the data.

Result: Out of respondents who provided a complete answer, 172(62%) were delayed for their first ANC visit. Respondent's living in urban area and those who had private employee husbands were negative associated with the outcome variable while, having a farmer husband, total number of biological living children, respondents who made decision together with their husband and those who reported the right time to start first ANC as after 16 weeks of last normal menstrual period were positively associated predictors of delay on first ANC visit.

Conclusion: This study has documented that delay on first ANC visit among pregnant women attending ANC unit at the study area was alarming.

Keywords: Delay, Antenatal care, Boditi town, Ethiopia

I. Background

ANC is a type of care given for women during pregnancy and it is one of the bases of maternal health service. The major goals are Health promotion and disease prevention, early detection and treatment of complications and existing diseases, birth preparedness and complication readiness planning [1]. The World Health Organization (WHO) recommends a minimum of four antenatal visits, comprising interventions such as tetanus toxoid vaccination, screening and treatment for infections, and identification of warning signs during pregnancy [2]. Prevention and treatment of any complications; emergency preparedness; birth planning; satisfying any unmet nutritional, social, emotional and physical needs of pregnant woman; provision of patient

education, including successful care and nutrition of the newborn; identification of high risk pregnancy; encouragement of partner involvement in antenatal care are the main objectives of antenatal care [3].

The more helpful in preventing adverse pregnancy outcomes using ANC is when the pregnant women received early in pregnancy and continued through delivery. Under normal condition, WHO, recommends that a woman without complications should have at least four ANC visits, the first of which should take place during the first trimester [2, 4]. According EDHS 2016 report 62% of women in 15-45 age groups and based on residence of urban and rural, 90 and 58% respectively attends ANC with skilled providers [5].

Developing countries accounted for about 99% of global maternal deaths, with the maternal mortality ratio (MMR) of 239 per 100,000 live births. Despite an apparent global improvement made over the last two and half decades, the worldwide MM dropped by about 45% in 2015 which is far from the decline targeted (75%) to be achieved by 2015[6]. Moreover, majority of the countries with the highest maternal mortality are in sub-Saharan Africa, including Ethiopia [7]. In sub-Saharan Africa and South Asia region, fewer women received at least four antenatal visits (49% and 42% respectively) [8].

Based on the 2016 Ethiopian Demographic and Health Survey (EDHS) report, the maternal mortality ratio in Ethiopia was- estimated at 412 deaths per 100,000 live births. Most of these deaths occur unpredictably during labor, delivery, and the immediate postpartum period [5]. Ethiopia, as one of the sub-Saharan country, maternal care is extremely poor. According to EDHS 2011 and 2016, only 34% and 62 % of women who gave birth in the five years preceding the survey received antenatal care from a skilled provider respectively. Furthermore the study revealed that one woman in every five (19%) made four or more antenatal care visits during the course of her pregnancy [5, 9].

Study in Debra Berhan town, central Ethiopia revealed that only 26.2% of pregnant mothers started ANC visit early in the recommended time and another study in Ambo town showed that only 13.2% of the study respondents were started ANC timely (in the first trimester of pregnancy) [10, 11]. Furthermore, many studies have identified several factors that influence early initiation of ANC including: maternal education, husband's education, availability of health service, cost, household income, women's employment, media exposure, parity, previous experience of health service utilization, perceived quality of service and unrecognized symptoms of pregnancy were found to be predictors that either positively or negatively influence timing of ANC booking [12-15].

Though there is large body of literature on antenatal care utilization, there is little that specifically addresses the recommended initiation time of this very important life-saving and crucial health service among pregnant women. Therefore, to address gaps in this existing research, we examined the magnitude of delay on first antenatal care visit among pregnant women attending ANC in Boditi Health Center, Boditi town, Southern Ethiopia.

II. Methods and materials

Study area and period: The study was carried out in Boditi Health Center, Boditi town, Southern Ethiopia from April 1-30, 2019. It is located at a distance of 248 km in the south-west from capital city of Ethiopia, Addis Ababa and 138 km from the capital city of the region, Hawassa. There are nine kebeles, smallest local administrative office, and the total population of the town in 2016 was 56228 (27552 male and 28676 female) from these, 18,209 were women in reproductive age group (15-49). There is only one health center in the town, which starts to give the service in 1991, and it is expected that it give the service to the whole population of the town.

Study design: Facility based cross-sectional study design was conducted.

Source and study population: The source population was all pregnant women attending antenatal care service in Boditi Health Center, Boditi town. Study population were selected pregnant women who attend ANC visit in Boditi Health center, Boditi town during data collection period. All pregnant women who came to their ANC visit and whose gestational age is identified either by last menstrual period or ultra-sound were included in this study while, pregnant mothers who were seriously ill or not aware their menstrual period were excluded from the study.

Sample size determination: The sample size was calculated using a single population proportion formula, following such assumptions as 95% confidence level, 5% margin of error, 74% proportion of delay on first ANC visit taken from previous study conducted at Debre Birhan, Central Ethiopia [10], and 5% nonresponse rate. Accordingly, 311 pregnant women were recruited as study participants.

Sampling procedure: The study area consists of one public health center (Boditi Health Center). The number of study participants from this health facility was determined by taking the average of the last three months ANC client flow report. The average monthly client flow in the health facility was 600. Study participants were selected by systematic random sampling technique. A number between one and two was randomly selected and then, starting with this number, every second client who met the inclusion criteria was chosen.

Data collection tools and procedure: The main instrument of data collection was an interviewer-administered structured questionnaire which was developed based on relevant literatures. The data

collectors were four in-service Nursing students from Otona teaching and referral Hospital. The interview was carried out in quiet place after the pregnant women completed their ANC visits. The questionnaire was initially prepared in English and then translated in to Amharic then back into English to check its consistency. The selected participants were informed by the data collector. If the selected participant is interested, the informed oral consent obtained and the data collected.

Data quality control: To ensure the quality of the data, structured questionnaire was used and pretest was done on 5% of the questionnaires in a setting out of the study area (Otona Teaching and Referral Hospital) before the actual data collection starts. This helped for further clarification of instruments and data collectors to familiarize with the instrument and to estimate the time needed. The structured questionnaire was first prepared in English and then translated into Amharic and again translated back to English to increase the questionnaire consistency. Two days intensive training was provided about the instruments, ways of data collection, ethical issues and aims of the study for data collectors. Finally, ambiguous and unclear questions were modified before the data collection. To keep completeness and consistency, data collectors were closely supervised before and during the data collection process by the principal investigators.

Variables: Dependent variable; delay on first antenatal care visit. Independent variables include: - **Socio demographic:** age of mother, marital status, occupation, educational status, monthly income residence); **Antenatal care related variables:** timing of ANC, knowing the right time to start ANC, knowing recommended frequency of ANC visit during pregnancy, previous use of ANC service; **Husband involvement and Health service related:** distance from health service, waiting time, cost of service, women decision making, pregnancy plan includes husband; **Obstetric related:** Planned pregnancy, wanted pregnancy, previous history of stillbirth, previous history of abortion, parity, living children (biological).

Data analysis: The data was visually checked for completeness, inconsistencies, missing values and then entered into Epi-data version 4.4. Coded and cleaned data was exported to SPSS window version 25 for analysis. Frequency distribution was done to check for outliers, consistencies and to identify missing values. Descriptive statistics was computed to determine frequencies and summary statistics (mean, standard deviation, and percentage) to describe the study population in relation to socio-demographic and other

relevant variables. Data presented using tables, graphs and figures. Bivariate and multivariable logistic regression was done to test association between dependent and independent variables. Variables with p-values of <0.25 at bivariate analysis was transferred to multivariable logistic regression and a P-value of less than 0.05 were considered statistically significant with 95% CI.

Ethical approval: Ethical clearance was obtained from Chief Academic and Research Director office of college of Health Science and Medicine, Wolaita Sodo University. An informed written consent was obtained from all subjects for their participation after explaining the objective and purpose of the study. Study participants were informed that data will be kept private and confidential and used only for research purpose. The participants were also assured that they have the right to refuse or withdraw if they are not comfortable at any time. Personal privacy and cultural norms was respected.

III. Results

From the total of 311 pregnant women recruited, 277 responded to the questionnaire adequately making the response rate of 89.1%.

Socio-demographic characteristics: Out of 277 respondents, the majority (97.9%) of participant were age between 20 and 34, 203 (73.3%). The mean and standard deviation age of participant was 25.8(± 5.8). Two hundred fifty two (91%) respondents were married and 102 (36.8%) were daily laborer. The ethnic composition of study respondents shows that Wolaita (87%) are the dominant group followed by Amhara (5.8%). The majority of participants 219(79.1%) were protestant religion followers and regarding educational status of the mother, majority 141 (50.9%) were attended primary school and 39 (14.1%) can't read write. Majority of the respondents 175 (63.2%) were Urban residents. Nearly greater than half of pregnant women 156(56.3%) had monthly income of above 1000 ETB (Table 1).

Table 1:- Socio-demographic characteristics of pregnant women attending ANC visit in Boditi Health Center, Boditi town, Southern Ethiopia, 2019

Variables	Frequency (n)	Percent (%)
Age		
<20	55	19.9
20-34	203	73.3
35-39	19	6.9
Residence		
Urban	175	63.2

Rural	102	36.8	ANC after amenorrhea		
Religion			Within first trimester	158	57.0
Protestant	219	79.1	After first trimester	119	43.0
Orthodox Christian	40	14.4	Timing of ANC improve		
Muslim	18	6.5	outcome of fetus		
Ethnicity			Yes	258	93.1
Wolaita	214	87	No	19	6.9
Amhara	16	5.8	Timing of ANC improve		
Silte	12	4.3	health of the mother		
Tigre	8	2.9	Yes	259	93.5
Occupational status			No	18	6.5
Government employee	66	23.8	Number of ANC visits		
Private employee	18	6.5	1-3 visits	118	42.6
Merchant	49	17.7	≥4 visits	159	57.4
House wife	117	42.2	All pregnant women are at		
Daily laborer	27	9.7	risk of pregnancy		
Marital Status			complication		
Single	19	6.9	Yes	232	83.8
Married	252	91	No	45	16.2
Divorced	4	1.4	Primiparous and		
Widowed	2	0.7	multiparous in timing of		
Family monthly income			first ANC		
(ETB^a)			There is difference	101	36.5
<500	87	31.4	There is no difference	176	63.5
500-1000	34	12.3			
>1000	156	56.3			

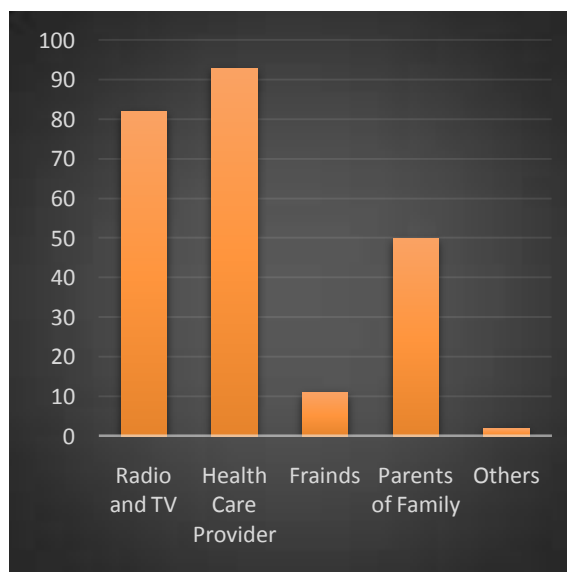
^aEthiopianbirr

Antenatal care visit related variables: Out of total respondents, 260 (93.9%) reported that ANC service is important. Around 259 (93.5%) and 258 (93.1%) respondents knew as early booking of first ANC improve health of the mother and fetal outcome respectively. Concerning the knowledge of appropriate time to begin first ANC 158(57%) mother reported that it should be within first trimester (<16 weeks) and 119(43%) after first trimester (≥16 weeks). One hundred fifty nine (57.4%) participants responded as four and above ANC visit is needed for pregnant women during normal pregnancy. From the total mothers who gave birth in the previous time nearly, 115 (41.5%) had ANC follow up and around 151 (54.5%) of these advised when to start first ANC for the next pregnancy. Out of the total respondents around 232 (83.8%) mothers reported that all pregnant mothers are at risk of pregnancy complications and 63.5% respondents responded that there is no difference between primi and multiparous in timing of first ANC (Table 2).

Table II:-Opinions of pregnant women attending ANC visits in Boditi Health Center, Boditi town, Southern Ethiopia, 2019

Variables	Frequency (n)	Percent (%)
Importance of ANC for the mother		
Yes	260	93.9
No	17	6.1
Appropriate time to begin		

Among the total respondent who mentioned ever heard (86%), majority mentioned that their source of information was Health care provider (39%), followed by radio and/or TV(34.5%) and parents or family(21%)



(Fig. 1).

Figure 1:- Source of information for timing of first ANC visits among pregnant women attending ANC visit in Boditi Health Center, Boditi town, Southern Ethiopia, 2019

Obstetric history: Among the total respondents, 213 (76.9%) have birth experience and from these mothers, 153(71.8) were multi Para who gave birth two and above. Stillbirth accounted around 38(13.7%) from the total birth and abortion accounted seventeen (6.1%)

from the total respondents. Nearly three quarter of participants (74%) had a plan to be pregnant for this current pregnancy and about 32(11.6%) pregnancy was unwanted (Table 3).

Table III:- Obstetric history of pregnant women attending ANC visit in Bodoti Health Center, Boditi town, Southern Ethiopia, 2019

Variable	Frequency (N)	Percent (%)
Birth experience		
Yes	213	76.9
No	64	23.1
Parity		
≤1	60	28.2
≥2	153	71.8
Number of alive children (biological)		
≤1	63	22.7
≥2	150	77.3
Any stillbirth		
Yes	38	13.7
No	175	63.3
Any abortion		
Yes	17	6.1
No	196	70.8
Had ANC visit for last pregnancy		
Yes	115	41.5
No	101	36.5

Husband involvement and Health service related variables: From the total respondents about 45(16.2%) pregnant mothers initiate ANC visit because of medical complications related with pregnancy. One hundred twenty six (45.5%) respondents had no information about timing of first ANC booking. Out of the total respondents, 193 (69.7%) mothers pay greater than five birr for transportation to reach to the health center for ANC service whereas 84(30.3%) pay 1- 5 ETB inclusive. Moreover, from the total respondents, 174 (62.8%) women were made decision with their husband on timing of first ANC visit.

Timing of first ANC booking: Out of 277 respondents only 105(38%) pregnant women booked timely (within first trimester) while 172(62%) were delay for first ANC visit,(after first trimester). The mean Gestational age of booked respondents was 20.5 weeks with standard deviation of 7.7 weeks and timing of first ANC booking ranged from six weeks to thirty-seven weeks.

Regarding to reasons for delay on first ANC visit, majority perceived that they came at the right time for ANC visit (32%) while, around 20% and 21% mentioned being healthy and unawareness of theirpregnancy as a reason for their delay respectively (Fig. 2).

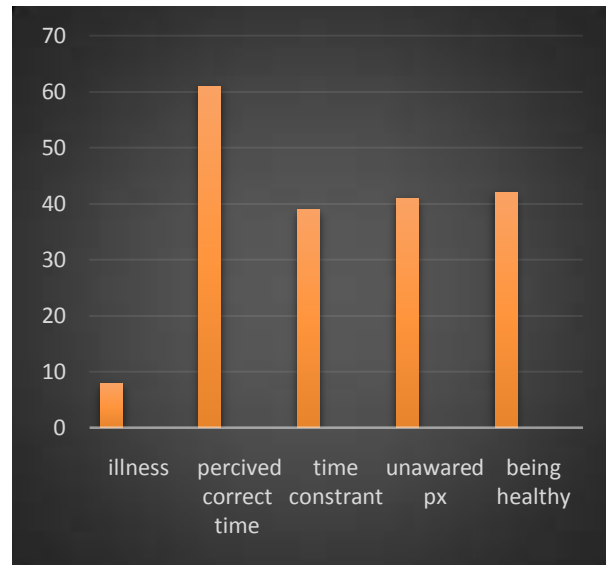


Figure 2:- Reasons for delay on first ANC visit among pregnant women attending ANC visit in Bodoti Health Center, Boditi town, Southern Ethiopia, 2019

Factors associated with delay on first ANC visit: In this section, the effects of factors that have suspected relationship to delay on first ANC visit have been explored using both bivariate and multivariable analysis. Accordingly variables which made an association in bivariate analysis with P-value <0.25 were: income, residence, women’s occupational status, transportation payment, ANC is important for the pregnant mother, informed about timing of first ANC visit, husband occupation, mothers who had biological living children, women decision making, knowing of right time to begin first ANC, Early initiation improves health of mother, early ANC improves health of the mother, history of stillbirth, ANC follow up for last pregnancy and planned pregnancy.

Multivariate analysis was done to control the confounder and to identify independent predictors of delay on first ANC visit and the result showed that the following five factors have association with delayed on first ANC; Residence of Respondents, Husband Occupation, mothers who had biological living children, Women decision making, and Knowledge of right time to begin first ANC (Table 4).

Finding of this study shows that women were living in urban were nearly 80% less likely (AOR=0.23; 95%CI: 0.08, 0.61) to delay on first ANC visit as compared to those living in the rural area. Participant’s husband occupation was another predictor for delay on first ANC visit in which, those women who had farmer husbands were five times (AOR=5.03; 95%CI: 1.29, 19.64) to delay on first ANC visit compared to those women who had a government employee husband. Contrary to this, those women who had private employee husband were almost 80% less likely (AOR= 0.17; 95%CI: 0.03, 0.80) to delay for first ANC visit.

Moreover, we have also noted that women who responded for the question ‘right time to start ANC’ as

after 16 weeks of last menstrual period were more than two times to delay on first ANC visit (AOR=2.28; 95%CI: 1.00,5.21) as compared to those women who responded the right time as within the first 16 weeks of last normal menstrual period. Those women who made decision with their husbands were 2.8 times delay on first ANC visit (AOR=2.80, 95% CI 1.14, 6.86) as compared to those women who made a decision by themselves. In addition, our finding shows that respondents with two or more than two biological living children were 97% less likely to delay on first ANC visit (AOR=0.03; 95%CI: 0.007, 0.13) as compared to respondents who had one or no biological living children (Table 4).

Table IV:- Bivariate and multivariable logistic regression of delay on first ANC visit among pregnant women attending ANC visit in Boditi Health Center, Boditi town, Southern Ethiopia, 2019

Variable	Delay on First ANC visit		COR (95% CI)	AOR (95% CI)
	No	Yes		
Residence				
Rural	22(21.6)	80(78.4)	1	1
Urban	83(47.4)	92(52.6)	0.30(0.17, 0.53)	0.23(0.08, 0.61)*
Income				
≤500	21(24.1)	66(75.9)	1	1
501-1000	11(32.4)	23(67.6)	0.66(0.27, 1.58)	0.28(0.06, 1.20)
>1000	73(46.8)	83(53.2)	0.36(0.20, 0.64)	0.36(0.09, 1.35)
Women’s occupation				
Gov’t employee	26(40.0)	39(60.0)	1	1
Private employee	6(33.0)	12(66.7)	1.33(0.44, 3.99)	1.63(0.26, 10.21)
Merchant	28(58.3)	20(41.7)	0.47(0.22, 1.01)	0.38(0.10, 1.44)
Daily laborer	28(28.0)	72(72.0)	1.70(0.88, 3.32)	1.09(0.32, 3.72)
Housewife	12(46.2)	14(53.8)	0.77(0.31, 1.95)	1.36(0.32, 5.71)
Husband occupation				
Gov’t employee	16(47.1)	18(52.9)	1	1
Private employee	37(56.1)	29(43.9)	0.21(0.07, 0.56)	0.17(0.03, 0.80)*
Merchant	26(40.0)	39(60.0)	0.14(0.06, 0.34)	1.23(0.38, 3.97)
Daily laborer	17(30.9)	38(69.1)	0.28(0.11, 0.67)	0.96(0.22, 4.16)
Farmer	9(15.8)	48(84.2)	0.41(0.16, 1.04)	5.03(1.29, 19.64)
Decision maker to initiate ANC follow up				
Myself	42(43.8)	54(56.3)	1	1
With my husband	61(35.1)	113(64.9)	1.44(0.86, 2.39)	2.80(1.14, 6.86)*
With others	2(28.6)	5(71.4)	1.94(0.35, 10.52)	2.80(0.28, 27.38)
Transportation payment to reach to HC				
≤5 ETB	39(46.4)	45(53.6)	1	1
>5ETB	66(34.2)	127(65.8)	1.66(0.99, 2.81)	1.04(0.41, 2.61)
Right time to start ANC				
Within first trimester	78(49.4)	80(50.6)	1	1
After first trimester	27(22.7)	92(77.3)	3.30(1.95, 5.64)	2.28(1.00, 5.21)*
Informed about timing of first ANC visit				
No	42(33.3)	84(66.7)	1	1
Yes	63(41.7)	88(58.3)	0.69(0.42, 1.14)	1.21(0.49, 2.97)
Total number of children (biological)				
≤1	4(6.3)	59(93.7)	1	1
≥2	101(47.2)	113(52.8)	0.76(0.02, 0.21)	0.03(0.01, 0.13)*
ANC is important for the pregnant mother				
No	4(23.5)	13(76.5)	1	1
Yes	101(38.8)	159(61.2)	0.48(0.15, 1.52)	0.91(0.19, 4.28)

Early ANC improves health of the mother				
No	10(55.6)	8(44.4)	1	1
Yes	95(36.7)	164(63.3)	2.15(0.82, 5.65)	1.45(0.30, 6.82)
History of stillbirth				
No	64(36.6)	111(63.4)	1	1
Yes	14(36.8)	24(63.2)	0.20(0.04, 0.90)	0.84(0.24, 2.94)
ANC follow up for the last pregnancy				
No	34(33.7)	67(66.3)	1	1
Yes	44(38.3)	71(61.7)	0.82(0.47, 11.43)	0.75(0.29, 1.93)
Was the current pregnancy planned				
No	34(47.2)	38(52.8)	1	1
yes	71(34.6)	134(65.4)	1.68(0.97, 2.90)	1.74(0.72, 4.20)

**Strong association with p-value<0.001*

IV. Discussion

This facility based cross sectional study was conducted to assess the delayed on first Antenatal care booking and associated factors. The findings of this study revealed that 62% were delayed for their first ANC visit. Initiation of first ANC ranges from six weeks to thirty seven weeks of pregnancy. The mean gestational age the respondent booked was 20.5 weeks and with standard Deviation of 7.7 weeks.

As stated above, the finding of this study revealed that 62% of the pregnant women initiated ANC at/after sixteen weeks of gestation. This finding is higher than that studies done in Addis Ababa(Ethiopia),Gonder (Ethiopia), Nigeria and Malaysia[11,17-19]. This might be due to socio demographic ,educational, and cultural differences as evidenced by the fact that majority of pregnant women who had no knowledge of right time of initiation of first ANC , husband involvement i.e. women decision making and women living in rural areas were delayed for their first ANC visit as compared to Addis Ababa and northern Ethiopian residents

This study shows as there is an association between pregnant women perception of right time to start first ANC visit and delay on first ANC visit. Women reported the right time to start first ANC visit at/after sixteen weeks were 2.28 times more likely (AOR=2.28, 95% CI 1.00, 5.21) to delay for first ANC visit than those who reported the right time. This finding is similar with the study done in Uganda [20], indicating that those participants who don't know the right time at which a pregnant woman should start attending ANC were more likely to delay for first ANC. Further, the study done in Debra Berhan, Ethiopia, supported this finding[10]. This might be due to the fact that, those who know the exact time come early than without information.

Those women who decides to initiate their ANC follow up with their husbands were 2.8 times

(AOR=2.80; 95% CI: 1.14, 6.56) more likely to delay for first ANC visit as compared with those who decide by themselves. This finding was in line with study conducted in Uganda, which indicated that initiation and frequency of ANC visits were significantly associated with mother's autonomy in taking health decision [21]. However, our finding was inconsistent with the study done in Pakistan [22] and in Dilla Town [23]. The observed difference in finding might be due to the fact that when women supported by their husbands, they seek health care timely, due to financial and psychological issues. Further, this difference might be due to the fact that lack of permission or discussion from husband hinders the ANC service. Also another study indicated that, decision making of wife only or husband only is associated with less ANC utilization as compared to joint decision making [24].

Total number of biological children was another predicting factor that affected delayed on first ANC visit in which; women who have two or more biological children were 97% less likely to delayed for their first ANC visit as compared to women who had one or no children (AOR=0.03, 95% CI,0.007,-.13).This study is in contrast with study done in Sodo town, pregnant women with no parity before were 2.5 times more likely to initiate timely than those with one and above birth experiences(AOR=2.5,95% CI, 1.6,4.8)[25]. Our study finding was also in contrast with studies conducted in Indonesia and Dilla, in which as parity increase there is likely hood of initiating first ANC visit lately [26,23]. This inconsistency in finding with ours may be due to the fact that women who are primigravida were not well matured in thought and they are not advanced in age.

Our study finding also shows statistically significant association between husbands' occupation and delayed first ANC visit. Those women who had farmer husbands were 5 times more likely to delay for first ANC visit as compared with those women who had government employee husbands. This may be due to knowledge gap and different level of monthly income between farmers and government employees. In

addition, our finding revealed statistically significant association between respondent's residence and delay on first ANC visit. Women whose residence is urban were nearly 80% less likely to delay on their first ANC visit (AOR =0.23; 95%CI: 0.08,0.61) as compared to their counterparts. Our finding was in line with a study conducted in Cameron [27], which shows urban dwellers are more likely to utilize ANC and booked early than the rural one.

This study is with certain limitations. Generalizability of this study to the general population in the community may be limited because pregnant women who visited the ANC clinic might be different from those who did not.

V. Conclusion

According to recommendation of WHO, every pregnant woman needs to start antenatal care in the first trimester of pregnancy. However, this study has documented that delay on first ANC visit among pregnant women attending ANC unit at the study area was alarming.

The study also identifies important factors associated with delay on first ANC visit and these includes: residence of respondents, husband occupation, mothers who had biological living children, women decision making, and knowledge of right time to begin first ANC. However, this all factors appear more rapidly amenable to carefully designed interventions. Therefore, information, education and communication on ANC and its right time of commencement should be organized and implemented by Regional Health Bureau and Boditi town Health Office.

Declarations

Ethics approval and consent to participant

Permission was obtained from WolaitaSodo University, College of Health Sciences, and Department of Midwifery. In addition, letter of permission was secured from Boditi town Health Bureau and Hospitals Management committee. Confidentiality of information was maintained.

Consent for publication: Not applicable.

Availability of data and materials: The data that support the findings of this study are available but some restrictions may apply to the availability of these data as there are some sensitive issues. However, data are available from the corresponding authors upon reasonable request.

Competing interests: The authors declare that they have no competing interests.

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Authors' contributions: GAA designed the study; prepared, obtained, analyzed and interpreted the data. BGA involved in analysis, reviewed and commented the entire of the paper from inception to end for its intellectual content. GAA prepared the first draft of this manuscript. Both authors reviewed, revised and approved the manuscript for publication.

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