

Predictors of Timing of First Antenatal Care Booking at Public Health Centers in Mekelle City, Northern Ethiopia

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Abstract: *Background:* Early antenatal care attendance during pregnancy is important to identify risk factors in pregnancy and to encourage women to have a skilled attendant at childbirth. But many pregnant women in sub-Saharan Africa start antenatal care attendance late, mostly in the second and third trimester. According to Ethiopian DHS 2011, Antenatal care coverage of Ethiopia is 34% and only 11% pregnant women start antenatal care timely. This indicates most pregnant mothers are not benefited from the services. Hence this study is aimed at assessing timing of first antenatal care visit and identifies factors affecting early attendance. *Methods:* Cross sectional descriptive study design was used. Data was collected from 410 systematically selected pregnant women who were attending antenatal care service at selected five governmental health centers of Mekelle city using pre-tested and interviewer administer structured questionnaire. SPSS version 16 was used to analyze the data. Socio demography, obstetric history and knowledge on advantage of early ANC booking and time when to start ANC were analyzed to see association with timing of antenatal care using bivariate and multivariate logistic regression analysis. *Result:* The proportion of respondents who made their first antenatal care within the recommended time (before or at 16 weeks of gestation) was found to be 32.7%. Multivariate analysis revealed that respondents with history of still birth, had obstetric problem for the current pregnancy, knowledge of timing of first visit and those pregnant women who had accompany to the health center for ANC visit were more likely to book ANC within the recommended time. Educational status of pregnant women and gravidity status has not significantly associated with timing of ANC booking. *Conclusions:* Majority of pregnant women do not practice early booking of antenatal care provided that the service is accessible. In order to improve the situation, adequate information should be provided to community.

Keywords: Timing, First ANC Booking, Predictors, Northern Ethiopia

1. Introduction

The lifetime risk for a woman in sub-Saharan Africa from pregnancy related causes is about 1 in 16 which is more than 500 times higher than for a woman in northern Europe [1]. According to Ethiopian DHS report 2011 in Ethiopia there are 676 maternal deaths for every 100,000 live births [2]. Focused antenatal care (ANC) is helpful to early identify preventable potential complications and danger signs and it is one of the big pillar on maternal and newborn death reduction [3, 4, 5]. Thus, pregnant women are encouraged to book for antenatal care as soon as pregnancy

is detected; which is less than 12 weeks of gestation. The aims of the first ANC booking are primarily to evaluate the state of well-being of the fetus and mother, to create awareness on signs and symptoms & complications of pregnancy. Afterwards the mother decides to timely access to skilled attendance of delivery and might be referred to appropriate emergency obstetric care if there is a need [1, 3, 5].

Evidences showed that in developed countries, most pregnant women attend their first ANC visit earlier (73%)

[6]. However, nine of ten (91%) pregnant women do not come early for ANC visit in Africa [7]. Similarly in Ethiopia many study indicated that most pregnant women who attend ANC come too late for their first ANC visit ranges from 40 to 60%) [8, 9].

Evidences states that different factors facilitates early use of ANC like being married women, higher education, previous ANC follow up and having awareness of obstetric danger signs are more likely to book ANC within recommended time compared with others [4, 2, 8, 10, 11]. Similarly, having high parity, younger age and unplanned pregnancy, lack of knowledge regarding the importance of early ANC are the causes for delayed booking for ANC [6, 12, 13].

Many pregnant women start antenatal care attendance late, mostly in the second and third trimester [6, 14-16]. Despite the fact that antenatal care seeking is essential; little is known about factors affecting timing of first ANC visit in Ethiopia in general and in Tigray Region in particular. Therefore, the aim of this study is to assess the factors associated with timing of first antenatal care visit in Northern Ethiopia.

2. Methods

2.1. Study Setting

The study was conducted in Mekelle city, Northern Ethiopia about of 783 km distance from capital city of Addis Ababa. Estimated total population of the study area was 289,756 during study period. The city has seven administrative sub-cities. In the city there are three public hospitals and nine public health centers all gives ANC service for five days in week. In Tigray including the study area ANC service is freely provided for all pregnant women. All pregnant women who came for ANC visit for first time for the current pregnancy and residents of Mekelle city were included in the study.

2.2. Sample Size and Sampling Procedure

Cross sectional descriptive study design was used. A total of 410 pregnant women (antenatal attendees) were interviewed using structured questionnaire at the time of exit. The sample size was calculated using single population proportion formula by considering prevalence (p) 42.2% of ANC booking within first trimester taken from study in Ethiopia [9] and 95% confidence interval and 5% margin of error and 10% non-response rate. From the total nine public health centers in Mekelle city, five health centers were randomly selected with lottery method, Number of pregnant mothers who visit each selected health centers was identified based on previous year client flow. Then using proportion to size allocation the total sample was shared to all randomly selected health centers. Then by using systematic sampling every other pregnant woman who came during data collection period was interviewed.

2.3. Data Collection

Five trained local female grade 12th complete students interviewed the pregnant woman. Structured questionnaire was developed by reviewing different literatures [8-13] and was pre-tested in similar set up on 5% of the total questioners to see the consistency of contents of the instrument. Data collection was conducted from February to March 2013. The dependent variable was timing of booking visit for ANC. If a mother came for ANC before or at 16 weeks of gestation for the first time during the pregnancy; she will be considered as having early booking visit (within the recommended time) unless considered as late attendance. The knowledge on advantages of early start of ANC booking and obstetric danger sign are measured by mean score. If mothers answered 50% or more of knowledge questions; she will be considered as knowledgeable unless considered as non knowledgeable to advantage of early start of ANC and obstetric danger sign.

2.4. Data Analysis

Each completed questionnaire had a unique code. Data was checked for completeness. Then the completed questionnaires were entered to SPSS version 16 for analysis. Data were analyzed using two step logistic regression (bi-variate and multivariate) to see the association of the independent variables on the dependent variable by controlling confounders. The dependent variable is dichotomous, that is timely or late seeking of ANC and the independent variables are categorical. Statistical significance was evaluated at 95% levels of significance. The predictor variables were computed by using bi-variate and multivariate logistic regression. The variables with a p-value < 0.05 at bi-variate were entered to multiple logistic regressions. Those variables with p-value < 0.05 on the multiple logistic regressions are identified as the predictor variables.

2.5. Ethical Clearance

Ethical clearance was obtained from the Ethical review board of Mekelle University. The health centers included in this study were asked permission using formal letters from the university. Informed verbal consent was obtained from the study participants. Privacy of clients and all information related to study participants was maintained confidential.

3. Result

3.1. Socio-Demographic of Respondents

From 412 sample pregnant women, 410 pregnant women were participated in this study making the response rate of 99.5%). Almost half (49.8%) of the respondents were in the age group of 25-34 years; the mean age of respondents was 25 year ranging from 15 to 43 years. Majority 92.4% (379/410) were married. Around two third, 271/410(66.1%) of the respondents were housewives and 158/410 (38.5%) attended primary school (Table 1).

Table 1. Socio-demographic characteristics of the respondents by timing of first ANC booking Mekelle City, Northern Ethiopia, 2013.

Variables	Booking before 16 weeks	Booking after 16 weeks	Total
Age in years	Freq (%)	Freq (%)	Freq (%)
15-24	64 (35.8)	115(64.2)	179(43.7)
25-34	64 (31.4)	140(68.6)	204(49.8)
35-45	6 (22.2)	21(77.8)	27(6.5)
Religion			
Orthodox	128 (32.5)	266 (67.5)	394 (96.1)
Muslim	5 (35.7)	9 (64.3)	14 (3.4)
Protestant	1 (50)	1 (50)	2 (0.5)
Marital status			
Single	1 (14.3)	6 (85.7)	7 (1.7)
Married	128 (33.8)	251 (66.2)	379 (92.4)
Divorced	2(15.4)	11 (84.6)	13 (3.21)
Widowed	3(27.3)	8(72.7)	11(2.7)
Educational status			
Illiterate	18 (24.3)	56 (75.7)	74 (18)
Primary (1-8)	47 (2.7)	111 (70.3)	158 (38.5)
Secondary	44 (36.7)	76 (63.3)	120 (29.3)
Diploma & above	25(43.1)	33(56.9)	58(14.1)
Occupation			
Employed	15 (35.7)	27 (64.3)	42 (10.2)
Private job	26 (30.6)	59 (69.4)	85 (20.7)
House wife	90 (33.2%)	181 (66.8)	271 (66.1)
Others	3 (25)	9 (75)	12 (2.5)

Table 2. Past experience on ANC and knowledge status of pregnant women by timing of first ANC booking, Mekelle city, Northern Ethiopia, 2013.

Variables	Booking before 16 weeks	Booking after 16 weeks	Total
Past experience of ANC	Freq(%)	Freq(%)	Freq(%)
Yes	65(29.4)	156(70.6)	221(82.5)
No	10(21.3)	37(78.7)	47(17.5)
Time of pervious ANC booking, n=221			
Booked before or at 16 weeks	42(48.8)	44(51.2)	86(38.9)
Booked after 16 weeks	23(17)	112(83)	135(61.1)
Had Knowledge when to start ANC			
Within 16 weeks	112(48.3)	120(51.7)	232(56.6)
After 16 weeks	22(12.4)	156(87.6)	178(43.4)
Knowledge on advantages of early ANC			
Knowledgeable	71(40.8)	103(59.2)	174(42.2)
Non knowledgeable	63(26.7)	173(73.3)	236(57.6)
Knowledge of danger sign			
Knowledgeable	15(51.7)	14(48.3)	29(7)
Non knowledgeable	119(31.2)	262(68.8)	381(93)

3.4. Timing of First ANC Visit

Almost one third, 134/410 (32.7%) of the respondents booked their first ANC visit before 16 weeks of gestation, whereas, 276/410 (67.3%) of the respondent were booked late. The timing of first ANC booking ranges from 1st month to 8 months of gestation. Perceived as correct time 166/276(60.1%), busy time 59/276(21.4%), previous experience 21/276(7.6%) unplanned pregnancy 13/276(4.7%), no health problem 10/276(3.6%), and unaware of pregnancy 7/276(2.5%) were the reasons given by pregnant women's for late booking. And reasons for early booking were perceive correct time 86/134(64.2%), to confirm pregnancy 17/134(12.7%), having health problem 10(7.5%), from previous experience 4/134(3%) and unplanned pregnancy 2/134(1.5%).

Out of 410 respondents, 340(82.9%) of them had received information on the advantages of timely ANC booking,

3.2. Obstetric History of Respondents

More than half, 232/410 (56.6%) of the respondents were Multi-gravid and 60/410 (14.6%) reported to have history of abortion. Thirty five out of 410 (8.5%) of the respondents had faced obstetric problem in the current pregnancy, of which 18/401 (4.4%) of them had previous history of still birth and 9/410 (2.2%) reported previous history of Caesarian section.

3.3. History of ANC Service Utilization and Knowledge Status of Women on Timing of ANC Visit

Among 268 respondents who had history of previous pregnancy, 221/410 (82.5%) had experience of ANC for the pregnancy preceding the current. Out of 221 respondents 86 (38.9%) had their previous visit before or at 16 weeks of gestation, About 56.6% (232/410) pregnant women had knowledge on when to start ANC booking, 174/410(42.4%) of them were knowledgeable on advantages of early ANC booking and only 29/410(7%) know obstetric danger signs (Table 2).

280(82.4%) were advised when to start ANC booking. Among these only 70/280(25%) of them were advised to book within 16 weeks of pregnancy.

3.5. Factor Associated with Timely Booking of ANC

In the final multivariate model the association remained statistically significant even after controlling for possible confounders were; Respondents with history of still birth, knowing that time of booking is within 16 weeks of gestation, who had accompany to the health center were more likely to book ANC within the recommended time compared to others (AOR =15.1, 95% CI 1.29-175.8), (AOR= 3.54 95% CI 1.415-8.835) and (AOR= 4.198 95% CI,1.18-14.94) respectively. But those do not have obstetric problem (AOR=0.050, 95% CI 0.11-0.228) and those who were booked timely for previous pregnancy preceding the current (AOR= 0.229, 95% CI 0.096-0.544) were less likely to book

early within 16 weeks of gestation (Table 3).

4. Discussion

This study determines the prevalence of women who started their ANC within the recommended time (early ANC booking). It also highlights the association between the proper timing of ANC and the factors that make women to have timely or late ANC booking for the visit. The factors associated with having early first booking for ANC visit include: previous history of still birth, history of obstetric problems for current pregnancy, previous early booking history, having knowledge on time when to start ANC and had accompany during ANC visit.

In the present study, the prevalence of early ANC booking among the respondents was 32.7%. This finding was almost similar with the results of study conducted in Tanzania, where as it is higher compared to other studies (Ethiopian DHS 2011 report -11%, south west Ethiopia -12.5% and in Uganda - 17%) [2, 8, 14]. The reason for the high prevalence of the present study could be explained with justifications: a) the effort of the government in improving women's access to maternal and child health services might have played a major role, b) the commitment of urban health extension workers who are engaged in tracing and further advising of pregnant women for early booking of ANC, c) besides, women are mobilized to seek early medical care by one to five women's network (women development army) which mainly focuses on proper ANC service and institutional delivery.

The mean gestational age at which the pregnant women starts the first booking and its distribution in this study is more or less comparable with Ethiopian DHS 2011 report and study done in Kenya [2, 17].

Though, it was not significant in the final model, women with 1-8 years of education were by far better to book early than non-educated women according bi-variate analysis. This finding is similar with Ethiopian DHS 2011 report where education was a strong predictor in the use of antenatal care services. [2]. However, our finding was in contrast to the results from Yem Wereda that revealed that women with education level of secondary and above were four times more likely to use antenatal care than illiterates. This difference could be due to having good access to reading materials, and availability of mass media so that individuals having primary school and those had secondary and above had equal chance to have awareness of the service [2, 8].

Having a history of still birth was found to be a significant predictor for early booking of ANC in this study. Women with foetal loss were 15 times more likely to book early compared to their counterparts. This finding is higher compared to the study results reported from Uganda and Tanzania This could be women who have had a previous complication are aware of the risk of pregnancy complications and therefore more likely to seek ANC early. with result finding in reveals that Mothers who gave birth by caesarean section, who experienced difficulty during the previous pregnancy, had faced miscarriage and still birth are about 10–11% in Uganda and 4%

in Tanzania more likely to initiate the first visit in the first trimester of pregnancy and attended 2 weeks earlier compared to counterparts [18, 14]. This difference could be health care providers may have different counseling techniques for timely booking in different countries.

Women with no history of obstetric problems for current pregnancy were found to book late for ANC in this study (AOR=0.050, 95% CI; 0.11-0.23). This is slightly lower with finding in Gumuz Metekel zone Ethiopia and Tanzania, which indicates pregnant women experiencing illness during pregnancy was two times more likely in Tanzania and 2.6 times more likely in Gomez to use ANC service than those do not experienced a life-threatening condition. This difference could be some of women facing health problem may go to private clinic for treatment and antenatal care may viewed primarily as curative rather than preventive by healthy pregnant women [19, 18].

In our study, these pregnant women who had experience to book early within 16 weeks of gestation for their past pregnancy preceding the current were less likely to book timely compared to those booked late (AOR=0.229 (CI;0.096-0.544). Among 86 respondents who were booked on time in their previous pregnancy almost half (48.8%) of them were booked timely is higher than the study done in Addis Ababa, Ethiopia (31%) [9]. Our finding is however similar with the study conducted in Niger which suggest that pregnant women who were advised by physicians booked early than others [20]. This difference may be that proper information and advice on pattern of ANC utilization from service providers are not given equally in both areas and the capacity of providers in providing advice to mothers may differ. This suggested that proper information and advice on pattern of ANC utilization is important to book early.

This study also assessed the association between knowledge and time of booking. Knowledge of women was found to be a strong predictor for early ANC booking. This result is in line with the findings reported from Metekel zone in Ethiopia and other study in Tanzania [21, 18, 19]. However, it is different from the study findings of South Africa, where, 36.4% of women booked late [12].

Accompanying pregnant women to health facility was associated with early booking of ANC in this study. The finding was consistent with other study [18]. In other side finding from Sumatra Indonesia reveals the number of women who were encouraged by their family to receive ANC was almost same compared to those who encouraged themselves (44.8%) [22]. In general this study has some limitations, in this study only pregnant women attending ANC at the governmental health institutions were included. The Governmental health centers are preferred because it is the first contact and easily accessible to the community for preventive health care aspects. Despite these assumptions other pregnant women may visit private clinics and hospitals for ANC. In addition, there will be a chick and egg dilemma since it is a cross sectional study design. Therefore it better to consider this limitation during the interpretation of the finding.

5. Conclusion

In this study majority of the pregnant women did not practice timely booking of first ANC provided that the services are physically and financially accessible. Pregnant mothers timely booked for their previous pregnancy were failed to book timely for the recent pregnancy. Pregnant women having support for accompany were book early on time. Having obstetric problem was the main factor for early booking and lack of appropriate knowledge on time of ANC booking and absence of health problems during pregnancy were the main reasons for late ANC booking. So it is

important to implement focused ANC timely in all health institutions in order to minimize the problem of delay start of ANC booking. In addition, the health provider need to clear information on general aspects of ANC to the expectant mother. Community based health education and involvement of husbands during information education and communication programmers are needed to correct the misconceptions about antenatal care. Establishment of peer discussion program for pregnant women like strengthen pregnant women's coffee ceremony program to improve their knowledge in regard to ANC booking is important.

Table 3. Association of factors with timely booking of ANC, Mekelle City, Northern Ethiopia, 2013.

Variables		Time at first visit		Crude Odd Ratio	Adjusted OR
		Booked Timely	Booked Late	OR (CI)	OR (CI)
Educational status	Illiterate	18(24.3%)	56(75.7%)	1	1
	Primary 1-8	47(2.7)	111(70.3)	1.97(1.069-3.627)*	1.804(0.579-5.615)
	Secondary and above	69(38.8)	109(61.2)	1.495(.948-2.357)	1.495(.948-2.357)
Gravidity	Primi gravida	59(41.5)	83(58.5)	1	1
	Multi gravida	67(28.9)	165(71.1)	0.402(.171-0.944)*	1.713(.505-5.818)
	Grand multigravida	8(22.2)	28(77.8)	0.704(.305-1.622)	1.718(.496-5.951)
Stillbirth	Had still birth	15(83.3)	3(16.7)	11.471(3.260-40.364)**	15.1(1.29-175.8) *
	No still birth	102(27.2)	273(72.8)	1	1
Had Obstetric problems for current pregnancy	Yes	32(91.4)	3(8.6)	1	1
	No	102(27.2)	273(72.8)	0.04(.01-0.12) **	0.05(0.11-0.23) **
Time of booking for previous pregnancy preceding current	Booked within 16 weeks	42(48.8)	44(51.2)	0.22(0.12-0.39) **	0.229(.096-0.54) **
	Booked after 16 weeks	23(17)	112(83)	1	1
Knowledge of time ANC start	Within 16 weeks	112(48.3)	120(51.7)	1.15(1.09-1.25) **	3.54(1.42-8.84) *
	After 16 weeks	22(12.4)	156(87.6)	1	1
Advantages of early ANC booking	Poor	63(26.7)	173(73.3)	1	1
	Good	71(40.8)	103(59.2)	1.89(1.25-2.88) *	2.15(0.94-4.92)
Had accompany	Yes	85(51.8)	79(48.2)	1.23(1.15-136) **	4.2(1.18-14.94) *
	No	49(19.9)	197(80.1)	1	1
Accompanied by	Husband	66(67.3)	32(32.7)	0.24(0.12-0.49) **	0.86(0.21-3.6)
	Mother	2(13.3)	13(86.7)	3.25(0.66-16.1)	0.53(0.11-2.63)
	Others (Sister/ Friends	17(33.3)	34(66.7)	1	1

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