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Article

DETERMINANTS OF ANTENATAL CARE SERVICES UTILIZATION AMONG REPRODUCTIVE AGE WOMEN IN BASSO LIBEN WOREDA

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ABSTRACT

Objectives: Ethiopia has the highest rates of maternal and infant morbidity and mortality in the world. Unfortunately, many women in Ethiopia do not have access to modern healthcare services, which is one of the factors contributing to this issue. According to the 2016 Ethiopian Demographic Health Survey, the percentage of receiving antenatal care (ANC) services reached 62%, which is lower compared to other African countries. Therefore this study aims to assess the determinants of ANC services utilizations in Basso Liben woreda.

Methods: A household-based quantitative cross-sectional study design was conducted in Basso Liben Woreda to evaluate the factors that determine ANC service utilization. The data were collected from a representative sample of 374 populations by using a systematic sampling technique. The study participants were women of reproductive age (15–49) years. Bivariate analysis was employed to determine the association between dependent and independent variables.

Results: The study's findings revealed that several factors, including residence, mother's educational level, marital status, media exposure, age at past birth, pregnancy desire, and occupational status of women, played a significant role in determining the utilization of ANC services in the study area. The relationship between the covariates and ANC service utilization was significant at p=0.05.

Conclusion: The research has identified significant disparities in ANC utilization among pregnant women in urban and rural areas, mothers' educational level, media exposure, age of mother, pregnancy desire, and occupational status. It's essential to address these issues by implementing government policies that give more emphasis to rural women, encouraging their participation in different sectors, improving their educational status, and distributing information about the use of ANC services.

Keywords: Antenatal care, Utilization, Basso Liben, Ethiopia.

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INTRODUCTION

Healthcare services during pregnancy and after birth have a major positive impact on both the mother and her child. Skilled nursing care, combined with other interventions, can offer assistance to reduce neonatal and maternal mortality and morbidity [1]. Even though childbirth and pregnancy are critical events all over the world, they are also very vulnerable for both the mother and her child. Each day, over 800 women pass on due to different causes related to childbirth and pregnancy and 99% of these deaths happen in low and middle-income countries [2].

Even though by 2015, maternal mortality had decreased by over 40% from the 1990 levels, maternal mortality levels have kept on inadmissibly high in sub-Saharan Africa [3,4]. Utilization of antenatal care (ANC) service utilization among expectant mothers is one of the foremost imperative well-being inputs in combating maternal diseases and mortality. Utilization of suitable and endorsed ANC assistance advances secure parenthood and conveyance with improved maternal and child well-being outcomes [2,3].

Within the continuum of maternal healthcare services, ANC, and institutional/skilled specialists during birth and postnatal care are important breakthroughs required to realize ideal maternal and child well-being. These components of care are expected to be provided as a continuum of care services to affect ideal advantage and the provision of these elements of care in a comprehensive continuum practice of care during pregnancy, childbirth, and postpartum period has been contended to decrease maternal and child (neonatal) mortality [5,6].

ANC is an entire component of maternal and child well-being care. Findings proved that certain components of ANC, such as risk screening, have a restricted effect on lessening maternal morbidity and mortality [3,7].

ANC aims to guarantee prevention, and early detection, and provoke management of pregnancy-related complications. The antenatal period presents openings for coming to pregnant women with many interventions that will be crucial to the health and well-being of their newborn children. Women who have attended ANC visits get adequate evidence-based clinical interventions, such as lockjaw toxoid immunization, folic acid supplements deworming, counseling on maternal health, emergency readiness, management of sexually transmitted diseases, organization of antiretroviral treatment in HIV-positive women, supply of fundamental data about improved hygienic practices, and the dangers associated with pregnancy and childbirth [8,9].

ANC boosts the health of pregnant women and has been found to decrease the risk of adverse pregnancy impacts, perinatal and newborn child mortality, and diseases. It also empowers skill birth attendance for births and postnatal care as women who go to ANC service utilization are more likely to utilize these services than non-attenders [4].

The most common causes of maternal mortality in Ethiopia include postpartum hemorrhage, sepsis, pre-eclampsia, and eclampsia and birthing complications. Even though most maternal deaths are preventable, many women regularly don't have access to evidence-based intercessions such as the utilization of ANC services before delivery, and

related services in childbirth and the postpartum period due to lack of income, shortage of information, and cultural barriers [1,10].

According to the 2016 Ethiopian Demographic Health Survey (EDHS), the percentage of women aged 15–49 who received prenatal care (ANC) services from a skilled attendant climbed from 27% in 2000 to 34% in 2011 and 62% in 2016. In their most recent pregnancy, 32% of women had at least four ANC visits. A blood sample (73%) and blood pressure measurement (75%) are more common among pregnant women than urine samples (46%) or dietary counseling (66% for both) [1].

The assessment of utilization and determinants of convenient ANC is fundamental to the progress of maternal and neonatal health outcomes. Findings in Ethiopia have shown many factors related to the utilization of ANC services, such as age, religion, parity, having a living child, educational attainment of women, place of residence, household wealth status, decision-making power, complications during the current pregnancy or past pregnancy, the husband's education, and access to mass media [5,7,10-14].

However, very few studies exist on the utilization or determinants of ANC service utilization in Northwest Ethiopia and there's a particular lack of community-level data on the timely use of diverse types of services for ANC service utilization. The aim of this study is therefore to assess the use of ANC services in Baso Liben Woreda, as well as the factors influencing their use.

METHODS

Study setting and period

The study was carried out in Basso Liben Woreda Amhara Region Ethiopia. It is located at a distance of 326 km from the capital of Ethiopia, Addis Ababa. There are 168,571 inhabitants in the district. Of which 88, 622 are women and 79,749 are men. In the East Gojjam Zone, Basso Liben woreda does not have sufficient health service availability compared with neighboring districts. The lack of health service availability aggravates the early childhood mortality in the area. The study period has been from March to June 2019 [15].

Study design

A household-based quantitative cross-sectional study design was held to assess the determinants of early childhood mortality in *Basso Liben Woreda,* Ethiopia.

Source of population

All reproductive-aged women (15–49) and permanent residents of *Basso Liben Woreda.*

Study population

The study population was women of reproductive age (15–49 years) who gave birth in the past two years before the study.

Sampling technique

First, all enumeration areas have been clustered into rural and urban. The rural enumeration areas were also clustered to, far, and near to the health facility by considering the distance. Out of the urban areas, two clusters have been selected by using a simple random sampling method. From the total rural clusters, two clusters near the health facility and two clusters far from the health facility have been selected by using a simple random sampling method to give equal chances for all clusters to be selected. Based on the Basso Liben Woreda health office report, taking the total number of women who have given birth in the past two years before the study in the selected five clusters, the sample population in each cluster was taken proportional to the total sample size.

Sample size determination

The required sample size was determined by using a single population proportion formula with the assumption of a 95% confidence interval, 5% error, and 50% prevalence of utilization of ANC services.

$$n = \frac{(Z\alpha/2)p(1-p)}{d^2}$$

Where is the desired sample size
$Z\alpha/2$ = Standard normal score (95%)
p = Prevalence of child mortality (50%)
d = Error (5%)

Where,

$$Z\alpha/2 = 1.96$$

$$n = \frac{(1.96)\times 0.5 \times (1-0.5)}{(0.05)}$$

$$\text{n} = \frac{3.841\times 0.5\text{x } 0.5}{0.0025} = 384$$

Accordingly, 384 questionnaires were prepared and distributed [15].

Data collection instruments and procedures

Data were collected by quantitative methods. In the quantitative study, the structured questionnaires are adopted from the EDHS questionnaire with modifications from relevant literature being prepared in English version. Later on, the English version of the questionnaire was translated into the Amharic version. Direct interviewing with face-to-face interaction between the interviewer and the interviewee by using a structured questionnaire at the household level was employed. The training was given to the supervisors and data collectors on the objectives of the study, the content of the questionnaire, the issues related to the confidentiality of the responses, and the rights of the respondents during data collection.

Dependent variable

The dependent variable is the utilization of ANC services. This is a dichotomous/categorical variable, the use of ANC services or not.

Independent variables

Those are variables that contribute to the use of ANC service or not.

Data processing and analysis

After data collection, each completed questionnaire was checked for completeness at the time of data collection. Then the data were entered into a computer by SPSS version 20. The study participants were described using descriptive statistics such as percentages and frequencies. To determine the determinants of utilization of ANC, a binary logistic regression model was used. Based on Table 1 the model is a generalized linear model for a dichotomous response variable, where the response variable takes the value 1 with a probability of success π. The independent variables can take any form and there is a linear relationship between the explanatory variables and the logit of the response variable. Given P independent/explanatory variables represented by vector X' = (X1, X2, X3… Xp) the probability that the outcome occurs is denoted by P(Y = 1| X) = π(x). The binary logistic regression model is given by:

$$Logit\{\pi(x)\} = \ln\{\frac{\pi(x)}{1-\pi(x)}\} = \beta 0 + \beta 1x1 + \beta 2x2\ldots + \beta pxp$$

Where, βi is for i=0, 1, 2,…., p are constant and coefficients of the model.

Bivariate analysis was computed to examine the crude association of predictors with ANC service utilization. Choosing suitable variables through binary logistic regression models while considering the confounding influence of predictors on outcome variables/antenatal care service utilization. A probability ratio with a 95% confidence interval is used to determine the strength of the association. A $p<0.05$ was considered as a level of significance.

Data quality

First, the questionnaires were prepared in English language and later on translated into local languages. Then consent was taken from the

Table 1: Socioeconomic and demographic variables modeling utilization of antenatal care services in Basso Liben Woreda

Variable name	Operational definition of variables	Type of variables	Coding of variables
Residence	Current place of residence at the time of the survey	Dichotomous	1=Urban 2=Rural
Mothers education	Level of mothers' education reported at the time of the survey	Categorical	0=Didn't attend formal education 1=Primary education 2=Secondary and above education
Mothers marital status	Self-reported marital status of the respondent at the time of the survey	Dichotomous	0=Single 1=Married
Media exposure	Women's exposure to media at the time of the survey	Dichotomous	0=No 1=Yes
The monthly income of the respondent	Self-reported monthly income of the respondent at the time of the survey	Dichotomous	1=<2000 2=2000+
Age of mother at past birth	Self-reported age of mothers at the time of the survey	Dichotomous	1=<20 2=20+
Birth order	Self-reported birth order of children at the time of the survey	Categorical	1=1–2 2=3–4 3=5–6 4=>6
Birth interval	Self-reported birth interval of children at the time of the survey	Dichotomous	1=0–4 2=4+
Decision-making power	Self-reported decision-making power at the time of survey.	Categorical	1=Respondent 2=Husband 3=Respondent and husband/jointly
Pregnancy desire	Pregnancy of mothers at the time of the survey	Categorical	1=Wanted 2=Unwanted
Family size	Family size of the household at the time of the survey	Dichotomous	1=1–2 2=3–4 3=5–6 4=>6
Occupation	Occupational status of the respondent at the time of survey.	Categorical	1=Housewife 2=Government employee 3=Merchant

respondents before the interview. The data were collected by principal data collectors and its completeness was checked before leaving the house and the data also have been checked for clarity and consistency every day by principal supervisors. The data were entered and analyzed after having different coding.

RESULTS

In the following section, the results of the study were presented by using univariate analysis.

Descriptive (univariate) presentation

Table 2 summarizes the background characteristics of the study participants. Of the 374 women interviewed in Basso Liben Woreda, the majority were rural residents (78.9%), followed by urban residents (14.3%). Regarding pregnancy, the majority of children (54%) wanted pregnancy. Concerning ANC follow-up 73% of women's attended ANC follow-up while 27% of the women did not attend ANC follow-up at the time of their past pregnancy. The results also indicate that the majority of mothers (62.8%) had delivered at home, whereas only 37.2% of mothers had delivered at health institutions. Only 14.4% of women had secondary and above education, whereas 67.6% of women did not attend any formal education. About the marital status of women, 24.6% and 75.4% of women were single and married, respectively. Regarding to media exposure most of the respondents (63.6%) didn't have exposure to media. Only 36.4% of the respondents had exposure to media. The distribution of respondents by their monthly income also indicated that 73.8% of the respondents had monthly income below 2000 ETB. Regarding to age at past birth of women, the majority of women (89.6%) were age 20 and above.

ANC coverage in Baso Liben Woreda

A percentage of women between 15 and 49 years of age with a live birth in the same period is expressed as the number of women with a

Table 2: Socioeconomic and demographic characteristics of the respondents in Basso Liben Woreda

Characteristics	Frequency	Percent
Residence		
Urban	79	21.1
Rural	295	78.9
ANC follow-up		
No	101	27
Yes	273	73
Mothers education		
Didn't attend formal education	253	67.6
Primary	67	17.9
Secondary and above	54	14.4
Mothers marital status		
Single	93	24.6
Married	281	75.4
Media exposure		
No	238	63.6
Yes	136	36.4
The monthly income of the respondent		
<2000	276	73.8
2000+	98	26.2
Age at past birth		
<20	39	10.4
20+	335	89.6
Birth order		
1–2	122	32.9
3–4	137	36.6
5–6	104	27.5
>6	11	2.9
Birth interval		
0–4	307	82.1
4+	67	17.9
Pregnancy		
Wanted	202	54
Unwanted	172	46

live birth in a given period who have received ANC four or more times during pregnancy [3].

As shown in Table 2 above, ANC services utilization in the study area is 73%. Of the total number of women, 108 (28.9%) of them have received ANC services one time by skilled attendants at health institutions. Fig. 1 also shows that 93 (24.9%) and 72 (19.3%) of women have received ANC services one time and two times by skilled attendants at health institutions, respectively.

DISCUSSION

The prevalence of ANC service utilization in the study area is 73% with a 95% confidence interval of (68.4, 77). This study shows that 73% of reproductive-age women have received ANC services at least once from health personnel. As shown in Table 3, the finding shows that there is a significant (11%) increment in ANC service utilization in the study area compared to the 2016 EDHS results [1].

Based on the findings, it appears that there is a positive and significant relationship between the predictor variable for current residence in the rural-urban context and the probability of intensifying the use of ANC services. Women who live in urban areas are more likely to utilize ANC services with an adjusted odd ratio [AOR=0.283, 95% CI=0.212–1.052] compared to women who live in rural areas. This indicates that women residing in urban areas may have an awareness of the use of ANC services. The result is consistent with other findings conducted in Nigeria [6], Ghana [2], and Ethiopia [10] but it is inconsistent with research conducted in Hadya Zone [11].

The study found that women's level of education was a significant predictor of their use of ANC services in the study area. In addition, the odds of receiving ANC services from skilled health personnel were lower for women who didn't attend formal education compared to women who attended primary, secondary, and above education, with an adjusted odds ratio [AOR=4.622, 95% CI=1.960–10.898] and [AOR=6.314, 95% CI=1.864–21.388], respectively. The finding is consistent with a similar study conducted in Nigeria [6,16], which also found that women who attend primary, secondary, and above education were 4.43 and 10.48 times more likely to attend ANC service utilization compared to women who didn't attend formal education, respectively. Other studies conducted in Benishangul Gumuz [17], Nairobi, Kenya [8], Benin [9,18], and Ethiopia [10,13] were also consistent with this finding. It is believed that education empowers women to seek proper healthcare services and receive benefits from skilled health personnel, while those without education are less likely to visit antenatal clinics or benefit from health personnel.

The study found a strong correlation between the marital status of women and their utilization of ANC services. Specifically, married women tended to make more ANC visits than those who had never been in a relationship [AOR=3.272, 95% CI=1.924–5.564]. This finding

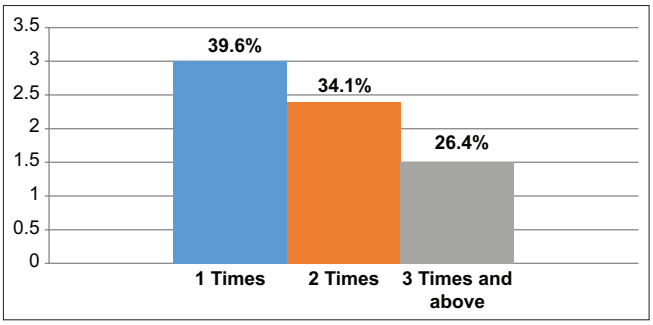

Fig. 1. Graphical presentation of antenatal care coverage in Basso *Liben Woreda*

Table 3: Determinants of antenatal care service utilization in Basso Liben Woreda

Characteristics	Category	Antenatal care service utilization			
		B`	Adjusted OR (95%CI)	B`	Crude/Unadjusted OR (95CI)
Residence	Urban	0.75	0.283 (0.212, 1.052)**	1.25	0.472 (0.135, 0.592)***
	Rural (Ref)	0	1	0	1
Mothers education	Didn't attend formal education (Ref)	0	1	0	1
	Primary	1.53	4.622 (1.960, 10.898)***	1.57	4.814 (2.112, 10.974)***
	Secondary and above	1.84	6.314 (1.864, 21.388)**	2.25	9.549 (2.898, 31.463)***
Marital Status	Single	0	1	0	1
	Married	1.18	3.272 (1.924, 5.564)***	1.260	3.528 (2.139, 5.819)***
Media exposure	No (Ref)	0	1	0	1
	Yes	1.16	3.190 (1.784, 5.703)***	1.255	3.510 (1.999, 6.164)***
Monthly income of the household	<2000 (Ref)	0	1	0	1
	2000+	0.25	1.291 (0.701, 2.376)	0.64	1.911 (1.078, 3.387)**
Age at past birth	<20 (Ref)	0	1	0	1
	20+	0.81	0.444 (0.164, 1.203)**	-1.00	0.366 (0.139, 0.964)**
Birth order	1–2 (Ref)	0	1	0	1
	3–4	-0.83	0.432 (0.222, 0.843)	-1.07	0.341 (0.180, 0.646)***
	5–6	-0.97	0.378 (0.188, 0.764)	-1.38	0.251 (0.130, 0.486)***
	>6	-0.80	0.446 (0.108, 1.837)	-1.33	0.264 (0.069, 1.004)
Birth interval	0-4 (Ref)	0	1	0	1
	4+	0.83	2.300 (1.065, 4.969)	1.01	2.757 (1.311, 5.799)**
Decision-making power	Respondent (Ref)	0	1	0	1
	Husband	-0.64	0.523 (0.305, 0.897)	-0.90	0.406 (0.244, 0.674)***
	Respondent and husband/jointly	1.03	2.818 (1.105, 7.187)	1.11	3.060 (1.216, 7.703)**
Pregnancy	Wanted	1.39	4.045 (2.305, 7.101)***	1.72	5.605 (3.346, 9.387)***
	Unwanted (Ref)	0	1	0	1
Family size	1-2 (Ref)	0	1	0	1
	3-4	1.13	3.096 (0.593, 16.151)	1.14	3.130 (0.699, 14.019)
	5-6	0.61	1.847 (0.359, 9.506)	0.14	1.159 (0.264, 5.076)
	>6	1.10	3.023 (0.569, 16.051)	0.198	1.219 (0.273, 5.435)
Occupation	Housewife (Ref)	0	1	0	1
	Government employee	1.67	7.585 (0.325, 10.826)**	20.47	89.22 (88.00, 91.325)***
	Merchant	1.22	3.408 (1.111, 10.456)	1.60	4.971 (1.731, 14.276)**

**Statistically significant at p<0.05, ***Statistically significant at p<0.001. (Ref): Reference category

is consistent with a similar study conducted in Ethiopia [12,14]. It may be that the involvement of men in encouraging and supporting their partners to attend healthcare services can play a significant role in increasing ANC utilization rates. Other studies have also noted that married women or those in a union may receive partner support to attend ANC service utilization [19].

The finding of this study revealed that women who have media exposure are 3.1 times more likely to attend ANC services compared to those who have no media exposure.). This is because those who ever heard about ANC were more likely to know the benefits of having ANC visits and health risks during the antenatal period. The finding is consistent with other research conducted in Benin [18] and Ethiopia [10]. However, the finding contradicts research conducted in southern Ethiopia [13].

The study found that women aged 20 and above were more likely to use ANC services compared to women aged 20 and below. The finding is in line with other findings [2,5,18,20]. The result is also inconsistent with other findings conducted in Nairobi [8]. Some researchers suggest that older women may have had previous unpleasant experiences with the quality of ANC services, or they may perceive ANC as unnecessary if they have had uneventful pregnancies before. On the other hand, younger women, including teenagers, may not be knowledgeable about the benefits of ANC, or they may seek care less if the pregnancy is unwanted [6].

Regarding pregnancy desire, women who had wanted pregnancies were 4 times more likely to use ANC services compared to those who had unwanted pregnancies. According to the study, mothers who perceived pregnancy as a risky event were also more likely to seek ANC services than those who considered it risk-free. These findings suggest that maternal health education and counseling on the benefits of ANC should be tailored based on the mother's perception of pregnancy and her pregnancy intentions [11,18].

Concerning occupation, there is a strong correlation between occupation and ANC service utilization in the study area. The findings suggest that government-employed mothers were 7.5 times more likely to attend ANC services as compared to housewives. This may be that earning ability could be one of the factors that influence the utilization of ANC services among pregnant women [8]. This is consistent with other findings in Nigeria [6] and Tigray [5]. However, this finding contradicts research conducted in Ghana [2].

CONCLUSION

According to this study, 73% of reproductive-age women have received ANC services from health personnel at least once. The study also found that there has been an increase in ANC service utilization in the study area as compared to the 2016 EDHS results. This is a positive trend that indicates more women are seeking and receiving essential healthcare services during pregnancy. The study shows the significant disparities in ANC utilization among pregnant women in urban and rural areas, mothers' educational level, media exposure, age of mother, pregnancy desire, and occupational status. It is recommended that government policies give greater emphasis to rural women by encouraging their participation in different sectors, improving their educational status, and distributing information about the use of ANC services. This will not only benefit the women themselves but will also contribute to the overall development of rural areas.

DECLARATIONS

Ethics approval and consent to participate

The study has got approval from the College of Social Science and Humanities ethical clearance committee at the University of Gondar. The study was commenced after written consent was obtained from *Basso Liben Woreda's* administrative office. Written informed consent was not obtained from a parent or guardian for participants under 16 years old. However, each respondent was informed about the objective of the study and assurance of confidentiality.

AVAILABILITY OF DATA AND MATERIALS

All necessary data analyzed for this study are available in SPSS readable format and all findings are presented in figures and tables in the manuscript.

CONSENT TO PUBLISH

Not Applicable in this section.

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AUTHORS' CONTRIBUTIONS

AMH. Conception and design of the research design. KYM. Preparation of questionnaires, and training of data collectors. AMH. Data collection, data entry, and analysis of the research. NMA. Data editing and cleaning. AMH. Moreover, writing of the research and interpretation of the result.

COMPETING INTEREST

There is no competing interest.

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