

Antenatal and postnatal care service utilization in southern Ethiopia: a population-based study

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Abstract

Background: Access to antenatal care (ANC) and postnatal care (PNC) services has a great deal of impacts on major causes of infant death and significantly affects trends of mortality in a population. Antenatal care may play an indirect role in reducing maternal mortality by encouraging women to deliver with assistance of a skilled birth attendant or in a health facility. In most rural settings of Ethiopia, there are challenges in increasing such health care service utilization mainly due to the fact that the decisions that lead women to use the services seem to occur within the context of their marriage, household and family setting.

Objective: Examining the prevalence and factors associated with antenatal Care (ANC) and Postnatal Care (PNC) service utilizations.

Methods: This was a cross-sectional population based study undertaken in 10 rural villages of the Sidama zone, southern Ethiopia. The data were collected from a representative sample of 1,094 households drawn from the study population using a combination of simple random and multistage sampling techniques. Two dependent variables were used in the analysis: The ANC, measured by whether a woman got the service (at least once) from a health professional or not during her last pregnancy and PNC which was approximated by whether the last born child completed the required immunization or not. Household and women's characteristics were used as explanatory variables for both dependent variables.

Results: The study revealed that the level of ANC and PNC service utilizations is 77.4 % and 37.2% respectively. The predicted probabilities, using logistic regression, showed that women who are literate, have exposure to media, and women with low parity are more likely to use both ANC and PNC services.

Conclusion: Antenatal care service utilization was generally good while the postnatal care given to new born children was very low compared to other population groups in the region. Promoting women's education and behavioral change communication at grass root level, provision of the services at both home and health facilities, and improving the quality and capacity of the health providers are some of the recommendations forwarded.

Key words: Antenatal Care, postnatal care, service utilization, complete immunization, Sidama Zone, Southern Ethiopia
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Introduction

Inadequate access and under-utilization of modern healthcare services are major reasons for poor health in the developing countries. This inequality in the health and wellbeing of women in the developing world is a growing concern¹. Improving maternal and newborn health requires strengthening of existing interventions in ANC and PNC². Studies have shown that ANC and PNC have a great deal of impacts on major causes of infant death and shape trends

of mortality and morbidity among populations^{3, 2}. It is also possible that antenatal care may play an indirect role in reducing maternal mortality by encouraging women to deliver with assistance of skilled birth attendant or in a health facility⁴. As one major component of the PNC, immunization remains to be one of the most effective health interventions and has been proven to prevent up to 24% of the 10 million yearly deaths of children under five years⁵.

In Ethiopia although access to health care services is improving, the country has faced challenges in increasing health care utilization⁶. For example, the proportion of women who give birth with the assistance of skilled attendants is among the lowest in sub-Saharan Africa⁷.

A number of individual, household and institutional characteristics affect women's decisions to seeking care, which includes education, income,

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accessibility, age, organization and functioning of the health care system and services, interaction between parents and health workers, waiting time and clinical practice⁸. Mengistu and James, in their study in the Arsi zone of central Ethiopia, found maternal age, parity, lack of time, education, marital status, and women's economic status to be significant predictors of utilization of maternity care⁹. A study in Yirgalem town and in the surrounding Southern Nations, Nationalities, and People's Region (SNNPR) of Ethiopia showed that women's education, inadequate household income, and unwanted pregnancy were important predictors of antenatal care utilization¹⁰.

In general, despite the fact that ANC and PNC services are made accessible to nearly all villages (in most instances at lower or no cost), the decisions that lead women to use the services seem to occur within the context of their marriage, household and family setting. It is thus important to examine the extent to which women are making use of the services and answer why many women do not use the services. To the best knowledge of the author, the very few studies conducted in the region are either based on small sample or single out only one aspect (ANC or PNC or sub parts) or are based on secondary data available in health facilities. This study therefore aims at examining both the utilization of Antenatal and Postnatal care (ANC and PNC) services in one of the most populous zone of Southern Ethiopia, the Sidama. It tries to test three major hypotheses a) educated women are more likely to use ANC and PNC service than their counterpart uneducated ones b) older women are more prone to using ANC and PNC compared to the younger ones. c) higher parity mothers are more likely to use ANC and PNC.

Methods

The study setting

The study was conducted in Sidama, one of the most populous zone of Southern Ethiopia. Sidama is located in the SNNPR. The Sidama zone is bordered in the south by the Oromia Region except for a short stretch in the middle where it shares a border with Gedeo, on the west by the Bilate river which separates it from Wolayita, and on the north and east by the Oromia Region. The administrative center for Sidama is Hawassa town. According to the recent census¹¹, the total population of the zone was 2,954,136. With an area of 6,538 square kilometers, Sidama has a population density of 452/km² with an average household size of 4.99 persons. Of the population,

5.51% are urban inhabitants and a further 0.18% are pastoralists¹¹. A substantial area of the Sidama land produces coffee, which is the major cash crop in the region. 'Enset' (*enset ventricosum*) is the single most important root crop grown in the study area and the bulk of the population depends heavily on it for survival.

Sampling

The 1,094 households were selected from two agro climatic zones; highland and low land areas of Sidama zone of Southern Ethiopia using appropriate statistical estimation. The two agro climatic zones have nearly equal number of population/villages (38 and 36 kebeles), and hence, the sampling was not weighted.

Probability sampling in a form of simple random and two-stage sampling methods were used for selecting the required size from the study areas. Since the two sub-districts (the low and high land) were decided upon in advance, the first stage of the sampling was started by selecting five kebeles (small villages) from each of the two sub-districts using simple random sampling. At the second stage, a random sample of households with a child less than 24 months was selected from the available list, giving a total of 1,094 households.

Data collection

The data for this study were generated through a structured interview schedule. Prior to the data collection, the checklists/schedules underwent intensive review and pre-testing on a small sample of subjects from all categories of respondents. During the interview, the enumerators went through all the items where wives and husbands were interviewed separately in view of avoiding any discomfort for mothers/women.

The two most important variables forming the main response variables, ANC and PNC, were framed using universally accepted survey questions. For ANC, a dichotomous variable was asking created whether woman had visited a skilled health care provider (such as doctor, nurse, midwife, or any other prescribed and trained health professional) at least once during the last pregnancy. The measure is adopted from the World Health Organization's definition of ante natal care¹². The unit of analysis in this case is the mother. The second dependent variable, PNC, was measured by the level of immunization of the last child. Attempt was made to follow the immunization factors recommended

by the World Health Organization¹² : The Bacillus Calmette Guerin (BCG) which protects the child from tuberculosis and given at birth; the Polio and Diphtheria pertussis and tetanus (DPT) vaccination (given at six , ten and fourteen weeks) and measles vaccination which is administered at nine months. The unit of analysis in this case is a child below the age of 24 months.

Data Processing and analysis

The data processing and analysis has started with computing the percentages of mothers who got antenatal care services from the health professional which formed the first dependent variable, and also computed the proportion of children less than 24 months with complete immunization per WHO definition which formed the second dependent variable (PNC).

Both bivariate and multivariate analyses were used to examine the association between the study variables and selected household and individual characteristics. In the bivariate analysis, Pearson's chi-square test of independence was performed to test the existence of significant association between categories of ANC/PNC status and selected predictors. Due to the fact that the chi-square bivariate analysis indicates effects or associations of variables without controlling for the confounding effects, the net effects of each independent variable were further examined using multivariate (the logistic regression) analysis.

In the logistic regression analysis, the first response variable (ANC) had two outcomes; whether a woman got the service (at least once) from health professional or not during her last pregnancy. Similarly, the second dependent variable was framed to have two outcomes; whether the last born child completed the required immunization or not. Since the interest is in identifying the probability of facing the outcome variable, the dependent variables were coded as 1 if the event happens and coded as 0 if not.

The odds ratios, which were determined from the logistic regression coefficients, tell us the increased or decreased chance of ANC/ PNC given a set of level of an independent variable while controlling for the effects of the other variables in the model. Estimates of odds greater than 1.0 indicate that the probability of the event happening is greater than that for the reference category. Estimates less than 1.0 indicate that the risks are less than that for the reference categories of each variable.

Results

Table 1 presents the background characteristics of respondents. The age distribution of the women shows that a larger proportion of them (47.7%) were in the early adulthood (age 25-34) followed by those in the age group of 15-24 (39.4 %). With regards to the number of children born, larger proportions of women had given birth to 1-3 (46.3%) and 4-7 children (35.5%). Protestant Christians account for the highest proportion in the religious distribution (73.5 %) followed by Catholic and Muslim (10.8 and 9.4 %) respectively while the remaining religious groups contributed small proportion of the respondents. The large majority of the respondents (60.6 %) of the study households have 4-7 members and 22.1 percent of them had greater than 7 members. The average household size for the study population was 5.87. The analysis showed that 15.3 percent of the women were engaged in polygamous marriage arrangement (i.e husbands having two or more wives during the survey).

The distribution of the respondents by educational status revealed that majority of the respondents were illiterate (56.3 %) followed by elementary level (27.9 %) while the remaining respondents accounted for a smaller proportion of the respondents. The majority (47.1%) of the respondents were farmers, and 39.9 percent were self employed while the remaining employment categories contributed smaller proportion of the respondents. Land ownership by households in the study area was quite small and fragmented. It is seen from table 1 that about 95 percent of the households owned land size less than one hectare.

Table 1: Background characteristics of respondents, Sidama zone, 2011 (n= 1,094)

Characteristics	Number (n= 1094)	Percent
Age of women		
15-24	431	39.4
25-34	489	44.7
35-49	174	15.9
Religion		
Orthodox Christian	28	2.6
Catholic	118	10.8
Protestant	804	73.5
Muslim	103	9.4
Traditional	25	2.3
Others	16	1.5

Continuation of table 1

Characteristics	Number (n= 1094)	Percent
Household size		
1-3 persons	189	17.3
4-7 persons	663	60.6
Greater than 7 persons	242	22.1
Marital Form		
Polygamous	166	15.2
Monogamous	928	84.8
Educational Status of the women		
Illiterate	616	56.3
Elementary (1-6)	305	27.9
Junior secondary (7-8)	69	6.3
Secondary (9-12)	44	4.0
College diploma	14	1.3
Others	46	4.2
Usual occupation		
Self employment	437	39.9
Civil servant	13	1.2
Farmer	515	47.1
Petty trader	60	5.5
Others	69	6.3
Land size owned by the household		
Landless	31	2.8
> 0.5 hectare	459	42.0
0.5-1 hectare	579	52.9
> 1 hectare	25	2.3
Children ever born		
No children born	50	4.6
1-3 children	506	46.3
4-6 children	388	35.5
7-10 children	150	13.6

Table 2 shows the percentage distribution of women respondents by ANC and PNC status for the last child. About 77.4 percent of them reported getting ANC service from trained health professionals. The immunization coverage for specific vaccination type was generally good. However, the full or complete immunization was far below the expected standard. The World Health Organization (WHO) suggested that complete vaccination coverage should reach at least 90% of children at the country level and 80% in sub-areas¹³. Among the study population, complete immunization is only 37.2 percent.

Table 2: Percentage distribution of respondents by ANC service received and reported type of immunization given to the last child (born during the last 24 months), Sidama zone, 2011 (n = 1,094)

Type of ANC and PNC services	Yes	No
Received ANC services (from trained health professionals)	77.4	22.6
Type of immunization		
TB Immunization	65.9	34.1
Immunization of Polio 0	66.6	33.4
Immunization of DPT 1	60.1	39.9
Immunization of DPT 2	57.7	42.3
Immunization of DPT 3	56.9	43.1
Immunization of Polio 1	65.4	34.6
Immunization of Polio 2	66.5	33.5
Immunization of Polio 3	62.6	37.4
Immunization of Measles	71.4	28.6
Fully immunized	37.2	62.8

As part of the preliminary analysis, the results of the bivariate analysis for ANC and PNC indicated that six variables had a significant association with ANC utilization and these included age of women, pregnancy reaction, usual work status, children ever born, religion and literacy status. Similarly, seven variables (age of women, usual work status, children ever born, religion, literacy status, marital form and educational status of the husbands) have shown a significant association with PNC service utilization (tables not shown).

Since the chi-square (bivariate) analysis indicates effects or associations of variables without controlling the confounding effects, multivariate analysis using logistic regression was applied in view of further examining the predicting variables. As clearly seen in table 3, two independent regression models were used (for the ANC and PNC) using nearly similar types of independent variables. The variables included in the two models were: age of women, children ever born, religion, radio listening frequency, reaction to previous pregnancy, usual work, experiencing infant death, marital form and women's literacy.

Table 3: Results of logistic regression (odds ratio) for ANC and Immunization, Sidama zone, 2011 (n = 1094)

Variables	ANC		Immunization	
	Model 1	Model 2	Model 1	Model 2
Age of women	B	Exp(B)	B	Exp(B)
Age 15-24 (RC)	-	-	-	-
Age 25-34	-.563	.570*	-.374	.688
Age 35-49	-.982	.374***	-.199	.820
Children ever born				
1-3 children	-	-	-	.-
4-6 children	-.182	.834*	-.809	.445**
7-10 children	-.231	.794	-.721	.486
Religion				
Orthodox Christian (RC)	-	-	-	-
Catholic	-.091	.913	.301	1.352
Protestant	-.883	.414	.233	1.262
Muslim	-.013	.987	-.295	.745
Traditional	.111	1.118	.897	2.453
Others	-.312	.732	.900	2.461
Radio listening frequency				
Almost every day (RC)	-	-	-	-
Twice a week	-.717	.488	.268	.307
Once in a fortnight	-1.314	.269**	.495	.640
Not at all	-.670	.935*	.563	.757*
Pregnancy reaction				
Wanted RC	-	-	Na	Na
Wait	-.772	.462***	Na	Na
Never wanted	-.709	.492**	Na	Na
Usual work				
Self employment (RC)	-	-	-	-
Civil servant	.674	1.963*	.339	1.404
Farmer	-.626	.535	1.989	7.308
Petty trader	.229	1.258	.481	1.618
Others	-1.309	.270*	.420	1.522
Experienced Infant death				
Yes RC	-	-	-	-
No	-.369	-1.446	-.082	-1.086
Marital form				
Polygamous (RC)	-	-	-	-
Monogamous	-.334	-.716	-.437	-1.548*
Women's literacy status				
Literate (RC)	-	-	-	-
Illiterate	-.327	.721*	-.284	-.753*
Constant	.125	.133	.673	.960
-2 Log likelihood				
*=p<0.05, **=p<0.01, ***=p<0.001		1047.566		1328.488 ^a

In model 1, which presents the results for ANC, six variables had significant associations with the ANC service utilization. These are; age of women, previous pregnancy reaction, usual work status, children ever born, radio listening frequency and literacy status. For the PNC, four variables established significant associations with the dependent variable, which includes; children ever born, radio listening frequency, marital form and literacy status. Therefore, the study revealed three common denominators/ variables predicting both outcome variables: children ever born, radio listening frequency and literacy status.

Women in the age groups 25-34 and 35-49 are 43 and 62.6 percent less likely to use ANC services compared to the reference category (younger mothers aged 15-24). Women who gave birth to 4-6 children were 15.6 % less likely to use the service compared to the reference category. Similarly, for PNC, those who have 4-6 children were 55.5 % less likely to attain full immunization. Radio listening frequency (which is presumed to measure exposure to media) has become a significant variable for both ANC and PNC service utilization. Accordingly, for ANC service, those who reported listening to radio once in a fortnight and not at all are 73.1 and 6.5 percent less likely to use the services respectively. Similarly, those who never listened to radio were 24.3 percent less likely to use PNC services.

Women were asked the reaction they had towards their last born child when they were pregnant. Accordingly, those who reported “wanted to wait” and “did not want to become pregnant at all” were 53.8 and 50.8 percent less likely to use the ANC services compared to those women who wanted the pregnancy to happen. Women who are working in formal employment (such as in civil services) were 1.96 times more likely to use the ANC services. The literacy status was significantly associated with ANC and PNC service utilization. Illiterate women were 27.9 and 24.7 percent less likely to use the ANC and PNC services respectively compared to their counterpart literate women. Finally, it was seen that those who were engaged in monogamous marital relations were 1.55 times more likely to use the PNC services compared to polygamous ones.

Discussions

The study was aimed at demonstrating the coverage of ANC and PNC, and also examine the key factors predicting the utilization behavior in the study area. The study has revealed that the level of ANC service utilization is relatively higher (about 77.4 percent)

compared to other populations in southern Ethiopia. However, this figure should be interpreted cautiously due to two reasons: first, the study collected information on service utilization in relation to the most recent birth during the 24 months preceding the survey, and hence, it is difficult to look into consistency in the use of these services between successive births. Secondly, most women might have visited the service to get treatment for their health problem instead of deliberately seeking the ANC services.

The utilizations of professional assisted delivery care and PNC among the study population was very low. With regards to the level of PNC, the finding documented that the proportion of the sample households/children who got complete immunization is very low (only 37.2%) compared to many population groups in Ethiopia. The poor utilization of delivery and postnatal care service has often been attributable to the unpredictable onset of labor, making it difficult for women to travel long distances as well as some factors associated with cost of delivery of care.

In view of addressing the second objective, attempt was also made to examine the associations between various explanatory variables and the two main study variables (ANC and PNC). The study identified six variables for ANC and four variables for PNC with strong significant associations. Three explanatory variables have become common variables influencing both ANC and PNC in the study area, namely; literacy status, children ever born, and radio listening frequency.

The age of women and children ever born have followed similar patterns in influencing the ANC service utilization i.e older and high parity women are less likely to use the ANC service compared to their respective reference categories. The possible explanation for the low utilization of the services among high parity older women are twofold: such women usually tend to develop confidence due to the experience and knowledge accumulated from previous pregnancies and births, and may believe that modern health care makes very little difference in the outcome. Secondly, more difficult labor and associated complications are believed to occur among younger women who are to become pregnant for the first time compared to the older and high parity women, and hence, the latter become less motivated to go through the formalities in the health institutions. This result is consistent with Mekonnen and Asnahech¹⁴, Mekonnen¹⁵ and Sommerfelt¹⁶.

The significant relationship between the women's reaction to their pregnancy and likelihood of utilizing the ANC service is an important findings of this study. When women feel that their pregnancy is somewhat unwanted or untimely, there is a likelihood that they develop little motivation to get ANC and professional delivery assistance. Part of their decline to utilize the services may emanate from denial of the fact that they are pregnant.

There are certain reasons to believe that literate women are more prone to using both ANC and PNC. Education is likely to enhance female autonomy and help women develop greater confidence and capability to make decisions about their own health. It is also likely that literate women seek out higher quality services and have greater ability to use health care inputs that offer better care¹⁴. Kwast and Liff¹⁷, in their study of maternal mortality in Addis Ababa, showed that women who did not receive maternity care were often poor, illiterate, and unmarried, with limited knowledge of maternity care services¹⁷

Finally, it is important to mention some of the strengths of the present study so as to clarify the contexts under which the study was conducted. The major strengths are: first, the study was based on a large sample (1,094 households/women) selected randomly from Sidama zone, Southern Ethiopia, and hence its findings can be generalized to the entire population seeking ANC and PNC. Second, unlike many other previous studies, it has brought both factors (ANC and PNC) onto the board and dealt with the levels and common factors affecting them. In view of the fact that many of the studies are either national or regional level secondary data analysis, this study is believed to give better insight into the problems at population level.

Conclusion

On the basis of the information collected from the 1,094 eligible households and taking into account all the methodological pitfalls of cross sectional study design, the present study has come up with the following two plausible conclusions and policy implications;

While women's utilization of ANC service seems to be good (about 77 %), a large majority (more than 86 %) of the women are not getting professional delivery care and instead exercise home delivery. In relation to this, it is important to emphasize that educational status and media

exposures are the prime determinants of both ANC and PNC service utilization among the study population. The implication of this finding is that unless the local government puts pressure on women's education and work on behavioral change communications in rural areas, it will be difficult to attain the targets for ANC and PNC.

The study realised that the rate of complete immunization is far below the WHO's recommended standard. In view of the fact that immunization is provided free of cost and is usually accessible, failure on the part of the women to use the services can be explained by women and household level factors discussed above. This calls for policymakers and program implementers at grassroots level to consider providing PNC services at both health facilities and at home to overcome financial, psychological and cultural barriers to care-seeking outside the home during the early postnatal period. Finally, it is needless to say that the quality and capacity of the health providers should be improved overtime through refreshment training opportunities.

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