



Cross-sectional Study

The factors associated with antenatal care utilization in Ethiopia

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ABSTRACT

Background: Antenatal care (ANC) is the provision of health services to pregnant women by trained health professionals before the birth of their babies to reduce maternal mortality and morbidity. So, the study aimed to identify the factors associated with Antenatal care utilization in Ethiopia.

Methods: A Community-based Crosssectional study design was used for 8885 women aged 15 to 49. The dependent variable was the utilization of Antenatal care services. Independent variables were Socio-demographic and Socioeconomic factors. The data was from the 2019 Ethiopian Mini demographic and health survey. Bivariate and multilevel binary logistic regression was used.

Results: Out of 8885 of all women considered for this study, 3910(44%) were utilized Antenatal Care (ANC) four or more times. 72.81% of the women were aged 15–34 years. On the other hand, high portions of women were from Amhara, Oromia and Southern Nations Nationalities Regional State with their respective percentages of 10.7%, 11.8% and 11.3%. Women from Somalia Region were 0.285 times less likely to utilize Four or more Antenatal Care (ANC) as Compared to a Women from Tigray Region [AOR = 0.285, 95% CI = 0.109–0.747].

Conclusion: The utilization of the Antenatal Care service was underutilized in Ethiopia. Education status, Ages of mothers, Size of family, Religion and Place of Residence were major Factors of influenced ANC utilization. The concerned government body should also create a better environment for impoverished women to participate in entrepreneurial activities.

1. Introduction

Antenatal care (ANC) is the provision of health services to pregnant women by trained health professionals before the birth of their babies to reduce maternal mortality and morbidity [1,2]. Risk detection, prevention and management of pregnancy-related diseases, as well as health education and promotion are all part of ANC [3]. During pregnancy, the World Health Organization advises a minimum of four prenatal care visits [4].

Maternal mortality is one of the major development and health challenges facing the developing world. As a result, developing nations account for almost 99% of worldwide maternal mortality each year [5]. Approximately 800 women die every day from pregnancy-related complications around the world; 99% of these deaths occur in under-developed countries, with Sub-Saharan Africa accounting for over two-thirds of the deaths (62%) [6]. Ethiopia is one of the countries in Sub-Saharan Africa with 19,000 maternal deaths per year [7]. Ethiopia has a high maternal death rate (412 per 10,000 life birth) [8]. For the past 20 years, the country has had a reproductive strategy. In the rural, ANC services are available and are included in the health extension

package. The use of ANC is increasing over time. However, it remains modest [9].

Prenatal care has the potential to lower mother and child morbidity and death, as well as improve neonatal health [10–12]. For example, ANC visits were found to be strongly related to a 34% reduction in newborn mortality in a comprehensive review and meta-analysis [13]. According to cohort research conducted in Ethiopia, having four or more ANC visits was substantially related to a reduction in postpartum haemorrhage, early newborn death, preterm labour, and low birth weight, respectively, by 81.2%, 61.3%, 52.4%, and 46.5% [12]. Poor pregnancy outcomes have been linked to insufficient prenatal care visits, late appointments, or fewer than the recommended number of visits [14]. In Sub-Saharan Africa, a shortage of relevant and high-quality prenatal care services is a major concern [15].

Various studies on the prevalence and/or factors associated with ANC utilization have been conducted in Ethiopia [16,17]. Scholars have found determinant factors such as maternal educational status, age, residence, wealth index, pregnancy status, number of children, access to health services, occupation, and religion [18]. However, all of the research was wasted on a limited scale at the local level. There has been

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researching in Ethiopia utilizing the Ethiopian Demography and Health Survey-2016 using logistic regression and the EMDHS 2019 using the Count Model without taking into account regional and intra-regional variation. So this study aimed to identify factors associated with ANC utilization in Ethiopia by using the multilevel logistic regression model.

2. Methods

The Ethiopian Mini Demographic and Health Surveys (EDHS) 2019 dataset was used in this study, which is freely available online [19]. The sample for the 2019 EMDHS was designed to provide estimates of key variables for the entire country, urban and rural areas separately, and each of the nine regions and two administrative cities individually. Ethiopia's 2019 Mini Demographic and Health Survey (EMDHS) is the country's second Mini Demographic and Health Survey. The survey was carried out at the Ministry of Health's request by the Ethiopian Public Health Institute (EPHI) (MoH). The data was collected From March 21 to June 28, 2019. Individual interviews were conducted with 9,012 eligible women from the interviewed households; 8,885 women were interviewed.

2.1. Sampling

In two stages, the 2019 EMDHS sample was stratified and selected. There were 21 sampling strata in each region, which were divided into urban and rural areas. In two steps, EA samples were picked individually in each stratum. At each of the lower administrative levels, implicit stratification and proportional allocation were achieved by sorting the sampling frame within each sampling stratum before sample selection, according to administrative units at different levels, and selecting a probability proportional to size at the first stage of sampling. Face-to-face interviews with women who satisfied the eligibility requirements (women aged 15–49 years) were used to collect data. All reproductive age group women (15–49 years) who have terminated a pregnancy five years before the survey and who replied to the women's EMDHS questionnaire in 2019 make up the study population.

2.2. Response variable

Women's ANC is utilized during their pregnancies. Zero if a woman visited ANC less than four times, one if visited ANC four or more times.

$$X = \begin{cases} 0 & \text{if a woman visits ANC Less than four} \\ 1 & \text{if a woman attended ANC four or More} \end{cases}$$

2.3. Explanatory variables

Various demographic, socioeconomic, biological, and environmental aspects have been studied earlier and were included as predictor variables: mother's current age, mother's education level, family wealth index, family size, Pregnancy Complication, Counselling of health worker, and Religion were all included as predictors [20,21].

2.4. Inclusion and exclusion criteria

The sole qualifications were to be an Ethiopian national between the ages of 15 and 49, to have given birth in the year before the interview, and to have lived in Ethiopia during the pregnancy. This study excluded mothers with any mental condition and mothers who refused to participate. Based on the above inclusion and exclusion criteria, 8885 mothers were interviewed with a 100% response rate, and 127 mothers out of 9012 reproductive-aged women were left out of the study.

2.5. Statistical analysis and processing

The data was analyzed using SPSS version 26 statistical software.

Descriptive statistics such as frequencies and percentages were used to summarize the sample's background characteristics. Binary logistic regression was used to see if there is an association between the dependent and independent variables. All variables with a p-value of less than 0.25 in the bivariate analysis were chosen for the multivariable logistic regression to compensate for putative confounders. Significant predictors were defined as factors with a p-value of less than 0.05. The Multilevel Logistic Regression Model (MLRM) was used because of the hierarchical nature of the data collection. This includes both fixed and random effects [22]. The model's fixed effects/measures of relationships were assessed using binary logistic regression, providing odds ratios (ORs) and adjusted odds ratios (AORs). Intra-Cluster Correlation, on the other hand, was utilized to examine random effects changes measures (ICC) [23].

3. Ethics approval and consent to participate

Ethics approval and consent to participate in Ethical clearance for the 2019 EMDHS was provided by the Ethiopian Health and Nutrition Research Center (EHNRI) Review Board, the National Research Ethics Review Committee (NRERC) at the Ministry of Science and Technology, the Institutional Review Board of Inner City Fund (ICF) International, and the Centers for Disease Control and Prevention (CDC). The requirement for obtaining informed consent was waived by Ethiopian Health and Nutrition Research Center (EHNRI) Review Board, but the data were kept anonymous and confidential. This study was conducted by the Helsinki Declaration. The work has reported according to STROCSS criteria [24].

researchregistry8029 (<https://www.researchregistry.com/browse-the-registry/#home/>).

4. Results

4.1. Socio-demographic characteristics of ANC utilized in Ethiopia

A total of women in the fertility age of 8885 populations from the EMDHS 2019 dataset 8885(100%) had given their responses with a mean of 0.34 and a Standard Deviation of 0.47. Among 8885 women 3910(44%) were utilized Antenatal Care (ANC) four or More while 4975 (56%) were utilized Antenatal Care (ANC) Less than four. Among all individuals considered for this study, 72.81% of the women were aged 15–34 years. On the other hand, high portions of women were from Amhara, Oromia and SNNPR with their respective percentages of 10.7%, 11.8% and 11.3%. Almost the majority of women 41.0% were not educated and 37.1% were attended elementary school. The majority of women 40.9% and 38.0% were Muslim and Orthodox Followers Respectively. Also, the majority of women 94% were not counselled by a health worker during pregnancy (Table 1).

4.2. Utilization of antenatal care services

The variable Wealth Index of Household was found to be associated in a bi-variable chi-square test of association (p-value = 0.551) and was not found to be significantly linked to the use of ANC services. As a result, none of the others was taken into consideration for the final model. The resulting binary logistic regression model fits well according to the Hosmer and Lemeshow goodness of fit test (p-value = 0.728). The final model revealed that characteristics like as mothers' educational status, Region, Religion, pregnancy Complications, Counselling of health workers and Family Size were significant predictors in ANC service consumption at a 5% level of significance (Table 2).

Women from Somalia Region were 0.285 times less likely to utilize Four or more ANC as Compared to a Woman from Tigray Region [AOR = 0.285, 95% CI = 0.109–0.747]. Women from Benishangul gumuz region were 0.407 times less likely to utilized four or More ANC as Compared to a woman from Tigray Region [AOR = 0.407, 95% CI =

Table 1
Socio-demographic characteristics of ANC visits in Ethiopia (N = 8885).

| Variables | Frequency | Percent | ANC visits of the Respondents | |
|----------------|---------------------|---------|-------------------------------|------------------|
| | | | 4 or less | 4+ |
| Age | 15–19 | 2006 | 22.6 | 1511 (75.32%) |
| | | | | 495 (24.68%) |
| | 20–24 | 1518 | 17.1 | 836 (51.67%) |
| | | | | 782 (48.33%) |
| | 25–29 | 1677 | 18.9 | 977 (54.98%) |
| | | | | 800 (45.02%) |
| | 30–34 | 1105 | 12.4 | 638 (57.73%) |
| | | | | 467 (42.26%) |
| Region | 35–39 | 974 | 11.0 | 619 (63.55%) |
| | | | | 355 (36.45%) |
| | 40–44 | 686 | 7.7 | 533 (77.70%) |
| | | | | 153 (22.30%) |
| | 45–49 | 526 | 5.9 | 430 (81.75%) |
| | | | | 96 (18.25%) |
| | Tigray | 733 | 8.2 | 269 (36.70%) |
| | | | | 464 (63.30%) |
| Residence | Afar | 641 | 7.2 | 426 (66.46%) |
| | | | | 215 (33.54%) |
| | Amhara | 948 | 10.7 | 409 (43.14%) |
| | | | | 539 (56.86%) |
| | Oromia | 1052 | 11.8 | 552 (52.47%) |
| | | | | 500 (47.52%) |
| | Somali | 640 | 7.2 | 487 (76.10%) |
| | | | | 153 (23.90%) |
| Educational | Benishangul | 747 | 8.4 | 277 (37.08%) |
| | | | | 470 (62.92%) |
| | SNNPR | 1008 | 11.3 | 538 (53.37%) |
| | | | | 470 (46.63%) |
| | Gambela | 723 | 8.1 | 467 (64.59%) |
| | | | | 256 (35.41%) |
| | Harari | 763 | 8.6 | 463 (58.39%) |
| | | | | 330 (41.61%) |
| Wealth | Addis Adaba | 818 | 9.2 | 129 (15.77%) |
| | | | | 689 (84.23%) |
| | Dire Dawa | 812 | 9.1 | 380 (41.67%) |
| | | | | 532 (58.33%) |
| | Urban | 2951 | 31.9 | 878 (29.75%) |
| | | | | 2073 (70.25%) |
| | Rural | 5934 | 64.2 | 3794 (63.94%) |
| | | | | 2140 (36.06%) |
| Marital status | No education | 3886 | 43.7 | 2535 (65.23%) |
| | | | | 1351 (34.77%) |
| | Primary | 3159 | 35.6 | 2094 (66.29%) |
| | | | | 1065 (33.71%) |
| | Secondary | 1098 | 12.4 | 755 (68.76%) |
| | | | | 343 (31.24%) |
| | Higher | 742 | 8.4 | 483 (65.10%) |
| | | | | 259 (34.90%) |
| counselled | Poorest | 2031 | 22.9 | 1512 (74.45%) |
| | | | | 519 (25.55%) |
| | Poorer | 1341 | 15.1 | 937 (69.87%) |
| | | | | 404 (30.13%) |
| | Middle | 1268 | 14.3 | 804 (64.41%) |
| | | | | 464 (36.59%) |
| | Richer | 1344 | 15.1 | 961 (62.24%) |
| | | | | 583 (37.76%) |
| counselled | Richest | 2901 | 32.7 | 1753 (60.43%) |
| | | | | 1148 (39.57%) |
| | Never in union | 2618 | 29.5 | 1857 (70.93%) |
| | | | | 761 (29.07%) |
| | Married | 5365 | 60.4 | 3503 (64.97%) |
| | | | | 1862 (35.03%) |
| | Living with partner | 105 | 1.2 | 75 (71.43%) |
| | | | | 30 (28.57%) |
| counselled | Widowed | 210 | 2.4 | 141 (67.14%) |
| | | | | 69 (32.86%) |
| | Divorced | 405 | 4.6 | 281 (69.38%) |
| | | | | 124 (30.62%) |
| | Separated | 182 | 2.0 | 120 (65.93%) |
| | | | | 62 (34.07%) |
| | No | 8353 | 94.0 | 5547 (66.41%) |
| | | | | 2806 (33.59%) |

Table 1 (continued)

| Variables | Frequency | Percent | ANC visits of the Respondents | |
|-----------|-------------|---------|-------------------------------|------------------|
| | | | 4 or less | 4+ |
| Religion | Yes | 531 | 6.0 | 220 (41.43%) |
| | | | | 311 (58.57%) |
| | Orthodox | 3374 | 38.0 | 2192 (64.10%) |
| | | | | 1182 (35.90%) |
| | Catholic | 78 | .9 | 56 (71.80%) |
| | | | | 22 (28.20%) |
| | Protestant | 1711 | 19.3 | 1173 (68.56%) |
| | | | | 538 (31.44%) |
| Other | Muslim | 3635 | 40.9 | 2109 (58.02%) |
| | | | | 1526 (41.98%) |
| | Traditional | 60 | .7 | 43 (71.67%) |
| | | | | 17 (28.33%) |
| | Other | 27 | .3 | 20 (76.92%) |
| | | | | 6 (23.08%) |

0.179–0.923]. Women aged between 44 and 49 were 2.993 times more likely utilized Four or more ANC as Compared to women aged between 15 and 19[AOR = 2.993,95% CI = 1.168–7.669]. Women who attended elementary school were 1.368 times more likely to utilize four or more ANC as compared to a woman who had no formal education[AOR = 1.368,95% CI = 1.072–1.745] as well as women who attended secondary school were 1.501 times more likely to utilized four or more ANC as compared to a woman had no formal education[AOR = 1.501,95% CI = 1.050–2.145] and women attended higher school were 1.565 times more likely to utilized four or more ANC as compared to a woman had no formal education[AOR = 1.565,95% CI = 1.047–2.340]. Women who had pregnancy Complications were 5.501 times more likely to utilized four or more ANC than women no had pregnancy Complications [AOR = 5.501, 95% CI = 2.701–11.203]. Women of Muslim followers were 2.052 times more likely to utilized four or more ANC than a women followers of Orthodox women [AOR = 2.052, 95% CI = 1.242–3.390]. A woman who had birthed the one Child were 1.651 times more likely to utilized four or more than a woman who had no birth[AOR = 1.651,95% CI = 1.059–2.572] and a woman who had two birth were 2.875 times more likely to utilized four or more ANC than women had no birth[AOR = 2.875,95% CI = 1.768–4.651] (Table 2).

4.3. Multilevel logistic regression analysis

The fixed and random effects of utilization of Antenatal care (ANC) are presented in Table 3. The ICC in the empty model implied that 13.2% of the total variance in the utilization of Antenatal care was attributed to differences between communities (Table 4).

In Model-II only individual-level variables were added. In this model, the variables age of Mothers, Education level, Wealth index and Counselling during pregnancy were included. The results showed that the age of Mothers, Education level, Wealth index and Counselling during pregnancy were significantly associated with the utilization of Antenatal care (ANC) in Model-II. The ICC in Model-II indicated that 2% of the variation in utilization of Antenatal care (ANC) was attributable to differences across communities. As shown by the PCV, 90% of the variance in the utilization of Antenatal care (ANC) across communities was explained by the individual-level characteristics (Table 4).

In Model-III only community-level variables were added. In model-III, the community-level characteristics of residence were included. The results in Model-III revealed that place of residence was significantly associated with utilization of Antenatal care (ANC).

The ICC in Model-III implied that differences between communities account for about 1.2% of the variation in utilization of Antenatal care (ANC). In addition, the PCV indicated that 90.2% of the variation in utilization of Antenatal care (ANC) between communities was explained by community-level level characteristics (Table 4).

Model-IV, the final model included both the individual and

Table 2

Binary Logistic regression of ANC Visits Results in Ethiopia Predictors (N = 8885).

| Variables | COR 95% CI | AOR 95% CI | P-value |
|--------------------------------|------------------------|-------------------------|---------|
| Ages of Mothers | | | |
| 15–19 | | | .001 |
| 20–24 | 1.582 (0.893–2.802) | .726(0.298–1.768) | .480 |
| 25–29 | 2.207 (1.307–3.717) | .832(0.357–1.938) | .670 |
| 30–34 | 2.923 (1.707–5.007) | 1.140(0.483–2.69) | .765 |
| 35–39 | 3.593 (2.114–6.107) | 1.698 (0.714–4.034) | .231 |
| 40–44 | 3.144 (1.741–5.676) | 1.578 (0.629–3.955) | .331 |
| 45–49 | 4.991 (2.819–8.835) | 2.993 (1.168–7.669) | .022 |
| Regions of Mothers | | | |
| Tigray | | | .001 |
| Affar | 1.478 (0.790–2.765) | .695(0.305–1.584) | .386 |
| Amhara | 1.032 (0.556–1.916) | .849(0.435–1.659) | .632 |
| Oromia | 1.086 (0.596–1.979) | .515(0.241–1.100) | .086 |
| Somalia | .759 (0.363–1.588) | .285(0.109–0.747) | .011 |
| Benishangul Gumuz | .759 (0.907–1.537) | .407(0.179–0.923) | .032 |
| SNNPR | 1.599 (0.907–2.818) | .929(0.440–1.965) | .848 |
| Gambella | .501 (0.223–1.122) | .228(0.080–0.654) | .006 |
| Harar | .368 (0.153–0.886) | .175(0.062–0.494) | .001 |
| Addis Ababa | .591 (0.283–1.236) | .436(0.168–1.134) | .089 |
| Dire Dawa | 1.262 (0.683–2.332) | .665(0.300–1.474) | .315 |
| Education levels of Mothers | | | |
| No Education | | | .060 |
| Elementary | .642 (0.474–0.870) | 1.368 (1.072–1.745) | .012 |
| Secondary | .520 (0.319–0.849) | 1.501 (1.500–2.145) | .026 |
| Higher | .417(0.28–0.801) | 1.565(1.047–2.30) | .029 |
| Wealth Index of HH | | | |
| Poorest | | | .511 |
| Poorer | 1.203 (0.719–2.012) | | .482 |
| Middle | 1.552 (0.929–2.593) | | .093 |
| Richer | 1.239 (0.713–2.154) | | .447 |
| Richest | 1.506 (0.770–2.945) | | .231 |
| Sign of Complication Pregnancy | | | |
| No | | | |
| Yes | | 5.501 (2.701–11.203) | .000 |
| Orthodox | | | .116 |
| Catholic | | 1.286 (0.162–10.207) | .812 |
| Protestant | | 1.670 (0.916–3.044) | .094 |
| Muslim | | 2.052 (1.242–3.390) | .005 |
| Traditional | | .907(0.116–7.127) | .926 |
| Others | | 3.378 (0.396–28.796) | .265 |
| Family Size | | | |
| 0 | | | .000 |
| 1 | | 1.651 (1.059–2.572) | .027 |

Table 2 (continued)

| Variables | COR 95% CI | AOR 95% CI | P-value |
|-----------|------------|------------------------|---------|
| 2 | | 2.875 (1.768–4.675) | .000 |
| Constant | | .023 | .000 |

Table 3

Multilevel logistic regression on individual and regional level factors associated with Antenatal Care Utilization.

| Variables | Model I | Model II AOR 95% CI | Model III AOR 95% CI | Model IV AOR 95% CI |
|-----------------------------|---------|-------------------------|------------------------|-------------------------|
| Ages of Mothers | | | | |
| 15–19 | . | .492(0.346-.700)* | . | |
| 20–24 | . | .893 (0.731–1.091) | . | 0.356 (0.220–0.577)* |
| 25–29 | . | .799(0.648-.983)* | | |
| 30–34 | . | .492(0.346-.700)* | | |
| 35–39 | . | | | |
| 40–44 | . | | | |
| 45–49 | . | Reff | | Reff |
| Residence | | | | |
| Urban | . | . | .556 (0.490–0.631)* | 0.563 (0.452–0.652)* |
| Rural | | | Reff | |
| Education levels of Mothers | | | | |
| No Education | . | .573(.468-.701)* | | 0.719 (0.557–0.927)* |
| Elementary | . | .906 (.761–1.078)* | | .721 (0.564–0.920)* |
| Secondary | . | .866 (.727–1.030)* | | .735 (0.500–0.964)* |
| Higher | . | Reff | | Reff |
| Wealth Index of HH | | | | |
| Poorest | . | .411(0.356-.475)* | | |
| Poorer | . | 1.302 (1.125–1.508)* | | |
| Middle | . | 1.458 (1.247–1.704)* | | |
| Richer | . | 1.388 (1.183–1.629)* | | |
| Richest | . | Reff | | |
| Counselling | | | | |
| No | . | .671(.539-.834)* | | |
| Yes | . | .743 (.618-.893) | | 1.651 (1.059–2.572)* |
| Constant | | | | .023 |

Table 4

Model comparison and random effect distribution on Antenatal Care Utilization in Ethiopia.

| Random effect model comparison | Model I | Model II | Model III | Model IV |
|---------------------------------------|---------|----------|-----------|----------|
| Variance | 0.50 | 0.05 | 0.049 | 0.04 |
| Inter-cluster correlation(ICC) | 0.132 | 0.02 | 0.012 | 0.012 |
| Log-likelihood ratio(LLR) | 38616.7 | 38592.8 | 38593.5 | 28651.52 |
| AIC | 38618.7 | 38594.8 | 38596.2 | 28653.52 |
| BIC | 38625.8 | 38601.9 | 38602.3 | 28660.3 |
| Proportional change in variance (PCV) | Reff | 0.9 | 0.902 | 0.92 |

community level characteristics simultaneously. The current study looked at the relationship between individual level, regional level, and ANC utilization in Ethiopia. Age, education, Place of residence and counselling during prenatal care (ANC) utilized were found to have significant relationships with antenatal care (ANC) utilization. According to the findings, women aged 20 to 24 were more likely to utilize antenatal care (ANC) than women aged 45 to 49 (AOR = 0.356, 95% CI = 0.220–0.577). Women who lived in urban had a higher likelihood of utilizing antenatal care (AOR = 0.563, 95% CI = 0.452–0.652) than women who lived in rural areas. Using higher education as a reference, secondary education (AOR = 0.735, 95%CI = 0.500–0.964), elementary education (AOR = 0.721, 95%CI = 0.564–0.920), and no education (AOR = 0.719, 95% CI = 0.557–0.927) all had lower odds of utilized ANC. Women who received Counselling during ANC visits used ANC more frequently (AOR = 1.651, 95% CI = 1.059–2.572) than women who did not get Counselling. (Table 3).

5. Discussion

This study aimed to identify factors associated with antenatal care (ANC) utilization in Ethiopia by using EMDHS 2019. This is the first study to provide a comprehensive assessment of ANC use in Ethiopia by region of living, service type and demographics. ANC utilized was found to be a regional variation in Ethiopia. It was also found that women's ANC utilization was significantly associated with different individual and region-level factors.

The current study showed that the prevalence of utilized ANC in Ethiopia was 44%. In urban regions, the largest proportion was reported (70.25% vs 36.06%). Nonetheless, compared to the results of the previous three DHS surveys, more women had used ANC four or more times in 2019 [25,26]. There are also differences in ANC utilized around the country. Tigray, Amhara, and Benishangul gumuz regions, as well as Addis Ababa and Dire Dawa City administrations, reported the highest proportions of utilized four or more ANC. The Somali, Afar, and Gambella regions had the lowest rates of ANC usage, with less than 40% of people utilizing four or more [21].

From the Current study Place of Residence was a factor in the utilization of Antenatal care (ANC). Women in rural areas were less likely than women in urban areas to utilize four or more antenatal care (ANC) according to the study (AOR = 0.563, 95% CI = 0.452–0.652). This outcome was consistent with previous research conducted in underdeveloped countries. For example, research in Nigeria found that rural women were less likely than urban women to attend prenatal clinics [27]. Likewise, in studies done in Nepal [28], Butajira in Southern Ethiopia [29], and Metekel Zone, North West Ethiopia [30] In comparison to their rural counterparts, urban women were more likely to utilize antenatal care (ANC) four or more.

The Wealth Index of the Household was found to be unrelated to Antenatal care (ANC) utilization in this study. Because ANC is provided as a free service in Ethiopia, wealth status is not a factor in ANC visits. However, one study found that impoverished women had fewer Antenatal care (ANC) attendants than wealthier women. Similar findings have been observed in earlier Ugandan investigations [31] and Nepal [28]. Because women with lower incomes had fewer Antenatal care (ANC) utilization than women with higher incomes.

The current study showed that the age of mothers was a major factor in Antenatal care (ANC) utilization. According to a prior study conducted in Tanzania, being single increases the likelihood of late Antenatal care (ANC) utilization [32]. As the age of the first pregnancy rises, so is the likelihood of receiving antenatal care (ANC) Services also increases. This is a surprising discovery because younger women with less experience and in their first pregnancies are less likely to have Antenatal care (ANC) utilized than older women. The majority of pregnant women under the age of 20 are unmarried. This could explain the low rates of early prenatal visits among pregnant women under the age of 20. Attending a clinic where she would meet her aunts and mothers is

challenging for a teenager. It is against both religious and cultural beliefs for a young lady to become pregnant without first marrying.

The Current Study showed that the education level of Mothers was found to be a major factor in Antenatal care (ANC) utilization. This finding is consistent with past research findings [33,34]. This conclusion could be explained by the fact that moms with greater education are more likely to use antenatal care, have a better understanding of information, and are more aware of the necessity of the service [35]. Furthermore, educated women are more likely to improve their independence, self-confidence, and ability to make health-related decisions for themselves.

The Current Study showed that the size of the family was found to be a major factor in Antenatal care (ANC) utilization. Mothers who had two or more children were more likely to utilize prenatal care than mothers who had one child. Another study conducted in India found that women who had one or more live births were more likely to use the service than women who had no live births [36]. This could be because women with a higher parity have had more pregnancy and birth difficulties in the past. Furthermore, they may have had past antenatal consultations, which may encourage them to use the service again.

The Current Study showed that Religion was found to be a strong factor in Antenatal care (ANC) utilization. Muslim religious followers have a higher percentage of Antenatal care (ANC) utilization than Orthodox and Protestant followers. According to studies, there is a religious diversity of utilized Antenatal care (ANC) [37,38]. More qualitative research may be required to learn more about the impact of religion on the use of Antenatal care (ANC) utilization.

5.1. Strength and limitation of the study

The retrospective nature of the EMDHS records is a concern with this approach and national dataset. The records are enormous and so can included large Scope. This study had some limitations in that it relied on quantitative methods that merely found correlations between variables and did little to explain them. Furthermore, the study was a population-based survey, which can only explain the existence of a relationship between variables, not the causation effect relationship. For the causal-effect relationship of variables, an experimental design study design is advised.

5.2. Implications

Our data imply that, on average, education level is linked to Antenatal Care Utilization. Although the place of residence is an essential factor in the ANC utilization, increased government spending on education could help to mitigate this effect. This conclusion revealed that focusing on the study area's residential area is an essential approach for improving the utilization of ANC.

6. Conclusion

The utilization of Antenatal Care was underutilized in Ethiopia. Education status, Ages of mothers, Size of family, Religion and Place of Residence were major Factors of influenced ANC utilization. From the current study, the researcher conclude that there was regional variation in the utilization of Antenatal Care in Ethiopia. In conclusion, raising knowledge through education and improving women's living conditions may increase the number of women who seek antenatal care. As a result, maternal mortality and morbidity can be reduced, and Ethiopia can reach its SDG target. Because there was a strong association between economic status and the use of ANC services, the concerned government body should also create a better environment for impoverished women to participate in entrepreneurial activities. Finally, more research is needed to determine the impact of various traditional, cultural, and other associated activities on ANC service utilization among ethnic groups in the region.

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Author contribution

*GD: The author conceived the study, wrote the abstract to get permission from EMDHS 2019, facilitated data extraction and process, data analysis and interpretation, drafted the first manuscript, and write up the final manuscript.

Registration of research studies

1. Unique Identifying number or registration ID: researchregistry8029
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Guarantor

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Consent

Not Applicable.

Declaration of competing interest

The author(s) declared no potential Computing of interest to the research, authorship, and/or publication of this article.

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Appendix A. Supplementary data

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