

## Maternal Empowerment Indicators Predict Health Care Seeking Behavior during Pregnancy: Evidence from Ethiopian National Data

Victoria Matatio Elia Guli<sup>1</sup> and Nigatu Regassa Geda<sup>2\*</sup>

<sup>1</sup>University of Juba, Institute of Peace Development and Security Studies, Juba, South Sudan  
E-mail: elia\_vicky@yahoo.com

<sup>2\*</sup>Center for Population Studies, College of Development Studies, Addis Ababa University, Sidist Kilo Campus, Ethiopia, PO Box 1176  
E-mail: negyon@yahoo.com

**KEYWORDS** Antenatal Care. Autonomy. Delivery. Women Status. Health-seeking. Ethiopia

**ABSTRACT** The purpose of this study was to examine the leverage of women's empowerment status and their living context in healthcare-seeking behavior during pregnancy. The study used the Ethiopian Demographic and Health Surveys (EDHS). In addition, the frequency of Antenatal Care (ANC) was used as an outcome variable to gauge women's health seeking behavior. The negative binomial regression analysis results showed that the expected mean number of ANC visits was lower for mothers with lower education levels and for women living with husbands having poor education. On the other hand, the expected mean number of ANC visits was much higher for younger women, working women, for those with some household decision making autonomy, women living in better household wealth category, women living in smaller households, and those who had reasonable access to media (radio). Given the significant contribution of women's status and living contexts, aggressive moves should be made to reduce the demand-side barriers to health care services, mainly promoting women's education and participation in decision-making at household and community levels.

### INTRODUCTION

In the past two decades, most developing countries have made remarkable progress towards achieving a substantial decline in maternal and child health outcomes (such as infant and child mortality, maternal morbidity, and mortality). In this regard, the role played by maternal and child health intervention is of paramount importance, especially in the context of Africa and other developing countries (Mulholland et al. 2008). For example, antenatal care, delivery assisted by skilled professionals, post-natal care during the first two months after birth, treatment of common childhood disease (diarrhea, malaria, and pneumonia that account for more than half of under-five deaths); preventive and promotive childhood interventions such as immunization are all critical in reducing childhood mortality (WHO 2010). These interventions are also cost-effective mechanisms to curb maternal morbidity and mortality (Zere et al. 2007).

Skilled attendance during pregnancy, birth, and early post-natal checkup is the most appropriate intervention in preventing maternal death, and is

instrumental in attaining the Sustainable Development Goals (SDG 3)(UN 2017). The WHO defines antenatal health care (ANC) services as "care a pregnant mother receives before birth and involves education, screening, counseling, treatment of minor ailment and immunization services" (WHO 2019). The WHO recommends ANC visits at least four times for normal pregnancies. Studies have shown that women who had an antenatal visit were four times more likely to have safe delivery with a midwife than women who had no antenatal visit (Van-neste et al. 2000). Antenatal care visits by mothers are not only beneficial in terms of avoiding adverse pregnancy outcomes (pregnancy complications) but it is also an important entry point for delivery of Essential Nutrition Actions (ENA) message through the current Health Extension Program (HEP)(UN 2017). In addition, Skill Birth Attendant (SBAs) at birth would reduce 13-33 percent of maternal mortality rate (Adegoke and van den Broek 2009).

Studies conducted in developing countries have reported several individual, household and community level factors predicting maternal health care seeking during pregnancy. Some of these factors include, but not limited to, gender discrimination and low levels of female education, marital status,

\*Address for correspondence

parity, husbands' occupation and household economic status (Yalem et al. 2013; Kinney et al. 2010; Babalola and Fatusi 2009; Darmstadt et al. 2009). At the community level, proximity to the health facility is a commonly reported predictor of health care seeking behavior (Gabrysch and Campbell 2009).

Ethiopia is among the countries in Sub-Saharan Africa with poor health service infrastructure and high disparities in Health across its various sub-populations. Only a third of women get access to adequate ANC service ( $\geq 4$  visits), less than 30 percent deliver at health institutions, and as small as 12 percent get access to post-natal care services (CSA and ICF 2016). Despite a significant decline in under-five mortality, maternal mortality, and morbidity during the last two decades, the prevalence of most of these health outcomes is still unacceptably high even in Sub Saharan African standards. In this regard, the role of maternal healthcare-seeking behavior during pregnancy plays an important role. While a wide range of factors predicts the likelihood of care-seeking during pregnancy, maternal empowerment and living arrangements are hypothesized, in this study, having higher leverage.

Previous studies conducted in Ethiopia (Berhan and Mohammed 2020; Seman et al. 2019; Dereje et al. 2020) have identified a wide range of factors affecting ANC service utilization. However, most of these studies emphasized the commonly known individual and household factors. Therefore, there has been little emphasis on the role of maternal empowerment indicators (such as maternal autonomy in decision-making, women's experience of intimate partner violence, and labor force participation). In addition, most local studies considered ANC as a binary outcome variable (that is if a woman has less than four visits or not). Therefore, the present study emphasized on key women empowerment variables and measured ANC as a count variable to adequately address the gap in modeling this outcome variable.

### Objective of the Study

This study is primarily aimed at investigating the role of maternal empowerment variables in promoting health care seeking during the most recent pregnancy based on the Ethiopian Demographic and Health Survey (EDHS) data.

## METHODOLOGY

### Study Area and Context

With an anticipated population of about 110 million people, Ethiopia is the second-most populous country of Africa, next to Nigeria (World Bank 2019). Administratively, Ethiopia is divided into nine geographic regions and two city administrations. The government heavily relies on an agricultural economy that employs nearly 85 percent of its population. About a third of the Ethiopian population still lives below the poverty line; more than 50 percent have no education and have limited access to healthcare services (World Bank 2019). Most people, especially women and children, have very poor access to and utilization of basic health services due to a wide range of demand and supply side factors (FMOH 2014; FDRE 2010).

### Data Sources

The study used a nationally representative data of Ethiopia conducted every five years since 2000. The 2016 EDHS was performed on a nationally representative sample of 16,650 households. The sampling design for the surveys was a two-stage stratified cluster sampling that was not self-weighted at a national level. The researchers used children's file for most analysis in this work, which contained entries for 3285 women (age 15-49) with mainly recent birth. The EDHS followed previously approved standard protocols, data collection tools, procedures (CSA and ICF 2016). Data were collected from women having at least one under-five child during the survey period. The DHS survey uses standardized individual and household level survey questionnaires which are validated across many countries. Participation in the survey was voluntary, and consent to use the data for the present study was granted by DHS (USA) and Central Statistics Authority (Ethiopia).

### Variables and Measures

Frequency of antenatal care visits was used for measuring women's healthcare-seeking behavior during the most recent birth. Thus, the outcome variable takes a count form that ranges from 0 to 20 visits, and is a proper right skewed distribution.

The primary exposure variables were women empowerment indicators (including women autonomy, education, work status, access to information/radio, and experiences of Intimate Partner's Violence (IPV). Household and contextual factors included: household size, non-monetary wealth index, paternal education level and religion; and community level variables considered were: residence, wealth, and maternal education at cluster/community level. Women's autonomy was measured based on women's participation in a set of household decision-making domains. Intimate Partner's Violence (IPV) was constructed from the mother's binary response for a set of questions about her experiences of violence by her partner during the 12 months before the survey. The variable was categorized into three groups based on mean/median values. The EDHS constructed household economic status using ownership of asset-based wealth and was organized into poor/poorer, medium, and rich/richer. Two of the three community-level variables (mean household wealth and mean maternal education at cluster/community level) were used as continuous variables.

### Statistical Analysis

The analysis began with assessing the changes in regional disparity in essential maternal healthcare-seeking behavior between two survey periods (2000 and 2016) using percentages and independent t-test. Next, the researchers used the negative binomial regression analysis to examine the role of critical maternal empowerment variables in women's healthcare-seeking behavior. The model is most preferred when the outcome variable takes count/rate and when the frequency distribution is skewed to the right. Multicollinearity between the explanatory variables was checked using tolerance test/ variance inflation factors (VIF). The analysis was presented in two phases: The researchers examined the bivariate association between the frequency of ANC visits and each potential predictor in the first phase. All predictors statistically associated with a p-value of <0.2 at bivariate level were subsequently included in the multivariable regression model in the second phase. In the final model, we used a p-value of <0.05 to define statistical significance. In addition, the Deviance and Degree of Freedom (Deviance/DF) were used to test the model fitness. All analyses were presented using STATA version 12 (StataCorp 2013).

## RESULTS

Table 1 presents the background attribute of the study participants for the two survey periods (2000 and 2016). It is noted that about half of the mothers were in their primary reproductive age (20-34 years old). The proportion of women with no education category significantly declined from 82 percent in 2000 to 66 percent in 2016. On the other hand, there was a 100 percent change in the proportion of mothers at the primary education level. Close to 90 percent of the respondents resided in rural areas in both 2000 and 2016. There has not been a considerable change in the household size, where the proportion of large households (7+ members) remained the same for the two periods (37% and 40%, respectively). More women (73%) reported working in the 2016 survey compared to the first survey (56%). The Orthodox Christian followers accounted for 49 percent and 34 percent for the first and second surveys, respectively. Finally, the headship rates remained the same across the two survey periods.

**Table 1: Socio-demographic characteristics of respondents, EDHS 2000 and 2016, Ethiopia**

Background variables	2000 n (%)	2016n (%)
<i>Age of Women</i>		
15-24	3307 (27.0)	2168 (21.8)
25-34	5730 (46.7)	5245 (52.7)
35 and above	3223 (26.3)	2536 (25.5)
Mean (SD)	29.6 (7.16)	29.5 (6.61)
<i>Place of Residence</i>		
Urban	1277 (10.4)	1147 (11.5)
Rural	10984 (89.6)	8802 (88.5)
<i>Education of Women</i>		
No education	10063 (82.1)	6581 (66.1)
Primary	1597 (13)	2636 (26.5)
Secondary and higher	601 (4.9)	732 (7.4)
<i>Household Size</i>		
0-3 members	1353 (11.0)	961 (9.7)
4-6 members	6326 (51.6)	5037 (50.6)
7 and above	4581 (37.4)	3951 (39.7)
<i>Women's Work Status</i>		
No	5398 (44.0)	2725 (27.4)
Yes	6858 (55.9)	7224 (72.6)
<i>Sex of Household Head</i>		
Male	10589 (86.4)	9494 (86.1)
Female	1671 (13.6)	1529 (13.9)
<i>Religion</i>		
Orthodox	6042 (49.3)	3772 (34.2)
Muslim	3714 (30.3)	4561 (41.4)
Others	2505 (20.5)	2690 (24.4)

Table 2 presents the distribution of six maternal and child healthcare service utilization by geograph-

**Table 2: Changes in the rate of critical maternal and child health services/interventions, 2000-2016, Ethiopia**

Regions	ANC		Delivery		Post-natal care		Treatment of ARI		Immunization		Contraceptive	
	2000	2016	2000	2016	2000	2016	2000	2016	2000	2016	2000	2016
Tigray	36.4	90.4	3.7	59	19.1	33	12.3	34.1	43.5	67.3	10.2	36.3
Afar	26.1	51.6	4.1	14.7	9.5	8	21.9	41.3	0.5	15.2	7.7	11.6
Amhara	18.9	67.6	2.8	27.1	5.9	13	11.5	31.4	14.4	45.8	7.5	47.3
Oromia	27	51.4	4.3	18.8	8.7	8.9	16.6	35	9.8	24.7	6.6	28.6
Somali	14.6	44	5.6	18	20.6	10.8	49.4	26.8	22.2	21.8	2.6	1.5
Benshangul_ Gumuz	25.7	69.2	7.8	25.7	11.7	18.1	28.0	41.6	12.2	57.4	8.7	28.5
SNNP	28.4	69.6	4.3	25.5	9.6	13.3	15.4	36.7	10.5	46.9	6.4	39.9
Gambella	49.8	72.7	23.2	45	30.3	20.3	41.3	45	10.8	41.1	13.5	34.9
Harari	50.2	76.3	24.7	50.2	45.6	34.8	40.5	54	35.9	42.2	22.0	29.5
National average	26.7	63.1	5	26.2	10.5	13.1	15.8	35.3	14.3	38.5	8.1	35.9
T test: Mean diff (p value)	-35.21 (0.000)		-22.47 (0.001)		-1.800 (0.971)		-12.86 (0.019)		-22.68 (0.003)		-20.07 (0.000)	

ic regions for the two survey periods. It is noted that all the areas have made significant positive changes in five of the six maternal and child health service indicators ( $p < 0.05$ ). However, the changes in post-natal care service utilization rates were not significant ( $p > 0.05$ ) as most of the regions made very slight changes. The most significant improvement in post-natal care service utilization was made by the Tigray region, which increased from 19-33 percent between the two survey periods. The three (Somali, Harari, and Gambella) had lower rates in 2016 (Table 2).

Table 3 presents the bivariate Negative Binomial regression results for 13 variables to see their unadjusted effect on the outcome variable (number of antenatal care visits). It is noted that all the variables had a strong bivariate association with care seeking during pregnancy ( $p < 0.05$ ). The variables with  $p < 0.20$  are further entered into the multivariable Negative Binomial regression model (see Table 4) to see their adjusted effects on the outcome of interest.

Table 4 presents the results of multivariable Negative Binomial regression analysis to examine the associations between hypothesized explanatory variables and maternal care seeking during pregnancy. It is noted that most of the maternal empowerment indicators and contextual factors have become significant predictors of care-seeking during pregnancy ( $p$ -values  $< 0.05$ ). Keeping other factors fixed, the expected mean number of ANC visits of women with no education and primary level education decreased by 71.4 percent (IRR=0.286; 95% CI: 0.246-0.331) and 32.6 percent (IRR=0.674; 95%

CI:0.588-0.772), respectively. Similarly, the expected mean score of the outcome variable decreased for women with husbands having no education and primary level education by 45.2 percent (IRR=0.548; 95% CI:0.484-0.621) and 38 percent (IRR=0.620; 95% CI:0.553-0.695), respectively. On the other hand, the expected mean number of ANC visits was much higher for younger women than older ones.

The expected mean number of ANC visits for mothers working outside their home in gainful employment was 1.1 times higher (95% CI: 1.025-1.186) than non-working women. The expected mean number of ANC visits for women having some household decision-making autonomy was 1.2 times higher (95% CI: 1.085-1.269) than those with no autonomy. Those who had reasonable access to media (radio) had a higher expected mean score of care-seeking during pregnancy (IRR=1.342; 95% CI: 1.243-1.447). The expected mean score also decreased for women having experienced IPV during the 12 months before the survey.

Women living in poor and middle level household wealth category had significantly lower expected mean of ANC visits (IRR=0.767; 95% CI: 0.696-0.845 and IRR=0.899; 95% CI: 0.816-0.990, respectively) compared to those residing in more affluent households. The predicted mean number of ANC visits is much higher for women living small size households those living in larger families (7 and above members). The mean score also increased for Orthodox Christian followers compared to others. It is also noted that the three community-level variables (residence, mean household wealth, and mean ma-

**Table 3: Results of bivariate Negative Binomial regression analysis for assessing the effects of maternal empowerment variables (unadjusted) on care-seeking during pregnancy, Ethiopia, EDHS 2016**

Variables	p-values	IRR (unadjusted)	95% CI	
			Lower	Upper
<i>Maternal empowerment variables</i>				
<i>Age of the Women</i>				
15-24	0.000	1.199	1.110	1.295
25-34	0.000	1.263	1.183	1.348
34+ <sup>RC</sup>	-	1	-	-
<i>Education of the Women</i>				
No education	0.000	0.476	0.434	0.522
Primary level	0.000	0.643	0.583	0.710
Secondary and higher <sup>RC</sup>	-	1	-	-
<i>Women's Labor Force Participation</i>				
Working in gainful employment	0.000	1.281	1.208	1.358
Not working <sup>RC</sup>	-	1	-	-
<i>Women's Autonomy in Household Decision Making</i>				
Yes	0.021	1.079	1.012	1.150
No <sup>RC</sup>	-	1	-	-
<i>Women's Experience of IPV</i>				
High IPV	0.000	0.705	0.659	0.755
Mild IPV	0.000	0.766	0.720	0.815
No or low violence <sup>RC</sup>	-	1	-	-
<i>Women's Access to Information/Radio</i>				
Yes	0.000	1.543	1.455	1.635
No <sup>RC</sup>	-	1	-	-
<i>Household and Contextual Factors</i>				
<i>Wealth Index</i>				
Poor/poorer	0.000	0.545	0.513	0.579
Middle	0.000	0.686	0.638	0.738
Rich/richer <sup>RC</sup>	-	1	-	-
<i>Education of Partners/Husbands</i>				
No education	0.000	0.544	0.502	0.589
Primary	0.000	0.614	0.565	0.667
Secondary and higher <sup>RC</sup>	-	1	-	-
<i>Household Size</i>				
0-3 members	0.000	1.215	1.115	1.323
4-6 members	0.000	1.139	1.074	1.208
7 and above <sup>RC</sup>	-	1	-	-
<i>Religion</i>				
Orthodox Christian	0.000	1.279	1.196	1.369
Muslim	0.013	0.914	0.851	0.981
Others <sup>RC</sup>	-	1	-	-
<i>Residence</i>				
Urban	0.000	2.178	2.016	2.352
Rural <sup>RC</sup>	-	1	-	-
<i>Mean Wealth at Community Level</i>	0.000	1.330	1.297	1.364
<i>Mean Maternal Education at Community Level</i>	0.000	1.172	1.153	1.191

ternal education at community/ cluster level) have become significantly associated with several ANC visits.

## DISCUSSION

The present study examined the effects of key women's empowerment indicators on healthcare-

seeking behavior during the most recent pregnancy based on nationally representative data of Ethiopia.

Analysis of the critical maternal health care service utilization (2000 to 2016) indicated that the country made significant strides in reducing regional inequalities in essential maternal and child health care services during the period. However, some indica-



**Table 4: Results of multivariable Negative Binomial regression analysis (adjusted) for examining the effects of maternal and contextual variables (adjusted) on care-seeking during most recent pregnancy, Ethiopia. (n =3285)**

Variables	p-values	IRR	95% CI	
			Lower	Upper
<i>Maternal empowerment variables</i>				
<i>Age of the Women</i>				
15-24	0.000***	30.347	27.103	33.979
25-34	0.000***	9.761	8.938	10.661
34+ <sup>RC</sup>	-	1	-	-
<i>Education of the Women</i>				
No education	0.000***	0.286	0.246	0.331
Primary level	0.000***	0.674	0.588	0.772
Secondary and higher <sup>RC</sup>	-	1	-	-
<i>Women's Labor Force Participation</i>				
Working in gainful employment	0.009**	1.102	1.025	1.186
Not working <sup>RC</sup>	.	1	.	.
<i>Women's Autonomy in Household Decision Making</i>				
Yes	0.000***	1.174	1.085	1.269
No <sup>RC</sup>	-	1	-	-
<i>Women's Experience of IPV</i>				
High IPV	0.489	1.031	0.945	1.126
Mild IPV	0.021*	0.913	0.845	0.986
No or low violence <sup>RC</sup>	-	1	-	-
<i>Women's Access to Information/ Radio</i>				
Yes	0.000***	1.342	1.243	1.447
No <sup>RC</sup>	-	1	-	-
<i>Household and Contextual Factors</i>				
<i>Wealth Index</i>				
Poor/poorer	0.000***	0.767	0.696	0.845
Medium	0.031*	0.899	0.816	0.990
Richer/richer <sup>RC</sup>	.	1	.	.
<i>Education of Partners/Husbands</i>				
No education	0.000***	0.548	0.484	0.621
Primary	0.000***	0.620	0.553	0.695
Secondary and higher <sup>RC</sup>	-	1	-	-
<i>Household Size</i>				
0-3 members	0.000***	11.198	9.983	12.560
4-6 members	0.000***	4.737	4.376	5.127
7 and above <sup>RC</sup>	.	1	.	.
<i>Religion</i>				
Orthodox Christian	0.000***	1.843	1.694	2.005
Muslim	0.770	0.987	0.905	1.077
Others <sup>RC</sup>	.	1	.	.
<i>Residence</i>				
Urban	0.000***	1.642	1.459	1.849
Rural <sup>RC</sup>	-	1	-	-
<i>Mean Wealth at Community (Cluster) Level</i>				
Mean Maternal Education at Community Level	0.000***	0.726	0.677	0.779
Intercept	0.000	0.809	0.744	0.881
(Negative binomial)	0.000	0.010	0.008	0.012
Deviance =2.328				
Number of cases = 3285				

Note: RC: Reference category; \*\*\* sig at 0.001; \*\* sig at 0.01; \*sig at 0.05

tors (such as delivery at health facilities) showed consistently high regional disparities across the two survey periods. Post-natal care service utilization

and immunization showed the largest percentage increment. One plausible reason for such increment could be significant financial and programming in-

vestments made available through the Health Sector Development Program (HSDP). The government envisages the HSDP as the key strategy to deliver maternal, neonatal, and child health interventions, particularly to the rural and impoverished segments of the population (FMOH 2017). It has allocated extensive resources and made educational opportunities and healthcare services available to rural communities in Ethiopia (Alemayehu et al. 2017; World Bank 2016). Health Extension Workers (HEW), deployed in a ratio to population of 1:2301, is mandated to conduct community outreach, education/training sessions, and extension activities and provide healthcare supports to millions of poor Ethiopian households (World Bank 2016; Wang et al. 2016).

However, despite significant progress made in some of the indicators, the 2016 survey witnessed still low (<40%) mean level prevalence for some of the health service utilization (such as family planning, treatment of childhood illness, post-natal care service). Because these services require women to make series of follow-up visits, the role of specific barriers such as distance to health facilities, transportation network, opportunity costs for the patients and caretakers, and cultural impediments were of paramount importance. Previous studies such as the World Bank's study of inequalities in Health in 56 countries (Gwatkin et al. 2007) and a study of equity in MNCH in Thailand (Limwattananon et al. 2010) reported similar patterns. However, countries like Thailand significantly addressed these demand-side barriers and achieved nearly equitable health systems with high healthcare coverage since 2002 (Limwattananon et al. 2010).

The study's primary interest is to address the question, "*why some women have higher health-seeking behavior during pregnancy than others?*" The researchers' findings from Negative Binomial regression analysis identified specific individual, household, and community-level predictors of maternal healthcare seeking behavior during pregnancy. In addition, six women empowerment variables and seven household and contextual variables appeared to significantly determine the mean score of antenatal visits during the most recent pregnancy. Therefore, the discussion made in the following few paragraphs emphasized on significant maternal empowerment predictors.

As expected, maternal education exerted positive effects on the likelihood of care-seeking behav-

ior. Earlier studies worldwide reported the positive linear association between women's years of formal education and the use of maternal and child health services (Cleland and Van Ginneken 1988; Baker et al. 2011). However, magnitude of the impact of maternal education reduces significantly in the presence of individual and community level controls (Kanté et al. 2013; Emily et al. 2012). Studies conducted in Ethiopia also reached a similar conclusion (Berhan and Mohammed 2020; Seman et al. 2019; Dereje et al. 2020). It is well recognized that formal education helps women transform their attitudes towards health living about traditional gender roles, allowing them to achieve greater decision-making autonomy within the household (Emily et al. 2012; Caldwell 1979; Jejeebhoy 1995). Similarly, husband's education appeared equally important in promoting women's healthcare-seeking behavior, disproving the general notion that paternal education has little or no effect on women's healthcare-seeking behavior.

The researchers' findings on the positive association between maternal autonomy and healthcare-seeking behavior strengthen the above argument of the positive impacts of education on healthcare-seeking behavior. Previous studies conducted worldwide reported significant and positive effects of women's autonomy on increased use of health care services (Woldemicael 2010; Woldemicael and Tenkorang 2010) and better child nutritional outcomes (Brunson et al. 2009; Dancer and Rammohan 2009). However, in Akinyemi and colleagues' (2017) study of Sub-Saharan Africa, the effects of women's decision-making index around health outcomes were more potent at the community than the individual level (Akinyemi et al. 2017). The finding entails that a separate women's decision-making power could be compromised significantly if a woman lives in a society where women generally have low decision-making power (Akinyemi et al. 2017).

Having better education and autonomy could also trickle down media access (especially radio) as more educated, and autonomous women opt for new information. In this regard, the finding shows that women with poor access to media had a lower chance of utilizing child health services. On the other hand, studies conducted in Ethiopia (Berhan and Mohammed 2020; Seman et al. 2019; Dereje et al. 2020; Mehari 2013) and India (Shariff and Singh 2002) concluded that women's exposure to printed and non-printed media significantly increased the utilization of maternal healthcare services.

Interestingly, the association between women's IPV experience and the mean score of antenatal care visits became significant, with evidence of a lower frequency of visits among those with mild IPV experience than those with more frequent experiences. The findings highlighted the importance of IPV experience and/or attitudes at household and community levels in promoting maternal healthcare seeking behaviours. In support of this, a study on the Ethiopian 2005 and 2011 national data indicated that women living in a society with a higher percentage of women disagreeing with domestic violence were more liable to use maternal healthcare services even after women's attitudes toward domestic violence and community-level characteristics were controlled (Tiruneh et al. 2017).

The impact of residence (rural-urban) on the expected mean number of ANC visits was statistically significant, with urbanites having a much higher expected mean score. Thus, even though the PHC service in Ethiopia is organized to deliver a package of essential preventive and curative health services targeting rural families, we still have a more significant gap in addressing the most deprived women residing in rural areas. The everyday use of these services among the deprived and rural inhabitants might be related to out-of-pocket spending by households, either for services or because families need to travel to a health facility (Van et al. 2013; Adewemimo et al. 2014). Other studies associate the poor healthcare seeking behavior of rural women with their preference for health facility attributes such as good technical quality, reliable supply of medicines, functioning equipment, and respectful provider attitude (Kruk et al. 2010).

The analysis demonstrated a strong positive association between household wealth and maternal healthcare seeking behavior. Previous reports indicated inconsistent findings. Some studies in Africa reported an increased frequency of seeking health care with household wealth (Yu et al. 2010; Bennett et al. 2010). The more affluent may also opt for private facilities because of their better ability to pay for services (Nabyonga et al. 2013). Some other evidence suggests that the poor may have higher health seeking behavior due to higher health concerns or disease burdens (David et al. 2014; Kiwanuka et al. 2008). Poor people, particularly the disabled and pregnant, in rural areas may not attempt to travel long distances to seek healthcare in the absence of adequate means of transport (David et

al. 2014). Another related household variable, household size, has also become significantly associated with women's tendency to seek healthcare during pregnancy. The findings show a reduced score of ANC visits as household size increased. Having a larger household size, which often imposes greater childcare responsibilities, has been reported as a reason for mothers' tendency to use services less frequently (Yared 2003).

## CONCLUSION

While the country made significant reductions in inequality in maternal and child health interventions over the last two decades, there is still a vast regional disparity in Ethiopia. Controlling for important confounders, the study concluded that maternal empowerment indicators (maternal autonomy in decision making, IPV, participation in labor force, access to information/radio, and educational level) have significantly determined the frequency of ANC visits for the most recent pregnancy.

## POLICY IMPLICATIONS AND RECOMMENDATIONS

The overall findings imply that Ethiopia's low ANC service utilization could be significantly improved if more attention and resources are allocated to enhance women's overall status. Regional and local government authorities should promote increased access to primary education and women's participation in gainful employment to improve women's empowerment at household and community levels. In addition, the use of Behavioral Change Communication (BCC) strategies to reach key community members (especially husbands) would help change attitudes and practices about women's health care needs. Alongside this, addressing the supply-side barriers to health care seeking during pregnancy (such as strengthening the outreach frontline workers) in rural and remote areas would increase the recommended number of antenatal care visits by pregnant women.

## LIMITATIONS

The generalizability of the findings to an enormous population is one of the significant strengths of this study. Further, one unique feature of the study is that the factors analyzed (more importantly, the



women empowerment variables) have not been addressed in greater detail in previous studies. Given the very few studies conducted on the subject, the study results will serve as a good reference point for researchers and policymakers. The main limitations of the study is that it cannot draw a causal/temporal relationship between the exposures and outcome of interest as the analysis was based on cross-sectional data. In addition, as most women respondents had no formal education, there might be some under-reporting of some variables and differential recall bias which may create underestimation/overestimating the exposure and outcome variables of interest. Finally, some of the factors not captured in the Negative Binomial regression model (such as cultural factors, distance, financial and psychological cost) might have influenced the estimated coefficients.

#### LIST OF ABBREVIATIONS

ANC: Antenatal Care  
 ARI: Acute Respiratory Infection  
 CSA: Central Statistical Authority  
 DHS: Demographic and Health Surveys  
 EDHS: Ethiopian Demographic and Health Surveys  
 FDRE: Federal Democratic Republic of Ethiopia  
 FMOH: Federal Ministry of Health  
 IPV: Intimate Partners Violence  
 IRR: Incidence Rate Ratio  
 MCH: Maternal and Child Health  
 MNCH: Maternal, Neonatal, and Child Health  
 PHC: Public Health Care  
 SDGs: Sustainable Development Goals  
 WHO: World Health Organization  
 UN: United Nations

#### ACKNOWLEDGMENTS

The authors would like to appreciatively acknowledge the Institute of Policy and Development Research, Hawassa University, for the support and guidance.

#### REFERENCES

Adewemimo AW, Msuya SE, Olaniyan CT, Adegoke AA 2014. Utilization of skilled birth attendance in Northern Nigeria: A cross-sectional survey. *Midwifery*, 30: e7-e1312.

Adegoke AA, van den Broek N 2009. Skilled birth attendance-lessons learnt. *BJOG*, 116(Suppl 1): 33-40. doi:10.1111/j.1471-0528.2009.02336.x.

Akinyemi J, Odimegwu CO, Banjo OO 2017. Dynamics of maternal union dissolution and childhood mortality in sub-Saharan Africa. *Development Southern Africa*, 34(6): 752-770. DOI: 10.1080/0376835X.2017.1351871.

Alemayehu A, Colin A, Anne MB, Elizabeth MF, Qaiser K, Huihui W 2017. Examining changes in maternal and child health inequalities in Ethiopia. *International Journal for Equity in Health*, 16(1): 152. DOI 10.1186/s12939-017-0648-1.

Babalola S, Fatusi A 2009. Determinants of use of maternal health services in Nigeria - looking beyond individual and household factors. *BMC Pregnancy Childbirth*, 9(43). <https://doi.org/10.1186/1471-2393-9-43>

Baker DP, Leon J, Smith Greenaway EG, Collins J, Movit M 2011. The education effect on population health: A reassessment. *Population and Development Review*, 37(2): 307-332.

Bennett KJ, Powell MP, Probst JC 2010. The relative financial burden of health care expenditures. *Soc Work Public Health*, 25(1): 6-16.

Berhan T, Mohammed A 2020. Prevalence and factors associated with antenatal care utilization in Ethiopia: Evidence from demographic health survey 2016. *BMC Pregnancy Childbirth*, 20(1): 528. DOI: 10.1186/s12884-020-03236-9.

Brunson EK, Shell-Duncan B, Steele M 2009. Women's autonomy and its relationship to children's nutrition among the Rendille of northern Kenya. *American Journal of Human Biology*, 21(1): 55-64.

Caldwell J 1979. Education as a factor in mortality decline: an examination of Nigerian data. *Population Studies*, 33(3): 395-413.

Central Statistical Agency (Ethiopia), ICF International 2011. *Ethiopian Demographic and Health Survey of 2011*. Addis Ababa and Calverton Maryland.

Central Statistical Agency (Ethiopia), ICF International 2016. *Ethiopian Demographic and Health Survey of 2016*. Addis Ababa and Calverton Maryland.

Cleland JG, Van Ginneken JK 1988. Maternal education and child survival in developing countries: the search for pathways of influence. *Social Science & Medicine*, 27(12): 1357-1368.

Dancer D, Rammohan A 2009. Maternal autonomy and child nutrition: Evidence from rural Nepal. *Indian Growth and Development Review*, 2(1): 18-38.

Darmstadt GL, Lee AC, Cousens S, Sibley L, Bhutta ZA, Donnay F, Osrin D, Bang A, Kumar V, Wall SN, Baqui A, Lawn JE 2009. Sixty million non-facility births: Who can deliver in community settings to reduce intra-partum related deaths? *Int J Gynaecol Obstet*, 107: S89-S112.

David M, Petra B, Ceri B, Miph BM 2014. Health-seeking behavior and challenges in utilizing health facilities in Wakiso district, Uganda. *Afr Health Sciences*, 14(4): 1046-1055. DOI: 10.4314/ahs.v14i4.36.

Dereje H, Akililu H, Biruk B 2020. Determinants of frequency and content of antenatal care in post-natal mothers in Arba Minch Zuria District, SNNPR, Ethiopia. *International Journal of Women's Health*, 12: 953-964.

- Emily SG, Juan L, David PB 2012. Understanding the association between maternal education and use of health services in Ghana: Exploring the roles of health knowledge. *J Biosoc Science*, 44(6): 733–747.
- Federal Democratic Republic of Ethiopia (FDRE) 2010. *Ministry of Health. Health Sector Development Program IV (2010/2011-2014/2015)*. Addis Ababa, Ethiopia.
- Federal Ministry of Health (FMOH) (Ethiopia) 2014. *Health and Health-related Indicators 2005 EC (2012/2013)*. Addis Ababa, Ethiopia.
- Gabrysch S, Campbell OM 2009. Still too far to walk: Literature review of the determinants of delivery service use. *Pregnancy Child Birth*, 9: 34.
- Gwatkin DR, Rutstein S, Johnson K, Suliman E, Wagstaff A, Amouzou A 2007. *Socioeconomic Differences in Health, Nutrition, and Population Within Developing Countries - An Overview*. Washington, DC: World Bank.
- Jejeebhoy SJ 1995. *Women's Education, Autonomy, and Reproductive Behavior: Experience from Developing Countries*. UK: Oxford University Press.
- Kanté A, HELLERINGER S, Honorati M 2013. Socioeconomic Inequalities in Child Mortality in Three Rural Tanzanian Districts. Population Association of America 2013 Annual Meeting. New Orleans. From <<http://paa2013.princeton.edu/abstracts/131665>> (Retrieved on 12 April 2021).
- Kinney MV, Kerber KJ, Black RE, Cohen B, Nkrumah F, Coovadia H, Nampala PH, Lawn J 2010. Sub-Saharan Africa's mothers, newborns, and children: where and why do they die? *PLoS Med*, 7(6): e1000294.
- Kiwanuka S, Ekirapa E, Peterson S, Okui O, Rahman MH, Peters D et al. 2008. Access to and utilization of health services for the poor in Uganda: A systematic review of available evidence. *Trans R Soc Trop Med Hyg*, 102(11): 1067–1074.
- Kruk ME, Paczkowski MM, Tegegn A, Tessema F, Hadley C, Asefa M et al. 2010. Women's preferences for obstetric care in rural Ethiopia: A population-based discrete choice experiment in a region with low rates of facility delivery. *J Epidemiol Community Health*, 64: 984–988.
- Limwattananon S, Tangcharoensathien V, Prakongsai P 2010. Equity in maternal and child health in Thailand. *WHO Bulletin*, 88: 420–427.
- Mehari A 2013. *Levels and Determinants of Use of Institutional Delivery Care Services Among Women of Child-bearing Age in Ethiopia: Analysis of EDHS 2000 and 2005 Data*. ICF International Calverton, Maryland, USA.
- Mulholland EK, Smith L, Carneiro I, Becher H, Lehmann D 2008. Equity and child survival strategies. *Bull World Health Organ*, 86: 399–407.
- Nabyonga OJ, Mugisha F, Okui AP, Musango L, Kirigia JM 2013. Health care-seeking patterns and determinants of out-of-pocket expenditure for malaria for the children under-five in Uganda. *Malar J*, 12: 175.
- Seman K, Ibrahim M, Viva CT, Johanne S, Jeanette HM 2019. Social Determinants of Antenatal Care Service Use in Ethiopia: Changes Over 15 Years. *Front Public Health*. From <<https://doi.org/10.3389/fpubh.2019.00161>> (Retrieved on 12 May 2021).
- Shariff A, Singh G 2002. Determinants of Maternal Health Care Utilization In India: Evidence from a Recent Household Survey. *Working Paper Series No. 85*. National Council of Applied Economic Research, India.
- StataCorp 2013. *Stata Statistical Software: Release 12*. College Station, TX: StataCorp LP.
- Tiruneh FN, Chuan, KY, Chuan, YC 2017. Women's autonomy and maternal healthcare service utilization in Ethiopia. *BMC Health Serv Res*, 17: 718. <https://doi.org/10.1186/s12913-017-2670-9>.
- United Nations (UN) 2017. *SDG 3: Ensure Healthy Lives and Promote Wellbeing For All At All Ages*. United Nations Sustainable Development Goals, USA.
- Van MC, Ogali I, Khasakhala A, Muchiri SN, Sparks C, Van OH et al. 2013. Decomposing Kenyan socioeconomic inequalities in skilled birth Attendance and measles immunization. *International Journal for Equity in Health*, 12: 3. DOI: 10.1186/1475-9276-12-3.
- Vanneste AM, Ronsmans C, Chakraborty J, Francisco AA 2000. Prenatal screening in rural Bangladesh: From prediction to care. *Health Policy and Planning*, 15(1): 1–10.
- Wang H, Tesfaye R, Gandham NVR, Chekagn CT 2016. *Ethiopian Health Extension Program: An Institutionalized Community Approach for Universal Health Coverage*. Washington, DC: World Bank.
- World Health Organization (WHO) 2019. Maternal Mortality. From <<https://www.who.int/news-room/fact-sheets/detail/maternal-mortality>> (Retrieved on 14 March 2021).
- Woldemicael G 2010. Do women with higher autonomy seek more maternal health care? evidence from Eritrea and Ethiopia? *Health Care for Women International*, 31(7): 599–620.
- Woldemicael G, Tenkorang EY 2010. Women's autonomy and maternal health seeking behavior in Ethiopia. *Maternal and Child Health Journal*, 14(6): 988–998.
- World Bank 2019. The World Bank in Ethiopia. From <<https://www.worldbank.org/en/country/ethiopia/overview#2>> (Retrieved on 14 March 2021).
- World Bank Group 2016. *Ethiopian Poverty Assessment 2014*. Washington, DC: World Bank.
- World Health Organization Regional Office for Africa 2010. *Health Inequities in the African Region of the World Health Organization: Magnitudes, Trends and Sources*. WHO, AFRO.
- Yalem T, Tesfay G, Isabel G, Kerstin E, Hailemariam L, Miguel S 2013. Determinants of antenatal and delivery care utilization in Tigray region, Ethiopia: A cross-sectional study. *International Journal for Equity in Health*, 12: 30.
- Yu B, Meng Q, Collins C et al. 2010. How does the New Cooperative Medical Scheme influence health service utilization? A study in two provinces in rural China. *BMC Health Serv Res*, 10(1): 116.
- Zere E, Moeti M, Kirigia J, Mwase T, Kataika E 2007. Equity in health and healthcare in Malawi: Analysis of trends. *BMC Publ Health*, 7: 78.

**Paper received for publication in April, 2021**  
**Paper accepted for publication in May, 2021**