

Factors Associated with Maternal Health Service Utilization in Cote d'Ivoire: Analysis of the 2011 Ivorian Demographic and Health Survey

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Abstract: Adequate and timely utilization of maternal health services, namely antenatal care and skilled birth attendants, represents a significant intervention for reducing maternal deaths. In Cote d'Ivoire, despite a very high maternal mortality ratio, these services are poorly used. Understanding the factors influencing such poor utilization is critical in designing effective strategies to address this problem. The objective of this study was to analyze factors associated with the use of ANC and Skilled Births Attendants in Cote d'Ivoire. Using data from the 2011 Ivorian Demographic and Health Survey, multivariate logistic regression analysis was conducted to explore determinants of ANC attendance and Skilled Births Attendants at delivery, among 15-49 years old women. Results showed that the coverage of at least 4 ANC and SBA at delivery were low, 43.4% and 59.1% respectively. Factors associated with the use of these services were women's and partner's education, household wealth index, media exposure, women's autonomy in health-related decision making and parity. Besides, utilization of at least 4 ANC was also positively associated with the presence of a skilled attendant at birth. These results imply that the determinants of maternal health service utilization are multi-sectoral and thus, need a multi-sectoral approach to tackle it. Policy makers, program managers, and researchers should also explore effective ways of increasing service utilization among less educated women, women from poor households, multipara, and those who are not achieving ANC.

Keywords: Antenatal Care, Skilled Delivery Attendant, Maternal Health Service, Determinants, Cote d'Ivoire

1. Introduction

Maternal mortality remains a significant public health issue worldwide. In 2015, 303 000 women died from pregnancy-related complications [1]. Developing regions account for approximately 99% of the global maternal deaths, with sub-Saharan Africa alone accounting for roughly 66%, that is about 201,000 maternal deaths [1].

Although several factors may explain such dismal maternal death figure, one of the prominent reasons remains

the inadequate access and use of maternal healthcare services, namely antenatal, intrapartum and postnatal health care services [2–6]. Scientific evidence has extensively studied and established the inverse relationship between use of Maternal Health Services (MHS) and the occurrence of maternal deaths [4–9]. For instance, the utilization of a skilled attendant at delivery could avert some estimated 13–33% of maternal deaths [10]. Women's contact with MHS represents a unique opportunity to provide them with valuable health care promotion and preventive maternal health care interventions, as well as life-saving intrapartum

and post-partum care [11–14].

Many previous studies revealed that demographic and socio-economic factors such as age, education, household wealth index and exposure to mass media were associated with the use of MHC [2, 15, 16]. Furthermore, parity, perceived quality of care, women level of autonomy, and place of residence are also considered as important factors in determining women's delivery care seeking behavior [2, 12, 17, 18].

The maternal mortality rate in Cote d'Ivoire is very high, 645 per 100,000 live births; positioning the country among the 19 countries with the highest MMR worldwide [1]. However, as in most sub-Saharan Africa, the utilization of MHS remains relatively low. According to 2012 Demographic and Health Survey (DHS), the percentage of women with at least one ANC visit by a health professional was 91%, but only 45% had 4 ANC visits as recommended by the WHO at the time of the survey [19]. The utilization of skilled delivery care is similarly low, and 41% of women delivered without the assistance of a skilled delivery attendant putting them at high risk of maternal death [19]. Understanding the factors that affect the utilization of these essential maternal health services can help design strategies and develop policies toward the improvement of service utilization in the country; and thereby, will aid in decreasing maternal mortality. Although some studies conducted in Ivory Coast have explored the topic, most of them were small size ones and conducted at a local level, leaving a need for results that can be applied on a large scale [20, 21]. With the aim of addressing this research gap, this analysis of a nationally representative survey was conducted to examine the factors associated with the utilization of antenatal care and skilled delivery services. More specifically, the analysis was conducted with the following objectives:

- i. To measure the coverage of ANC and SBA utilization in Cote d'Ivoire.
- ii. To identify factors associated with the utilization of these services in Cote d'Ivoire.

2. Methodology

2.1. Source of Data and Sample Size

Data for this analysis were extracted from the 2011-2012 Ivorian DHS, after a formal authorization from MEASURE-DHS. Cote d'Ivoire, a French-speaking country located in West Africa, is divided into 11 survey sites, all covered by this survey. The DHS is a community-based cross-sectional study conducted with individuals coming from a nationally representative sample of 10,413 households [19].

A stratified two-stage cluster sampling was used with the aim of obtaining an adequate representation of urban and rural setting as well as that of the eleven regions of the country [19].

The sampling frame consisted of strata or Enumeration Areas (EAs). An EA is a geographic area including a convenient number of dwelling units. On the first stage, 352

EAs were selected, 161 in urban areas and 191 in rural areas, using a probability to proportional size method. Then, on the second stage, based on the place of residence, a fixed number of households per EA was selected, which was 27 in urban areas and 32 in rural areas [19]. In each selected household, all women aged 15-49 were eligible for the survey [19]. Also, in a subsample of 1 out of 2 households, all men aged 15-59 were also eligible for the survey. In total 10,060 women and 5,677 men were successfully interviewed [19]. The survey collected information on diverse topics, including households socio-demographic characteristics, reproductive health, and maternal and child health. Data was also collected on the birth history in the five years preceding the survey. For the most recent birth, additional data were collected on maternal health care, going from pregnancy to delivery and postnatal care [19].

2.2. Study Population

- a) Source population: The source population was the total of births that have occurred in the five years preceding the survey.
- b) Study population: For each woman who had given at least one birth in the last five years preceding the survey, the DHS made a focus on the most recent birth, by collecting detailed information on pregnancy, delivery, and post-natal health care. In order to ease the analysis, a birth dataset including only the most recent birth was created by merging all the relevant information from all the data collected. In order to minimize recall bias, the analysis was restricted to these last-born children, meaning a total of 4,531 births [19].
- c) Statistical unit: The most recent birth was considered as the statistical unit.

2.3. Study Variables

Data available in the literature were used to inform the selection of the variables included in this analysis.

2.3.1. Outcome Measure

For this analysis, we selected two main outcomes to reflect the use of MHS, all coded as binary variables. The first outcome was the number of antenatal care visits during the last pregnancy, categorized as 4 or more ANC (4ANC+, coded 1) vs. less than 4 ANC visits (coded 0). The second outcome was the utilization of skilled delivery attendants, meaning any birth attended either by either a physician, a midwife or a nurse. This outcome was also coded 1 if women received skilled delivery attention and 0 otherwise.

2.3.2. Exposure Measures

The potential predictors of utilization of maternal health utilization identified in the dataset were grouped into demographic, socio-economic, accessibility, and reproductive characteristics related variables.

- a) Demographic characteristics of mothers: age, education, residence (Urban/Rural), Partner education, region;
- b) Socio-economic characteristics: household wealth

index, exposure to mass media (used as a proxy for measuring the access to health information), parity, number of births in the last 5 years.

- c) Accessibility related factors: women involvement in decision-making about the utilization of healthcare services, coded 1 if she was involved and 0 if not, women employment status.
- d) Reproductive characteristics: Number of children ever born (parity), number of births in the 5 years preceding the survey.

2.4. Data Analysis

Summary statistics including percentage and means (\pm standard deviation) were used to describe the socio-demographic and background characteristics of the study population (or participants). Bivariate and multivariate logistic regression analyses were then conducted to identify the association between the independent and outcome variables.

At the bivariate level, the chi-square test was first used to identify independent variables, which have an association with the outcomes measures under study. Factors which were significant at a p-value less than 0.25 were included in crude logistic regression models.

Those factors, which were statistically significant in the crude regression models, were added in the multivariable regression models, using a manual stepwise method.

Prior to multiple regression analysis, independent variables were tested for collinearity. Number of births in the past five years was not included in the final model as this variable was highly correlated with number of children ever born (parity). All analyses were conducted using STATA 15.0. Statistical significance was set at 95% level of significance.

2.5. Ethical Review

Considering that DHS data are publicly available, the ethical review had already been obtained from the Institutional Review Board of ICF International, the Center for Disease Control and the Ivorian National Research and Ethics Committee [10].

Detailed information on the study area, study population, organization of the survey, sample design, questionnaires, data collection, data quality, data processing, and ethical issue is published in the full Ivorian Demographic and Health Survey 2011 report [10]. Permission to download the dataset was granted to the authors by MEASURE DHS/ICF International.

3. Results

3.1. Descriptive Characteristics of Respondents

In total, 5431 women were considered for this analysis. Their background characteristics are summarized in table 1. The median age of the study subjects was 29 years, and the majority (68.9%) was found between the age of 20 to 34. More than 6 out of 10 women (64.6%) were from rural areas

and had no education (65.7%). Slightly more than half the respondent (56.3%) had no exposure to media.

Regarding wealth index, close to half of the women (48.2%) belonged to the poorer health while only 31% were from the richer one. The pattern distribution of partner's education was similar to that of the women, the highest proportion being those with no formal education (58.6 %). While the majority of women reported that they were working at the time of the survey, only 1 out of 3 (29.7%) had the opportunity to participate in the decision making regarding their use of healthcare service.

Concerning parity, slightly more than 1 out of 3 respondents (31.2%) were multiparas (5 children and more) whereas 21.2% were primiparas (first pregnancy). More than one-quarter of the index pregnancies were unwanted at the time of its occurrence. Although a high majority of the women reported at least 1 ANC visit, only 43.4% completed the four visits as recommended by WHO. About 1 out of 7 women (68.8%) attended their first ANC visit only by the second trimester, 13.4% were very late, between 7 and nine months of gestational age. About 2 out of 5 women (40.2%) did not use a skilled attendant, but most women (72%) received PNC in the 48 hours following the delivery.

Table 1. Socio-demographic characteristics of women who had at least one birth in the five years preceding the survey, Cote d'Ivoire 2011.

Socio-demographic characteristics	Frequency	Percentage
Age (years)		
15 – 19	446	8.2
20 – 24	1,296	23.8
25 – 29	1,396	25.7
30 – 34	1,056	19.4
35 – 39	727	13.4
40 – 49	516	9.5
Total	5,431	100.0
Place of residence		
Rural	3,511	64.6
Urban	1,920	35.4
Total	5,431	100.0
Region		
Centre	434	8.0
East Centre	457	8.4
North Centre	537	9.9
West Centre	494	9.1
North	519	9.6
North East	435	8.0
North West	718	13.2
West	502	9.2
South without Abidjan	380	7.0
South West	460	8.5
Abidjan	495	9.1
Total	5,431	100.0
Education level		
No education	3,570	65.7
Primary	1,271	23.4
Secondary+	590	10.9
Total	5,431	100.0
Wealth Index		
Poorest	1,352	24.9
Poor	1,268	23.3
Medium	1,091	20.1
Rich	1,002	18.4
Richest	718	13.2

Socio-demographic characteristics	Frequency	Percentage
Total	5,431	100.0
Partner's level of education		
No education	2,669	58.6
Primary	952	20.9
Secondary	937	20.6
Total (partnered women)	4558	100.0
Decision making for healthcare expenses		
Woman not involved	3,163	70.3
Woman involved	1,336	29.7
Total	4,499	100.0
Respondent currently working		
No	1,547	28.5
Yes	3,873	71.5
Exposure to media		
No	3,049	56.3
Yes	2,362	43.7
Total	5,411	100.0
Parity		
1	1,153	21.2
2-4	2,582	47.5
5+	1,696	31.2
Total	5431	100.0
Number of births in the last 5 years		
1	3,374	62.1
2+	2,057	37.9
Total	5431	100.0
Pregnancy wantedness		
No	1,443	26.6
Yes	3,975	73.4

Table 2. Utilization of MHS by delivery by women who had at least one birth in the five years preceding the survey, Cote d'Ivoire, 2011.

Utilization of MHS	Frequency	Percentage
Had at least one ANC		
Yes, by a skilled attendant	4,860	89.9
No ANC	547	10.1
Total	5,407	100.0
Number of ANC		
No ANC	490	9.1
Less than 4 ANC	2,562	47.5
4 ANC+	2,340	43.4
Total	5,392	100.0
Had at least 4 ANC (4 ANC+)		
No	3,052	56.6
Yes	2,340	43.4
Total	5,392	100.0
Timing of first ANC		
Less than 4 months	1,535	31.2
4 to 6 months	2,720	55.4
7 to 9 months	659	13.4
Total	4,914	100.0
Used skilled delivery attendant		
No	2,216	40.9
Yes	3,204	59.1
Total	5420	100.0
Timing_PNC		
PNC in 48h	3,912	92.4
PNC in 6 weeks	321	7.6
PNC after 6 weeks	18	0.4
Total	4251	100.0
PNC in 48h		
No	1,519	27.7
Yes	3,912	72.3
Total	5,431	100.0

3.2. Bivariate Analysis

The bivariate analysis found a significant association between the majority the independent variables and the two outcomes of interest, use of 4+ ANC and skilled attendance at delivery.

Urban women and those aged 35-39 were more likely to report the utilization of skilled care from pregnancy to delivery. In addition, the utilization of these services was more common among women who had some decision-making power in healthcare related decision and those who were employed. Women who reported exposure to media at least once per week were also more likely to benefit skilled care during pregnancy and delivery. Both indicators of use also increase steadily with education and household socio-economic status. Regarding partnered women, we found that the more educated is the partner, the higher is the proportion of women who used ANC and skilled delivery. In contrast, parity was negatively associated with the outcomes under study, primipara being more prone to use skilled pregnancy and delivery services than multipara.

Table 3. Percentage of women who had at least one birth in the five years preceding the survey who received skilled ANC and delivery service, by background characteristics.

Characteristics	Had 4 ANC %	Chi 2 P	Skilled attendant at delivery %	Chi 2 p
<i>Age (Years)</i>				
15-19	41.1	12.77	50.6	19.2
20-24	43.8	0.026	56.6	0.002
25-29	44.7		59.3	
30-34	43.5		59.6	
35-39	46.1		58.7	
40-49	36.9		49.9	
<i>Place of residence</i>				
Urban	63.01	460.32	83.4	566.2
Rural	32.70	<0.001	44.7	<0.001
<i>Region</i>				
Centre	31.71	374.79	45.4	447.2
East Centre	54.30	<0.001	45.4	<0.001
North Centre	40.41		57.6	
West Centre	32.59		57.9	
North	36.80		54.3	
North East	53.81		65.0	
North West	26.65		32.3	
West	47.65		51.3	
South without Abidjan	53.17		71.3	
South West	38.56		53.0	
Abidjan	72.75		93.0	
<i>Education level</i>				
No education	34.4	396.96	50.7	220.0
Primary	54.4	<0.001	67.4	<0.001
Secondary +	73.6		87.8	
<i>Wealth Index</i>				
Poorest	23.4	757.7	34.0	907.0
Poor	30.9	<0.001	40.2	<0.001
Medium	45.9		63.4	
Rich	57.8		84.7	
Richest	79.2		94.5	
<i>Partner's level of education</i>				
No education	32.2	352.1	49.9	200.8
Primary	44.5	<0.001	58.0	<0.001
Secondary	67.4		77.8	
Tertiary				
<i>Women involved in decision making for her healthcare related expenses</i>				
Involved	39.8	18.9	59.5	3.99

Characteristics	Had 4 ANC %	Chi 2 P	Skilled attendant at delivery %	Chi 2 p
Not involved	46.8	< 0.001	56.5	0.046
<i>Respondent currently working</i>				
No	44.5	0.9	59.14	2,37
Yes	43.0	0.340	61.7	0.124
<i>Exposure to media</i>				
No	31.5	401.5	45.4	353.7
Yes	58.8	<0.001	74.4	<0.001
<i>Parity</i>				
1	54.2	105.6	65.5	59.6
2-4	44.3	<0.001	60.2	<0.001
5+	34.8		49.8	
<i>Number of children in the past 5 years</i>				
1	34.3	110.3	62.2	60.4
2+	48.9	<0.001	50.3	<0.001
<i>Pregnancy wantedness</i>				
No	46.0	5.0	60.4	4.9
Yes	42.5	0.025	56.3	<0.027

3.3. Multivariate Analysis of Factors Affecting the Use of ANC and Skilled Delivery

Factors associated with achieving ANC4+ and using skilled birth attendant were examined by multiple logistic regression analysis. After controlling for potential confounding variables, utilization of MHS services was associated with household wealth index, exposure to media,

mother's and partner's education, parity, region of residence, and women's participation in decision making regarding use of healthcare services. As compared to poorest women, women in the other HH wealth index category were two to three times more likely to use maternal health services. The difference was higher for women from the wealthiest HH who were six times more likely to use skilled pregnancy services than their poorest counterparts (OR = 6.184, 95%CI: 4.446, 8.602). Mothers with some level of education were also more likely to use such services compared to mothers with no education.

Similarly, the more educated the partner, the higher the level of ANC4+ and skilled delivery services. Besides, women who reported media exposure at least once per week were more likely to report use ANC4+ and skilled services at delivery. However, decision making power was only associated with achieving ANC4+ (AOR = 1.18, 95%CI: 1.01, 1.34). Finally, after controlling for confounders, there was a persistent negative relationship only between ANC4+ and parity; women with 2-4 and women with 5+ children were less likely to achieve 4ANC+ (AOR= 0.75, 95%CI: 0.61, 0.92; AOR=0.71, 95%CI: 0.57, 0.88). Neither age nor place of residence were associated with the utilization of MHS in the final model.

Table 4. Multivariate logistic regression analysis results for ANC and skilled delivery attendance, Cote d'Ivoire, 2011.

Variables	Had 4 ANC		Skilled attendant at delivery	
	Adjusted OR	P value	Adjusted OR	P value
Place of residence				
Rural	ref	-	ref	-
Urban	1.21 [0.98-1.50]	0.075	1.11[0.874 -1.42]	0.380
Education level				
No education	Ref	-	ref	-
Primary	1.55 [1.31-1.84]	<0.001	1.20 [0.99 -1.46]	0.06
Secondary +	2.17 [1.61-2.94]	<0.001	1.74 [1.17-2.60]	0.006
Wealth Index				
Poorest	Ref	-	ref	-
Poor	1.32 [1.08- 1.62]	<0.007	1.08 [0.89- 1.31]	0.44
Medium	2.39 [1.94- 2.94]	<0.001	2.30 [1.86-2.85]	<0.001
Rich	3.14 [2.49- 3.97]	<0.001	6.20 [4.72- 8.15]	<0.001
Richest	6.18 [4.45- 8.60]	<0.001	10.98 [6.90- 17.49]	<0.001
Partner's level of education				
No education	Ref	-	ref	-
Primary	1.37 [1.15- 1.63]	< 0.001	1.02 [0.84-1.24]	0.826
Secondary	1.66 [1.35- 2.05]	<0.001	1.18 [0.92-1.51]	0.185
Tertiary	3.13 [1.88- 5.20]	<0.001	1.26 [0.65-2.45]	0.489
Exposure to media				
No	Ref	-	ref	-
Yes	1.53 [1.27-1.82]	<0.001	1.22 [1.03-1.45]	0.023
Women involvement in decision making regarding healthcare related expenses				
No	Ref	-	ref	-
Yes	1.18 [1.01-1.34]	0.041	1.01[0.86-1.19]	0.887
Parity				
1	Ref	-	-	-
2-4	0.75[0.61-0.92]	0.006	-	-
5+	0.71[1.45-2.72]	0.002	-	-
Use of ANC during the index pregnancy				
No	-	-	ref	-
Yes	-	-	2.31 [1.96- 2.72]	<0.001

4. Discussion

This study was conducted to assess the coverage of MHS utilization at the national level, and to identify its associated factors. Our results showed that the level of utilization of 4ANC+ and SBA in Cote d'Ivoire is low, at 43,4% and 59,1% respectively. Sociodemographics, economic and reproductive health characteristics were the main predictors of maternal healthcare services.

Education of women and their partner were strong predictors of maternal health care utilization for both ANC and SBA services. The results are in agreement with previous studies in other countries [2, 11, 22, 23]. This positive relationship may be explained by the fact that women's education enhances their knowledge and awareness of the importance of maternal healthcare services. They are more likely to have better access to health-related information and increased awareness of services available, resulting in a positive health care-seeking behavior. Education is an opportunity to empower women, providing them with higher confidence and capability to decide to use modern health care services for themselves and their children. They are also more likely to afford the cost of medical healthcare [2].

Expectedly, this study found economic status to be a significant predictor of use of maternal health services. For both indicators, use of maternal services increased steadily with household economic status. Studies elsewhere have also documented a positive relationship between economic status and early antenatal care utilization. [2, 15, 18–20]. In the Ivorian context specifically, this is expected because, while the study was conducted in 2011, the data collected were related to births that occurred in the five years preceding the survey, meaning births from 2005-2010. At that time, access to maternal services in Cote d'Ivoire was mainly depending on out of pocket payment. The deterring effect of such cost of services on the utilization of maternal healthcare has been extensively documented in the literature [23, 24]. Since then, the country has adopted a free healthcare policy for expectant women and children under five. However, even in such context, one should still expect some inequalities in the use of maternal health services among poorer and richer women. Indeed, Arthur et al. in a similar study conducted in Ghana found that, even though service is provided freely, it may still come with either direct or indirect costs, which are likely to hinder the utilization rates for poorer women. As the authors concluded, there is a need to go beyond the free availability of services and look for additional strategies aiming at improving maternal services accessibility for the poorer [24]. Adopting such strategies is undoubtedly likely to improve the use of MHS among Ivorian women.

Our study recorded that women who were exposed to mass media at least once a week were more likely to utilize skilled pregnancy and delivery services as compared to those who were not. Studies conducted in Ethiopia and Nigeria found similar results [2, 25]. Exposure to mass media is considered as a proxy for access to health information. In Cote d'Ivoire, health postcards are frequently diffused through television and

radio. Thus, women living in HH where such devices are available are more likely to be exposed to health-related info, with a subsequent increase in health awareness, as compared to women from no media exposed household.

Decision-making power of women has shown some inconsistent effects on their ability to seek healthcare services. Some studies found an association between women's autonomy and use of MHS [23, 26, 27] while others did not [26]. Such inconsistency is somewhat reflected in our study. Indeed, women' autonomy (as measured by their involvement in healthcare decision making) was positively associated with the utilization of ANC but showed no effect on the utilization of SBA.

Indeed, the lack of autonomy may prevent women from using MHS as needed. On the other hand, decision making involving delivery may appear as a more critical decision as compared to ANC and thus influence by factors other than autonomy. For instance, such a decision as compared to ANC may involve many other decision-makers beyond the women herself. Additionally, the emergency aspect of labor may make it difficult for the woman to have sufficient resources for being fully involved with regards to the choice of the delivery place.

This study has found a negative association between parity and ANC services utilization. The higher the parity, the lesser use of ANC services. However, parity shows no association with the use of SBA. Such a negative relationship is in agreement with the findings of a systematic review of 28 studies on determinants of ANC use as well as that of many other studies [11, 17, 22, 28]. Women with a previous pregnancy and birth experience may be reluctant to go again through ANC for a new pregnancy either because they feel more self-confident or because of prior negative experiences using MHS. Meanwhile, primipara may feel more afraid of pregnancy complications or may be more cautious about their pregnancies and sought trained professionals as compared to multipara.

The positive association between ANC attendance and use of SBA is well documented in the literature. This is due to the fact that ANC represents an opportunity for women's exposure to crucial information about the necessary follow-ups from pregnancy to delivery and the safety of skilled delivery attendance. Besides, it allows early detection of obstetric complications that are likely to influence women's decision to have a skilled attendance during childbirth. Interestingly, in this study, ANC was a significant positive determinant of SBA only for those women who attended four or more times as recommended by WHO. The study shows similar results with other studies [2, 11, 22, 25]. It should not be only about achieving some occasional contact with health professionals. Women should be encouraged to complete the required number of ANC, in order to fully reap the benefits of using the continuum of maternal care.

Place of residence has shown an inconsistent relationship with MHS utilization. Some studies found a positive relationship [22, 25, 29] while others did not [30–32]. Age has also shown an inconsistent relationship with MHS service utilization [2, 22, 30]. Our study did not record any association

between neither place of residence nor age and utilization of maternal health care service. The discrepancies suggest that variation exist by country, and highlight the need to understand critical determinants of service access in a given context in order to tailor effective intervention strategies.

The main strength of this study lies in the national representativeness of the data analyzed. Unlike most studies conducted in Cote d'Ivoire, the finding can be generalized, offering a unique opportunity to inform country-level programs and policies. However, there are some limits worthy of being noted. Even though the most recent births were considered, there could still be some recall bias since the women were asked for events within the last five years prior to the survey. Furthermore, as this is a secondary analysis of existing data, some known predictors of service utilization such as facility-related factors are missing from our analyses.

5. Conclusion

The principal associated factors with maternal healthcare utilization include women's and partners' education, household wealth index, exposure to media, the autonomy of decision making and parity. Such results imply that the determinants of maternal health service utilization are multi-sectoral and thus, need a multi-sectoral approach to tackle it. Policy makers, program managers, and researchers should also explore effective ways of increasing service utilization among less educated women, women from poor households, multipara, and those who are not achieving ANC.

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