

Does Knowledge on Pregnancy Complications can translate into Institutional Delivery in Ethiopia? Further Analysis of 2016 Ethiopia Demographic and Health Survey

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Abstract

Background: Women who do not know pregnancy complications are less likely to have better birth preparedness and complication readiness, and as a result, they usually delay in seeking appropriate obstetric care. Therefore, this research aimed to assess the association between having information on pregnancy complications and institutional delivery in Ethiopia.

Methods: We used the 2016 Ethiopia Demographic and Health Survey (EDHS) data set, which was a cross-sectional survey. About 3003 women delivered in the past 5 years preceding the survey and who knowledge about pregnancy complications at the time of the last ANC visit were our analytical study sample. The samples were selected using a two-stage stratified cluster sampling technique. Multivariable logistic regression analysis was performed to assess the association between having information on pregnancy complications and institutional delivery. An adjusted odds ratio with a 95 % confidence interval and p-value <0.05 were considered to declare a statistically significant association.

Result: Among the study samples (3003), only 1470 (47.2%) of women who had knowledge about pregnancy complications, and 1812 (60.34 %) of sampled women were delivered at the health institutions. The odds of institutional delivery were higher among women who had knowledge about pregnancy complications compared to those who did not have [AOR = 1.44, CI = 1.12–1.84].

Conclusion: women who had knowledge about pregnancy complications had higher odds of institutional delivery than those who did not have knowledge. Therefore, the health care provider should provide health education and deep counseling about pregnancy complications at the time of ANC visit to increase utilization of institutional delivery. Additionally, interventions need to target women who do not meet the recommended four ANC visits, the poorest women, those without education, women residing in a rural area, and women whose parity more than two.

Keywords: Knowledge; Pregnancy compilations; Ethiopia

Introduction

Despite a good improvement in reductions of maternal mortality worldwide, still it remains the top global health challenge [1]. Globally, 830 women die every day, and more than 303,000 women die each year as a result of pregnancy complications and 66% of the death occurred in sub-Saharan countries including Ethiopia [2]. According to the 2016 Ethiopia Demography and Health Survey(EDHS) report, the Maternal Mortality Ratio(MMR) was 412 per 100,000 live births which is one of the highest numbers in the world [3]. This might be due to unpredictable serious obstetric complications that require vigorous professional interventions to minimize maternal death [4, 5]. The most common obstetric complications includes; pregnancy-induced hypertension, maternal hemorrhage, maternal infections, prolonged or obstructed labour, and abortion [6-9]. These obstetrical complications can be prevented by providing prenatal education and Basic Emergency Obstetric and Neonatal Care (BEmONC) throughout pregnancy and childbirth if they have pregnancy follow up and give birth in the health institution [10, 11].

Various studies suggested that women having poor knowledge of obstetric danger signs and pregnancy complications are less likely to have better birth preparedness and complication readiness, and as a result, they usually delay in seeking appropriate obstetric care [12-16]. Likewise, other studies have proven that the knowledge of obstetric danger signs and preparedness for emergency complications

are effective ways of increasing maternal health service utilization particularly institutional skilled delivery [17-20].

Different studies also identified that institutional delivery associated with different factors including advanced maternal age, religion, parity, residence, maternal education, media exposure, wealth index, distance to a health facility, counseling during pregnancy, decision making on health care service, antenatal care visit [21-27]. Even though, the above factors play a major role in a pregnant woman's decision to have a birth in a health institution, the provision of information on pregnancy complications during antenatal care is a critical factor to increase knowledge of obstetrical complications which helps to seek appropriate care [28]. Besides, pregnant women in sub-Saharan Africa are not usually counseled on pregnancy complications during ANC visits [4] which results in low coverage of institutional delivery [29]. Even though some studies were done in Ethiopia using the 2016 EDHS about institutional deliveries, they did not consider

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information about pregnancy complications as an independent covariate [30-32]. Similarly, another study that was done in Ethiopia using 2016 EDHS considered the danger sign of pregnancy as a factor for institutional delivery, the study was highly prone to selection bias since the researcher had extracted about 11023 mothers who gave baby within the preceding 5 years [33] which could affect the validity of the result; in fact, the sample must be 7193 women who gave birth in the 5 years preceding the survey [30]. Besides this, the sample included in the previous study were women who had given birth in the last 5 years and those who had both ANC visits and, those who did not have ANC visits [33]. However, the current study focused only on women who delivered in the past 5 years preceding the survey and who attended at least one ANC visit. Therefore, we hypothesized that the probability of institutional delivery will increase while providing detailed counseling on pregnancy complications in each frequent ANC visits. Unfortunately, the previous national-based studies didn't address how information about pregnancy complications during ANC visits affects institutional delivery in Ethiopia. Therefore, this study aimed to fill the gap and to inspire healthcare providers to deal with a pregnant woman on pregnancy complications and to apply educational interventions at the time of ANC visit to increase institutional birth to prevent pregnancy and labour complications.

Materials and Methods

Data source

This study conducted in Ethiopia using secondary data from the 2016 Ethiopia Demographic and Health Survey (EDHS). The 2016 EDHS sample is stratified and was selected in two stages. Each region was stratified into urban and rural areas, which yielded 21 sampling strata. Samples of enumeration areas (EAs) were selected independently in each stratum in two stages.

In the first stage, 645 EAs were selected with probability proportional to the EA size and with independent selection in each sampling stratum with the sample allocation. The EA size is the number of residential households in the EA as determined in the 2007 population and housing census (PHC). A household listing operation was implemented in the selected EAs, and the resulting lists of households served as the sampling frame for the selection of households in the second stage. In the second stage of selection, a fixed number of 28 households per cluster were selected with an equal probability systematic selection from the newly created household listing. All women aged 15-49 who are usually members of the selected households or who spent the night before the survey in the selected households were eligible for the female survey. A full description of the study design and methodology of the survey was found elsewhere [3]. This study was found on data from the Woman's Questionnaire, which was administered to all women aged 15-49 in the selected households. The women's sample comprises 15683 women ages 15-49. Finally, weighting adjustment was done by considering the sampling procedure. Therefore, 3003 women who delivered in the past 5 years preceding the survey our analytical study sample.

Study Variables

In this study, the main outcome variable was the place of delivery. At the time of the survey, the women were asked "Where did you give birth?" which had eleven listed responses option. For binary logistic regression, the outcome variable was recoded and dichotomized into a binary outcome respondent's home was coded as zero (0), whereas all other health institutional delivery was coded as one (1).

The main exposure variable of this study was "knowledge about pregnancy complications" at the time of her last ANC visit which was coded as no (0), yes (1), and I don't know [8]. But women who had no ANC follow up at all and not sure whether they have been told or not were excluded from the study. Other independent variables were selected from a literature review on factors related to institutional delivery which includes; maternal age, religion, parity, residence, maternal education, media exposure, wealth index, distance to a health facility, counseling during pregnancy, decision making on health care service, antenatal care visit, awareness of complications were strongly associated with institutional delivery [21-27]. Maternal age was recoded as; 15-19, 20-24, 25-34, and 35-49. Likewise, religion is also recorded by merging orthodox, protestant and catholic as "Christian", Muslim as "Muslim" and others and traditional believes also merged as "other religion". According to EDHS 2016, the wealth index was coded as poorer, poorest, middle, richer and, richest. Likewise, the educational status of the women also was coded as 'no education, primary education, secondary education and, higher education'. Media access was defined based on response to how often respondents read a newspaper, listened to the radio, or watched television. Those who responded at least once a week to any of these sources were considered to have access to media and recoded as yes=1, and otherwise no=0. The number of ANC visits was recoded as 'one time, 2-3 times, and ≥ 4 times. Similarly, parity (number of childbirth) was also recoded as one, 2-4, and ≥ 5 children. Based on EDHS 2016, distance from health facility was also coded qualitatively as no problem, big problem and, not a big problem.

Data processing and analysis

The data analysis was done using all necessary statistical procedures. First, descriptive statistics and weighted percentages of socio-demographic variables were computed. Bivariate analysis using Rao scot chi-square was performed to select candidates for the multivariable model. All the covariates which had a p-value of < 0.25 were entered simultaneously into the multivariable regression model. Multivariable logistic regression was done using enter method of model selection to identify the association between the provision of information on pregnancy complications and the likelihood of institutional delivery. Adjusted odds ratios (AOR) and P-value ≤ 0.05 were used to declare a statistically significant association. The analysis was done using SPSS version 24. Sample weighting was applied for adjustments of cluster sampling design and sampling probabilities through strata and clusters Figure 1.

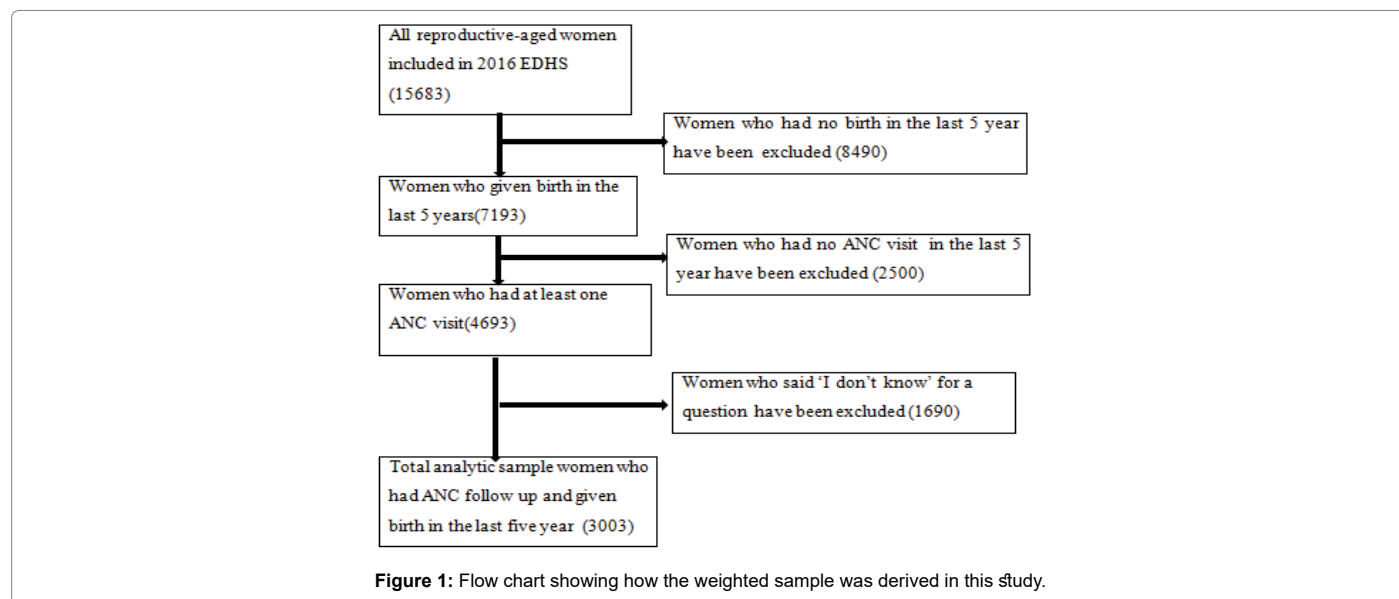
Ethics Approval and Consent to Participate

Ethical clearance for the study is not required since it is a secondary data analysis from EDHS 2016 database. The researchers have received the survey data from the USAID-DHS program and then the researchers of this study have maintained the confidentiality of the data. The consent was obtained from the study participants before study commencement.

Result

Socio-demographic characteristics

Of the total samples, 1812 (60.34%) of women had given birth in the health institution where skilled birth attendants are available. Similarly, about 1470(47.2%) of women were knowledgeable about pregnancy complications at the time of ANC visit, and 55.4% of them delivered at the health institutions. Likewise, institutional delivery was high among women aged 25-34 (60.9%), currently in union (91.2%), richest women (44%), women residing in urban areas(38.2%), Christianity follower(74.3%), those accessed media (56.6%), those who Para one women (46.4%), and women who had ≥ 4 ANC visit(63.4% Table1.



Variable	Categories	Wt. (%)	Place of delivery		Chi-square p-value
			Home	Institution	
Knowledge of pregnancy complications	No	1533(52.8)	742(61.5)	791(44.6)	<0.001
	Yes	1470(47.2)	449(38.5)	1021(55.4)	
Age	15-19	222(7.1)	83(6.7)	139(7.4)	<0.001
	20-24	681(21.9)	232(18.4)	449(25.3)	
	25-34	1839(61.6)	738(62.4)	1111(60.9)	
	35-49	261(9.4)	148(12.5)	113(6.5)	
Educational status	No education	1319(49.6)	780(66.5)	539(33.8)	<0.001
	Primary	1049(34.7)	357(30.4)	692(38.7)	
	Secondary	396(9.8)	42(2.3)	354(16.8)	
	Higher	239(5.9)	12(0.7)	227(10.7)	
Marital status	Never in union	42(1.3)	8(0.8)	34(1.7)	0.309
	Currently in union	2695(91.9)	1093(92.6)	1602(91.2)	
	Formerly in union	266(6.8)	90(6.5)	176(7.1)	
Resident	Urban	1039(21.8)	107(4.2)	932(38.2)	<0.001
	Rural	1964(78.2)	1084(95.8)	880(61.8)	
Religion	Christian	1968(70.5)	724(66.4)	1244(74.3)	0.001
	Muslim	1015(28.1)	454(31.1)	561(25.3)	
	Other	20(1.5)	13(2.5)	7(0.5)	
Wealth index	Poorest	513(13.5)	332(19.9)	181(7.5)	<0.001
	Poorer	445(17.6)	246(22.3)	199(13.2)	
	Middle	456(20.7)	249(25.7)	207(16.1)	
	Richer	445(21.5)	222(23.8)	223(19.3)	
	Richest	1144(26.7)	142(8.2)	1002(44.0)	
Media access	No	1498(55.8)	828(69.2)	670(43.4)	<0.001
	Yes	1505(44.2)	363(30.8)	1142(56.6)	
Distance	Big problem	1239(47.3)	671(57.0)	568(38.2)	<0.001
	Not a big problem	1764(52.7)	520(43.0)	1244(61.8)	
Parity	One	1151(36.0)	314(24.8)	837(46.4)	<0.001
	2-4	1147(37.8)	454(38.6)	693(37.1)	
	>=5	705(26.3)	423(36.6)	282(16.6)	
Number of ANC visit	One	178(6.2)	118(9.4)	60(3.2)	<0.001
	2-3	1046(41.1)	562(49.2)	484(33.4)	
	>=4	1779(52.8)	511(41.4)	1268(63.4)	

Wt. (%) = weighted percentage.

Table 1: Socio-demographic characteristics, knowledge of pregnancy complications related to a place of delivery (n=3003).

Variable	Categories	COR(95% CI)	AOR(95% CI)
Knowledge of pregnancy complications	No	1	1
	Yes	1.986(1.61-2.44)**	1.44(1.12-1.84)**
Age	15-19	1	1
	20-24	1.25(0.76-2.06)	0.91(0.53-1.55)
	25-34	0.88(0.56-1.39)	0.93(0.54-1.63)
	35-49	0.46(0.27-0.79)*	0.88(0.45-1.71)
Educational status	No education	1	1
	Primary	2.5(1.96-3.2)**	1.45(1.12-1.88)**
	Secondary	14.1(8.11-24.4)**	3.51(1.94-6.36)**
	Higher	29.4(12.5-69.3)**	4.28(2.05-8.9)**
Marital status	Never in union	1	1
	Currently in union	0.49(0.18-1.31)	0.8(0.24-2.64)
	Formerly in union	0.55(0.19-1.52)	0.93(0.27-3.26)
Resident	Urban	14.06(8.83-22.39)**	4.28(2.32-7.89)**
	Rural	1	1
Religion	Christian	5.84(2.86-11.89)	1.904(0.69-5.19)
	Muslim	4.23(2.01-8.90)	1.94(0.69-5.45)
	Other	1	1
Wealth index	Poorest	1	1
	Poorer	1.56(1.0-2.45)	1.46(0.91-2.34)
	Middle	1.66(1.09-2.52)*	1.51(0.99-2.31)
	Richer	2.15(1.41-3.27)**	1.55(1.01-2.38)*
	Richest	14.1(8.75-22.55)**	3.25(1.82-5.80)**
Media access	No	1	1
	Yes	2.92(2.27-3.76)**	0.95(0.71-1.27)
Distance	Big problem	0.46(0.35-0.60)**	0.86(0.65-1.13)
	Not a big problem	1	1
Parity	One	1	1
	2-4	0.51(0.39-0.66)**	0.51(0.35-0.74)**
	>=5	0.24(0.18-0.32)**	0.41(0.27-0.64)**
Number of ANC visit	One	1	1
	2-3	2.0(1.15-3.49)**	2.1(1.13-3.93)**
	>=4	4.5(2.57-7.95)**	3.38(1.75-6.52)**

*: shows p<0.05; ** p-value 0.01; 1: reference category

Table 2: Bivariate and multivariable analysis about knowledge of pregnancy complication and socio-demographic characteristics on institutional delivery (n=3003).

Factors associated with institutional delivery

All variables which had a p-value of < 0.25 were entered simultaneously into the multivariable regression model. After adjusted for possible confounder by logistic regression, knowledge of pregnancy complications was positively associated with institutional delivery.

In the multivariable logistic regression analysis, the odds of institutional delivery were 1.44 times higher among women who had knowledge about pregnancy complications compared to those who did not have it [AOR = 1.44, CI = 1.12–1.84].

Likewise, the odds of institutional delivery were higher among women whose level of education primary [AOR=1.45,CI=1.12-1.88],secondary[AOR=3.51,CI=1.94-6.36],and higher [AOR=4.28, CI=2.05-8.9] than uneducated women, respectively. Likewise, the odds of institutional delivery were 4.28 times higher among women residing in urban areas [AOR=4.28, CI=2.32-7.89] than their counterparts. Additionally, the odds of institutional delivery were 3.25 and 1.55 times higher among richest and richer women [AOR=1.55, CI=1.01-2.38] than the poorest women respectively. Similarly, the odds of institutional delivery 2.1 times higher among women who attended 2-3 ANC visits during their recent pregnancy were [AOR=2.1, CI=1.13-

3.93] than those who had one ANC visit. Likewise, the odds of institutional delivery were also 3.38 times higher among women who had ≥4 visits [AOR=3.38, CI=1.75-6.52] than those who had only one ANC visit. Surprisingly, the odds of institutional delivery were 49% lower among women having 2-3 children than women who had one child [AOR=0.51, CI=0.35-0.74]. Moreover, the odds of institutional delivery were also 59% lower among women having ≥4 children than women who had one child [AOR=0.41, CI=0.27-0.64] Table 2.

Discussion

The major aim of this study was to assess the association between having information on pregnancy complications and institutional delivery. Therefore, the findings of this study show that the odds of institutional delivery were higher among women who had knowledge about pregnancy complications during ANC than those who did not have knowledge about complications. This finding is consistent with a study done in Nepal [20], Bangladesh [34], Tanzania [35], Uganda [17], and Eritrea [36] in which the odds of institutional delivery were higher among women who had known complications of pregnancy. Likewise, this result also supported by another study done in Tanzania [21] that the odds of health institutional delivery were higher among women who had received counseling from health care providers

about dangerous signs of pregnancy. The consistency might be due to women who told information about pregnancy complications perceived themselves as high risk of being pregnant which encourages them to have a birth in health institutions [37]. In this logic, pregnant women who had knowledge about pregnancy complications might be frightened of adverse birth outcomes and they perceived that the likelihood of developing complications if they give birth at home.

This study also revealed that some obstetrical and socio-demographic factors which include; education level, wealth index, place of residence, parity, and the number of ANC visits were significant predictors of utilization of institutional delivery.

Regarding education, the odds of institutional delivery were higher among women whose level of education primary, secondary, and higher than women who had no education. This finding is also in line with various studies done in Ethiopia [27, 37, 38], Cambodia [39], Nepal [40], and Eritrea [36] in which increasing women's level of education, leads to also an escalation of institutional delivery.

This study also revealed that the odds of institutional delivery were higher among women residing in urban areas than rural residents. This result is supported by a study done in Bangladesh [34], Kenya [24] which urban residents more likely to give birth at health institutions. This can be explained by rural residents could have difficulty in accessing information about pregnancy complications and therefore they might be inclined to have institutional delivery.

Moreover, the odds of institutional delivery were higher among women with a parity of 2-4 and more than five children as compared to those who had one child. This finding is consistent with studies done in Ghana [41], Bangladesh [34] in which as parity increases, the likelihood of institutional delivery decreased. This could be explained by a multiparous woman who might have experience of previous home delivery which is not complicated that leads to giving a home birth for the next delivery [41]. Additionally, this could be also justified that nulliparous women perceived that the first birth could result in serious birth complications, and therefore, they favor deliver institutional delivery due to fear of unexpected first birth complications.

Regarding ANC, the odds of institutional delivery were higher among women who attended 2-3 and ≥ 4 visits during their recent pregnancy than those who had one ANC visit which supported with studies done in Mexico [28], Ghana [42] which have a higher inclination towards skilled birth attendance and institutional delivery. This could be explained that changing women's behavior towards institutional delivery through counseling could take frequent ANC visits.

Although findings in this study are useful for policy, there are some noteworthy limitations. For example, the information collected is self-reported, which is liable for reporting errors and biases. Additionally, since it is a cross-sectional study, we cannot assign causations to any of the associations between the identified factors and the outcomes of interest. Notwithstanding these limitations, our study is one of the few that have contributed in the context of the association between having information on pregnancy complications and institutional delivery utilization among women in Ethiopia using a recent version of a national demographic health survey.

Conclusion

The study has illustrated that institutional delivery has significant associations with knowledge about pregnancy complications. Women who had knowledge about pregnancy complications during ANC

had higher odds of institutional delivery than those who did not have knowledge about pregnancy complications. This study also revealed that some obstetrical and socio-demographic factors which include; education level, wealth index, place of residence, parity, and the number of ANC visits were significant predictors of utilization of institutional delivery.

Therefore, these findings guide a policymaker and health care professionals to reassess some features of maternal health services in Ethiopia. Particularly health care providers should provide health education and deep counseling about pregnancy complications at the time of ANC visit to enhance institutional delivery. To increase institutional delivery, interventions need to target women who do not meet the recommended four ANC visits, the poorest women, those without education, women residing in rural areas, and women whose parity more than two. Finally, an in-depth qualitative study should be conducted to deepen the understanding of these factors that could affect institutional delivery utilizations.

Abbreviations

AOR: Adjusted Odds Ratio; ANC: Antenatal Care; BEmONC: basic emergency obstetric and neonatal care; CI: Confidence Interval; EDHS: Ethiopian Demographic Health Survey; EAs: Enumeration Areas; PHC: Population and Housing Census; MMR: Maternal Mortality Ratio; SPSS: Statistical Package Software for Social Science; WHO: World Health Organizations.

Declarations

Data availability statement

We used the USAID-DHS program 2016 Ethiopian demographic and health survey data set. To request the same or different data for another purpose, a new research project request should be submitted to the DHS program here: <https://dhsprogram.com/data/AccessInstructions.cfm>.

The DHS Program will normally review all data requests within 24–48 hours (during working days) and provide notification if access has been granted, or additional project information is needed before access can be granted. After receiving permission, the researcher can log in and select the specific data in the format they prefer.

Conflict of interests

We confirm that this research is our original paper and that there is no conflict of interest in this work.

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Authors' contributions

All authors made a substantial input to the work reported, whether that is in the beginning, study design, execution, gaining of data, analysis, and interpretation, or in all these areas; took part in drafting, revising or version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work critically reviewing the article; gave final approval of the.

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