Utilization pattern of institutional delivery among mothers in North-western Ethiopia and the factors associated; A community - based study

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ABSTRACT

Background: Maternal mortality is a global health problem. Most maternal deaths occur due to complications that arise in intra-partum and postpartum periods, mainly due to post-partum haemorrhage immediately after delivery.

Objective: This study aimed to assess determinants of institutional delivery service utilization among mothers who gave birth within 1 year before this study, in North-western Ethiopia.

Methods: A community-based cross-sectional study was conducted among mothers who gave birth in the last 12 months prior to the study, from January 1-30/2016. A multistage sampling technique was used to select the study subjects. Logistic regression was used to identify factors associated with the outcome variable.

Results: The study revealed that 61.5% of mothers delivered in health facilities. Institutional delivery service utilization was significantly affected by; Residence (AOR = 3.66, 95% CI: 1.27, 10.56), Travelling time (AOR = 2.77, 95% CI: 1.34, 5.75), Parity which is being para one (AOR = 6.79, 95% CI: 2.97, 15.54) and being from para two to four (AOR = 2.42, 95% CI: 1.31, 4.47) and Antenatal care visit (AOR = 6.37, 95% CI: 3.12, 10.52).

Conclusion: Despite there is an improvement in institutional delivery service utilization, still it needs strong effort to sustain and meet the required level of skilled birth attendant which is 100%. Ambulance service accessibility and booking any pregnant mother for antenatal care services are recommended by the authors to have more than the above revealed institutional delivery service utilization.

1. Introduction

Maternal mortality is a global health problem.¹ The global maternal mortality ratio (MMR) in 2015 was 216 maternal deaths per 100,000 live births, a decline of 43% from 1990. Developing regions account for approximately 99% of the global maternal deaths in 2015, with sub-Saharan Africa alone accounting for roughly 66%.²

In the Country-level estimates; 10 countries comprised 58% of the global maternal deaths and Ethiopia (4%) is one of the big contributors for this figure next to India (17%), Nigeria, and the Democratic Republic of the Congo (7%).¹ In Ethiopia, maternal mortality and morbidity levels are among the highest in the world. The MMR in the year 2015 was 353 per 100,000 live births.²

Studies revealed that most maternal deaths occur due to

complications that arise in intra-partum and postpartum periods, mainly due to post-partum haemorrhage immediately after delivery.^{3,4}

Most deliveries in developing countries occur at home without skilled birth attendants, which may expose to complications among which are excessive bleeding, retained placenta, prolonged labour, and high fever.⁵⁻¹² Since most maternal deaths and obstetric complications cluster around the time of delivery⁴, and cannot be predicted a priori, skilled attendance during labour, delivery and the early postpartum period could reduce an estimated 13–33% of maternal deaths.¹³ The proportion of deaths due to Post-Partum Haemorrhage (PPH) that occurred in facilities is due to births take place at home, and women with PPH may not be arriving at a health facility in time.¹⁴

The safe motherhood initiative strongly emphasizes ensuring the availability and accessibility of skilled care during pregnancy and

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childbirth.¹⁵ However, in Ethiopia, the proportion of births attended by skilled personnel in a health institution is increased in a very slow fashion in 15 years.⁹

In Amhara regional state, institutional delivery service utilization is about 12% which is lower than the national level (16%).¹⁰ Over the years, several studies have been done to identify factors that are associated with Institutional delivery. Factors reported by many studies were maternal education, household wealth, maternal age, the autonomy of the mother, and physical access to a health institution. We documented variation among studies on the relative importance of reported factors. Therefore, assessing factors affecting institutional delivery service utilization in the study area is very important to improve health facility delivery use.

2. Methods

2.1. Design and setting

A community-based cross-sectional study was conducted among mothers who gave birth in the last 12 months prior to the study in Basoliben Woreda from January 1-30/2016.

Basoliben Woreda is located 320 and 292 km away from Addis Ababa, the capital city of Ethiopia, and from the capital city of Amhara region, Bahir Dar respectively. It is organized into 20 rural and 3 urban Kebeles. According to the Central Statistical Agency (CSA) 2007 census result, the Woreda had a total of 138,332 (68,034 males 70,298 females) population. Of these, 6439 live in urban and 131,893 in rural. Out of this female in reproductive age groups (15–49 years) was 38,480(37).

The woreda had one district Hospital, five health centres, twenty three health posts, seven private medium clinics, and two pharmacies. Concerning human resources for health; , the woreda has fifteen health officers, twenty midwives, forty nine nurses and forty three health extensions workers (HEW).³⁸

2.2. Sample size determination and sampling procedures

The required sample size of the study participants was determined by a single population proportion formula. We use the design effect of two (because there are two stages), then, the required sample size was 434, and adding 10% of the non-response rate, the final sample size was 478.

A multistage sampling technique was used to select the study subjects. Initially, the study area was divided into two strata, urban and rural kebeles. There were three urban and twenty rural kebeles during the study time. Then one urban kebele from the three and six rural kebeles from twenty were selected by simple random sampling technique. For the selected seven kebeles house-to-house visit was carried out to identify households with eligible mothers and one thousand sixteen households were found with eligible mothers. Households from each kebele were selected again proportionally by a simple random sampling by using computer-generated random numbers. The mother who gave birth before the study within the selected households was the study participant. If there were more than one mother within the same household lottery method was used to select the mother to be included.

2.3. Operational definitions

Institutional delivery service utilization: Mothers who gave the last birth in one of the health institutions (Hospital, Health centre, and Health post -).

Knowledgeable: Those mothers who scored mean and above from knowledge assessment questions.

Autonomous: Those mothers who decided the place of her last delivery by herself or with her husband.

Health Centre: a health facility at the primary level of the Ethiopian healthcare system, which provides promotive, preventive, curative and rehabilitative patient care including basic laboratory and pharmacy

services with the capacity of 10 beds for emergency and delivery services.

Health Post: The smallest community health facility at the primary level of the Ethiopian healthcare that provides mainly essential promotive and preventive maternal and neonatal health care services such as family planning, ante natal care and immunization.

2.4. Data collection tools and procedures

A face-to-face interview was conducted from January 1 - 30/2016, by using a pre-tested and structured questionnaire prepared in English and translated to the local language (Amharic) by language expertise. The questionnaire consists of items including socio-demographic characteristics, economic status, and institutional delivery care services utilization. By reviewing relevant literatures, questions that could address the objectives of the study were gathered and adapted.

The data was collected by seven female elementary school teachers who can read and fluently speak local languages after providing them with three days of training on the objective of the study, techniques of survey interviewing using the questionnaire, and on the overall data collection procedures by the principal investigator. Care was taken not to assign the teachers in the catchment kebele of the school where they work. Besides, two supervisors were trained on supervision techniques. Moreover, pre-testing was conducted and improvements had been made on the final version of the questionnaire. Strong supervision of the data collection process had been carried out by the principal investigator and all supervisors.

2.5. Data processing and analysis

The collected questionnaires were checked and entered into Epi-Info version 7 and then exported into SPSS version 20 for analysis. Bivariate logistic regression analysis was used to determine the association of each independent variable with the outcome variable. Variables significant in bivariate analysis (P-value < 0.05) were entered into a multivariate logistic regression model to adjust the effects of cofounders on the outcome variable. Odds ratio (OR) with a 95% confidence interval (CI) was used to see the association between independent variables and the dependent variable.

3. Results

3.1. Socio-demographic characteristics

A total of 478 mothers who gave birth in the last 12 months before the data collection time were invited to participate in this study; all of them participated.

The mean ($\pm$ SD) age of respondents was 29.11($\pm$ 6.19) years. The majority of 470(98.3%) of respondents were Orthodox Christian followers (Table 1).

3.2. Obstetrical characteristics

Three hundred seventeen (66.3%) of the mothers had got pregnant for the first time at the age of 20 and above. Regarding gravidity, 216 (45.2%) of the respondents were between gravida two to four (Table 2).

4. Institutional delivery service utilization

Among 478 respondents, the majority of 294(61.5%) gave their last birth in health institutions. Most of the home deliveries, 107(58.2%) were assisted by family members. Thirty-eight, (20.7%), 25 (13.6%), and 5 (2.7%) births were attended by trained traditional birth attendants (TBAs), untrained TBAs, and health extension workers respectively. 9 (4.9%) of births were unattended. Among mothers who gave birth in the health institutions, 222 (75.5%), 55 (18.7%), 12 (4.1%), and

Table 1

Socio-demographic characteristics of mothers who gave birth in the last 12 months prior to the study in Basoliben Woreda, North West Ethiopia, 2016 (n = 478).

Variables	Frequency	Percent
Place of residence		
Urban	88	18.4
Rural	390	81.6
Age of the mothers at interview		
15–19	3	0.6
20–24	110	23
25–29	155	32.4
30–34	103	21.5
35–39	60	12.6
40+	47	9.8
Marital status of the mother		
Married	451	94.4
Divorced	10	2.1
Separated	17	3.6
Educational status of the mother		
Unable to read & write	270	56.5
Read and write	109	22.8
Primary education(1–8)	70	14.6
Secondary education ^{9–12} and above	29	6.1
Educational Status of husband		
Unable to read & write	194	40.6
Able to read & write	106	22.2
Primary education(1–8)	131	27.4
Secondary education and above (9–12+)	47	9.8
Occupational status of the mother		
Housewife	389	81.4
Gov't employee	20	4.4
Private employee	4	0.6
Merchant	45	9.4
Daily laborer	18	3.8
House worker	2	0.4
Occupational status of the husband		
Farmer	307	64.2
Gov't employee	33	6.9
Private employee	17	3.6
Merchant	62	13
Daily laborer	50	10.5
Others ⁺	9	1.9
Family size		
≤5	278	58.2
>5	200	41.8
Travelling time needed to reach to a health facility		
<30 min	221	46.2
30–60 min	174	36.4
>60 min	83	17.4
Availability of Radio/Television		
Radio	224	46.9
Television	50	10.5
Radio and Television	25	5.2
Nothing	179	37.4

+ = Carpenter, Construction worker.

5 (1.7%) were giving their births in health centres, hospitals, health posts, and private clinics respectively.

4.1. Factors associated with institutional delivery service utilization

Mothers residence, educational status of the mothers, educational status of the husbands, family size, travelling time needed to reach to a health facility, number of ANC visit, age at first pregnancy, gravidity, parity, ANC visit during last pregnancy, planned pregnancy, and mothers autonomy were crudely associated with institutional delivery.

Mothers' residence, travelling time, parity, and ANC visit were positive predictor variables after the adjustment (Table 3).

5. Discussion

This community-based cross-sectional study attempted to measure the magnitude of institutional delivery and associated factors among

Table 2

Obstetric characteristics of mothers in Basoliben Woreda, North West Ethiopia, 2016(N = 478).

Variables	Frequency	Percent
Age at first pregnancy(years)		
<20	161	33.7
≥20	317	66.3
Gravidity		
1	108	22.6
2–4	216	45.2
5+	154	32.2
Parity		
1	126	26.4
2–4	223	46.7
5+	129	27.0
Ever had Abortion		
Yes	100	20.9
No	378	79.1
Ever had Stillbirth		
Yes	70	14.6
No	408	85.4
Ever visited health facilities during pregnancy		
Yes	414	86.6
No	64	13.4
ANC visit during last pregnancy		
Yes	304	63.6
No	174	36.4
Number of ANC visit (N = 304)		
One	72	15.1
Two	69	14.4
Three	76	15.9
Four+	87	18.2
Informed about delivery complications (N = 304)		
Yes	236	77.6
No	68	22.4
Informed about the place of delivery (N = 304)		
Yes	280	92.1
No	24	7.9
Last pregnancy planned		
Yes	315	65.9
No	163	34.1

mothers who gave birth in the last 12 months in both urban and rural areas of Basoliben Woreda. The results revealed that institutional delivery service utilization was 61.5% in the woreda.

Our finding is in line with the target of Health Sector Development Program IV (HSDP IV) by the year 2015 which was stated that the target for skilled delivery was 62%.³⁹ However, it is higher than the National (16%) and Amhara region (12%) Mini EDHS (2014) result. In Basoliben, we observed that the Woreda has made available ambulance services for labouring mothers in the rural area that brought labouring mothers from their home and back to home after the service and there were functional Health Development Army (HDA) to organize mothers at the time of labour. These might have resulted in a higher likelihood of having a health facility delivery among mothers living in Basoliben Woreda. On the other hand, it is lower than those studies done in Bahir Dar and Addis Ababa City administration in which delivery service utilization was 78.8%, 82.3%, respectively.^{10,21} The reason for this difference could be, in our study, high proportions of rural kebeles were included.

However, it is better than the findings of health facility delivery coverage in different parts of Ethiopia, Goba (47%), Dodota (18.5%), Sekela (12.1%), Munisa (12.03%), Cheha (31%), Raya Alamata (23.5%), Woldia (48.3%) and Banja(15.7%).^{5,7,8,11,12,18,20,40} The relatively better institutional delivery service might be due to the current better health care set up.

A residence was one of the positive predictor variables for institutional delivery service utilization. Mothers who were urban residents were more likely to give birth in the health institutions when compared with the rural residents (AOR = 3.66, 95% CI: 1.27, 10.56). This finding is consistent with studies conducted in different parts of Ethiopia.^{7,8,11,18,31} Similar findings are also observed in other countries

Table 3

Bivariate and multivariate analysis of factors associated with institutional delivery service utilization among mothers who gave birth in the past 12 months in Basoliben Woreda, Ethiopia, 2016 (N = 478).

Variables	Institutional delivery service utilization		Crude OR (95% CI)	Adjusted OR (95% CI)
	Yes	No		
Place of residence				
Urban	81	7	9.62(4.33, 21.35)	3.66(1.27, 10.56)⁺⁺⁺
Rural	213	177	1	1
Educational status of the mothers				
Cannot read and write	140	130	1	1
Read and write	68	41	1.54(0.98, 2.43)	0.96(0.49, 1.89)
Educated(primary education and above)	86	13	6.14(3.27, 11.54)	2.37(0.88, 6.34)
Educational status of the husbands				
Cannot read and write	68	126	1	1
Read and write	87	19	8.49(4.76, 15.11)	2.21(0.97, 5.1)
Primary level	107	24	8.26(4.85, 14.1)	1.68(0.74, 3.82)
Secondary education and above	32	15	3.95(2.00, 7.81)	0.74(0.28, 1.96)
Family size				
≤5	198	80	2.68(1.83, 3.92)	1.46(0.70, 3.10)
>5	96	104	1	1
Possessing media				
Radio or TV	212	79	3.44(2.33, 5.06)	1.99(0.58, 4.21)
No exposure	82	105	1	1
Travelling time needed to reach to health facility				
<30 min	164	57	6.31(3.63, 10.97)	2.77(1.34, 5.74)⁺⁺
30–60 min	104	70	3.26(1.87, 5.67)	1.69(0.78, 3.67)
>60 min	26	57	1	1
Age at first pregnancy (years)				
≥20	218	99	2.46(1.67, 3.64)	2.26(0.98, 4.12)
<20	76	85	1	1
Gravidity				
1	93	15	8.1(4.28, 15.14)	0.14(0.09, 2.12)
2–4	134	82	2.12(1.39, 3.23)	1.4(0.41, 4.79)
≥5	67	87	1	1
Parity				
1	109	17	9.49(5.11, 17.66)	6.79(2.97, 15.54)⁺
2–4	133	90	2.19(1.41, 3.4)	2.42(1.31, 4.47)⁺⁺
≥5	52	77	1	1
ANC visit during last pregnancy				
Yes	240	64	8.33(5.46, 12.72)	6.37(3.12, 10.52)⁺
No	54	120	1	1
Number of ANC visit				
None	54	120	1	1
Only one	58	14	9.21(4.73, 17.92)	0.3(0.05, 1.76)
Two	58	11	11.72(5.7, 24.)	1.12(0.22, 5.51)
Three	61	15	9.04(4.72, 17.3)	1.1(0.19, 5.46)
Four and above	63	24	5.83(3.3, 10.31)	0.59(0.17, 2.23)
Last pregnancy planned				
Yes	207	108	1.67(1.14, 2.46)	0.76(0.39, 1.46)
No	87	76	1	1

Table 3 (continued)

Variables	Institutional delivery service utilization		Crude OR (95% CI)	Adjusted OR (95% CI)
	Yes	No		
Mothers autonomy				
Autonomous	231	121	1.91(1.26, 2.88)	0.98(0.45, 1.73)
Not autonomous	63	63	1	1

✓The results that are written in **bold numbers** indicate the results of those variables that show statistically significant association with the outcome variable in multivariate analysis (back ward stepwise logistic regression).

✓+ = P < 0.001, ++ = P < 0.01, +++ = P < 0.05.

Notes.

Abbreviations: ANC: Antenatal care, **MMR:** Maternal mortality ratio, **EDHS:** Ethiopian demographic.

(24, 25). This might be due to the accessibility of health facilities is higher in urban.

Distance from the health institution was another positive predictor variable. Mothers who travelled less than 30 min were more likely to give birth at a health facility than women who should travel more than one hour (AOR = 2.77, 95% CI: 1.34, 5.75). This finding is consistent with other studies conducted in Nepal and Ethiopia.^{17,18,28} It might be due to high access as closer to the health facility.

Parity is also a positive predictor. Mothers who were para one and para two to four were more likely to give birth in the health institutions when compared with para five and above (AOR 6.79, 95% CI: 2.97, 15.54) for para one and (AOR = 2.42, 95% CI: 1.31, 4.47) for para two to four. It might be due to the fact that multiparas women have experienced pelvis for giving birth and their labour might be shortened and happened at home when compared with primiparas whose labour is usually prolonged and likely to go to health institutions. Many studies have shown consistent findings on the low likelihood of having a health facility delivery as several children ever born increases.^{30,43,44}

And the other positive predictor variable for the outcome variable was ANC visit. Mothers who had at least one registered ANC visit was more likely to give birth in the health institutions when compared with mothers who have no visit (AOR = 6.37, 95% CI: 3.12, 10.52). This finding is similar to the findings of other studies conducted across the country.^{7,8,11,31,35} This might be due to counselling to give birth in health facilities.

6. Conclusion

Despite there is an improvement in Institutional delivery service utilization, still, it needs a strong effort to sustain and meet the required level of skilled birth attendant which is 100%. Ambulance service accessibility and booking any pregnant mother for antenatal care services are recommended by the authors to have more than the above revealed institutional delivery service utilization.

Ethical approval and consent to participate

Ethical clearance was obtained from the Institutional Review Board (IRB) of the University of Gondar. The study was commenced after written consent obtained from Basoliben Woreda Health Office. Written consent was also obtained from the participants. They were also informed that all data obtained from them would be kept confidential by using codes instead of any personal identifiers. During the data collection process; the data collectors informed each study participant about the purpose and anticipated benefits of the research project and the study participants were also informed on their full right to refuse, withdraw, or completely reject part or all of their part in the study. There were no participants under age 18.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used during this study are available from the corresponding author and or first author on reasonable request.

Conflicts of interest

We, the authors declare that we have no competing interests.

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Authors' contributions

KTA brought the idea. Then all, KTA, KZG, TSN, GLA, and BWY equally contributed to the proposal development, data collection process, data management and analysis, and write up. All authors have read and approved the manuscript.

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