Utilization of institutional delivery service and associated factors among women who gave birth in the last 12 months in Gondar town, North West Ethiopia, 2019.

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SUBJECT AREAS Maternal & Fetal Medicine Obstetrics & Gynecology

KEYWORDS Institutional delivery, Community, Gondar, Ethiopia
Abstract

Abstract Objective: The aim of this study was to assess magnitude of institutional delivery utilization and associated factors among mothers who gave birth in the last 12 months in Gondar town, North West Ethiopia, 2019. Results: The proportion of institutional delivery utilization in this study was found to be 85.9%. Variables which were positively associated with the response variable were: Residence of the mother (AOR=3.2, 95% CI: 1, 6.4), Experience of previous bad obstetrics history (AOR=2.3, 95% CI: 1.2, 4.7), Ownership for source of information like TV/radio (AOR=3.3, 95% CI: 1.9, 5.9), Maternal educational status (AOR=17.3 95% CI: 4.2, 71.2) and average monthly income greater than 160.7 USA dollars (AOR=2.4, 95% CI: 1.1, 5.3). Authors for this study recommend to the maternal and child health care providers to be well linked to the health extension workers so that they may facilitate the pregnant mothers from the rural area to give birth in the health institution and so that institutional delivery utilization can be more than this figure. 

Key words: Institutional delivery, Community, Gondar, Ethiopia

Introduction

Institutional delivery is a delivery that has taken place in medical facility owned by skilled delivery assistance(1).

Worldwide, an estimated 287,000 maternal deaths occur every year among which, almost all, (99%) are from developing countries(2). Similarly, approximately 830 women died every single day due to complications during pregnancy or childbirth in 2015 (3).

Between 1990 and 2015, the global maternal mortality ratio (MMR) decreased by
44%, from 385 to 216 maternal deaths per 100,000 live births. Despite this progress, the world's program of the Millennium Development Goals (MDGs) which was with the target of a 75% reduction in the global MMR by 2015 has failed (4). Maternal mortality reduction remains a priority under Goal 3 of sustainable development goals of the new world program which talks about ensuring healthy lives and promote well-being for all at all ages in the new sustainable development goals (SDGs) agenda through 2030. In February 2015, the World Health Organization published Ending preventable maternal mortality (EPMM) Strategies, a direction-setting report outlining global targets and strategies for reducing maternal mortality under the SDGs(4). According to SDG Target 3.1, Reducing the global MMR from 216 per 100,000 live births in 2015 to less than 70 per 100,000 live births by 2030 with a supplementary national target that no country should have an MMR greater than 140 per 100,000 live births which requires a global annual rate of reduction of at least 7.5% (3).

Worldwide, the major causes of maternal mortality are hemorrhage (24%), infection (15%), unsafe abortion (13%), prolonged labor (12%) and eclampsia (12%) whereas primary causes of maternal mortality in Africa are hemorrhage (34%), other direct causes (17%), infection (10%), hypertensive disorders (9%) and obstructed labor (4%), abortion (4%) and anemia (4%)(5). In Ethiopia, top four causes of maternal mortality in the year 1980–1999 were abortion related complications (31%), obstructed labor/uterine rupture (29%), sepsis/infection (21%) and hemorrhage (12%). In the last decade, however, the top four causes of maternal mortality were obstructed labor/uterine rupture (36%), hemorrhage (22%), hypertensive disorders of pregnancy (19%) and sepsis/infection (13%)(6). Most maternal deaths are preventable because of the necessary medical interventions are well known. It is
therefore crucially important to increase women’s access to quality care before, during and after childbirth. In 2016, millions of births globally were not assisted by a trained midwife, doctor or nurse, with only 78% of births were in the presence of a skilled birth attendant(3).

Maternal mortality remains high in the developing world. Reduction of maternal mortality is a global priority particularly in developing countries including Ethiopia where maternal mortality ratio is one of the highest in the world (412/100,000). The key to reducing maternal mortality ratio and improving maternal health is increasing attendance by skilled health personnel throughout pregnancy and delivery. Skilled assistance during childbirth is a critical strategy to reducing maternal mortality (7, 8).

In despite of skilled delivery is one of the most tracked Millennium Development Goal indicators, the proportion of births attended by skilled health personnel in Ethiopia is very low(9). According to EDHS 2011 report nine women in every ten deliver at home in Ethiopia. As a result, Ethiopia is one of the six countries that contributes’ to more than 50 % of worldwide maternal deaths. While it is revealed that delivery attended by skilled provider at health facility reduced maternal deaths, around three quarter of all births in Ethiopia takes place at home (according to EDHS 2016,around 74%)(10).

Giving birth in a medical institution under the care and supervision of trained health-care providers promotes child survival and reduces the risk of maternal mortality(11).

Methods

Study design and setting
A community based cross sectional study was conducted from March to April, 2019 to assess the magnitude of institutional delivery service utilization and associated factors among women who gave birth in the last 12 months in Gondar town. Gondar town is located 725 kilometers, North West from the capital city of Ethiopia (Addis Ababa). According to the recent administration report, the town has 25 kebeles. There are five health centers and one teaching and referral Hospital serving the catchment population. According to 2007 central statistics agency (CSA), the town had an estimated population size of 206,987 (108, 902 were females) and the rest were males.

Sample size and sampling procedures

The required sample size was determined by single population proportion formula with the assumptions of 5% margin of error (d), 95% confidence interval (CI) and proportion(P) of 78.8% taken from a research done in Bahir Dar (12) and adding 10% non-response rate. Then, \( n = \frac{(za/2)^2.p(1-p)}{d^2} \), the sample size became 257 and with the 10% non-response rate, it was totaled as 283. Since we have used two stages of the sampling technique to get the study participants, we used a design effect of 2, multiplied by 283, total sample size became 566.

Multistage sampling technique was used to select the study participants. There were urban and rural kebeles. There was only one urban and 24 rural kebeles during the study time. The, the rural kebele and 3 urban kebeles from 24 were selected by lottery method. For the selected four kebeles, we conducted a house-to-house visit to identify households with eligible women and 1236 households were found with eligibility. Households from each kebele were selected again by systematic random
sampling using K interval of 2 from those houses coded during a house to house
visit and if we got a closed house or the mother was not available at the time of
collection, the data collectors frequently visited till end of data collection and if the
mothers still not found till then, the next house was taken.

Operational definition

*Home delivery:*-when a mother gave birth at her home or other’s home (traditional
birth attendance home, neighbor, relatives, families) or birth takes place outside
health institution or birth assisted by TBA (27).

*Institutional delivery service utilization:*-when a mother gave birth in health facility
assisted by skilled health provider(1).

Data collection procedures and tools

Data were collected using a semi-structured, pre-tested and interview based
questionnaire adapted from the literatures. It was prepared in English and
translated into local language Amharic and finally returned to English by English
language expertise.

Data quality control

Clarity of the tool was tested before the final utilization. The pretest was conducted
among 5% of the sample size in the other Kebele.A one day training was given for
data collectors and supervisors regarding the objectives of the study, data
collection method and significance of the study. During data collection, each data
collector was supervised for any difficulties and directions and necessary
corrections were provided.
Data processing and analysis

All collected data were rechecked for completeness, coded and entered using Epi
Info 7.2, and exported to SPSS version 23 for cleaning and analysis. Bivariable
logistic regression was employed to identify association, and multivariable logistic
regression model was used to control the effect of confounders.
Variables having P-value less than 0.05 in the Bivariable analysis were fitted into
the multivariable logistic regression model. 95% CI and odds ratio were computed
and variables having P-value less than 0.05 in the multivariable logistic regression
analysis were considered to declare statistical significance.

Results

Socio-demographic characteristics

In this study 562 mothers were interviewed which makes the response rate 99.3%.
The mean age of the respondent was 29. Majority 512 (91.1%) of respondents were
urban dwellers. 518 (92.2%) of respondents were married. Majority 519 (92.3%) of
mother were from Amhara ethnic group (Table 1).

Obstetrical and maternal characteristics

In this study, the mean age at first marriage and age at first pregnancy were 19.5
and 22 years respectively. More than one third, 200(35.6%) of the participants were
premiparous. Out of 562 respondents about 502(89.3%) had attended ANC. Four
hundred eighty two (85.9%) of mothers gave birth in health facilities (Table2).
Factors associated with the response variable

*Bivariate analysis showed that:* Residence, Maternal educational status, Monthly income, Availability of TV/radio, Age at 1st marriage, Experience of bad obstetrics history and gestational age at 1st ANC visit were crudely associated.

*Independently and positively associated variables in adjusted analysis were:*
Maternal residence, previous bad obstetrics history, maternal educational status, Ownership of information source like Radio/TV and monthly income *(Table 3).*

**Discussion**

This study has attempted to assess magnitude and factors associated with institutional delivery service utilization among mothers who gave birth in the past 12 months. The study shows that 85.9% of mothers gave birth in health facilities.

The major assistants for home delivery cases were families or relatives (39.2%) followed by traditional birth attendants (TBA) (36.7%).

The magnitude of institutional delivery in this study is higher than a study’s finding in Tanzania which is 56%(13). It is also higher when compared with different findings in Ethiopia like in Debre Berhan in which 80.2%(22), Bahir Dar and Debre markos whose magnitudes were 78.8% and 80.14% respectively(12, 23). The difference might be due to time gap. Similarly, this proportion is higher compared to Ethiopian demographic health survey (EDHS) 2016 report on utilization of institutional delivery service among urban mothers which was 74%(14). It is also higher than a study conducted in Arbaminch (23%)(20), Boset, Oromia regional state (60%)(18), Awi (15.7%) and sekela (12.1%) (7, 21). This difference might be due to
the fact that high proportions of urban mothers (91.1%) were included in our study.
But this study’s finding is lower when compared to a study conducted in Gana which
was (93.3%)(8). The difference might be due to difference in socio-demographic
characteristics.

One of the predictor variables for institutional delivery utilization was residence.
Mothers whose residence was urban were 3.2 times more likely to give birth in the
health facilities when compared with the rural counterparts (AOR = 3.2, 95% CI: 1.6,
6.4). This finding is supported by a study conducted in Arbaminch, Debre Berhan,
sekela Amhara regional state and Guragi. The possible explanation for this might
be: Mothers in the urban are likely to have high access for the health centers than
mothers from the rural side who might be absent due to transportation obstacles.

*Maternal educational status* was another positively associated variable. Mothers who
can read/write were 3 times more likely to deliver in health institution than those
mothers who can’t read/write (AOR = 2.8, 95% CI: 1.3, 6.3), Who attended primary
education were 4 times more likely to utilize institutional delivery service (AOR =
4.3, 95% CI: 2.1, 9.1), mothers who attended secondary and preparatory education
were 8 times more likely to give birth in health facility as compared to that of who
cannot read/write (AOR = 7.9, 95% CI: 3.4, 18) and utilization of institutional
delivery service is 17 times higher in mothers who attended diploma and above
educational level as compared to those who cannot read/write (AOR = 17.3 95% CI:
4.2, 71.2). The higher the educational level is, the more likely to use institutional
delivery service will be. This might be due to the fact that educated mothers may be
aware of the benefits of giving birth at health facility.

*Bad obstetrics history* was also a predictor variable for institutional delivery service
utilization. Mothers who had bad obstetrics history were 2 times more likely to give
birth in health institutions compared with the counterparts (AOR = 2.3, 95% CI: 1.23, 4.7). It is supported by the studies done in Guji zone and Dodota district of Oromia regional state. This might be due those who had bad obstetrics history might be more frightened to pregnancy related complications.

Ownership of mass media like TV and radio was another predictor variable. Mothers who had mass media 3 times more likely to deliver in health facilities than the counterparts (AOR = 3.3, 95% CI: 1.9, 5.9).

Monthly income also had its positive effect on institutional delivery. Mothers with average monthly income greater than 160.7 USA dollars were 2 times more likely to give birth in health facility than with average monthly income of less than 53.6 USA dollars (AOR = 2.4, 95% CI: 1.1, 5.3). It might be due to the fact that they could afford the payable transportation.

Limitations: It was good if the sampling technique were triangulated with the qualitative sampling designs.

Abbreviations

TBA: Traditional birth attendance, EDHS: Ethiopian demographic survey, ANC: Antenatal care, AOR: Adjusted odds ratio, COR: Crudes odds ratio

Declarations

Ethics approval and consent to participate

Letters of cooperation was written to administration of selected kebeles by ethical review committee of school of Midwifery, college of medicine and health science,
University of Gondar. Permission and written consent was obtained from each respondents. Data were collected after informing the participants about the objectives of the study, the benefits and also the fact that the right to decide not to participate. All information obtained from the participants at any course of the study was kept confidential. The mothers were also informed that they had full right not to participate in or withdraw from the study.

Consent for publication

Not applicable because there are no individually detailed data, videos or images.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

We authors declare that we have no competing interests.

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Authors’ contributions

GLA brought the idea. Then all, GLA, BZD, ESA, MAB and WKM equally contributed on proposal development, data collection process, data management and analysis, and write up. All authors have read and approved the manuscript.

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Tables

Table 1: Socio-demographic characteristics of mothers who gave birth in the last 12 months in Gondar town, North West Ethiopia, 2019 (n= 566)

| Variables          | Category                  | Frequency | Percent |
|--------------------|---------------------------|-----------|---------|
| Age of mother      | 15-19                     | 19        | 3.4     |
|                    | 20-24                     | 90        | 16      |
|                    | 25-29                     | 211       | 37.5    |
|                    | 30-34                     | 134       | 23.8    |
|                    | >=35                      | 108       | 19.2    |
| Religion           | Orthodox                  | 469       | 83.5    |
|                    | Protestant                | 35        | 6.2     |
|                    | Muslim                    | 57        | 16.1    |
|                    | Catholic                  | 1         | .2      |
| Residence          | Urban                     | 512       | 91.1    |
|                    | Rural                     | 50        | 8.9     |
| Ethnicity          | Amara                     | 519       | 92.3    |
|                    | Kimant                    | 30        | 53.4    |
|                    | Tigre                     | 13        | 2.3     |
| Marital status     | Single                    | 7         | 1.2     |
|                    | Married                   | 518       | 92.2    |
|                    | Widowed                   | 15        | 2.7     |
|                    | Divorced                  | 22        | 3.9     |
| Educational status | Can't read and write      | 93        | 16.5    |
|                    | Read and write            | 58        | 10.3    |
|                    | Primary education         | 100       | 17.8    |
|                    | Secondary education       | 145       | 25.8    |
|                    | Diploma and above         | 166       | 29.5    |
| Educational status of husband | Can`t read and write | 40 | 7.1 |
|------------------------------|---------------------|----|-----|
| Read and write              | 76                  |    | 13.5|
| Primary education           | 73                  |    | 13  |
| Secondary education         | 115                 |    | 20.5|
| Diploma and above           | 213                 |    | 37.9|
| Occupation of mother        | Housewife           | 243| 43.2|
| Governmental employ         | 172                 |    | 30.6|
| Farmer                      | 25                  |    | 4.4 |
| Merchant                    | 57                  |    | 10.1|
| Private employ              | 46                  |    | 8.2 |
| Others*                     | 19                  |    | 3.4 |

| Occupation of husband       | Governmental employ | 194| 34.5|
|------------------------------|---------------------|----|-----|
| Farmer                      | 40                  |    | 7.1 |
| Private employ              | 116                 |    | 20.6|
| Merchant                    | 131                 |    | 23.3|
| Daily laborer               | 20                  |    | 3.6 |
| Others*                     | 17                  |    | 3   |

| Family size                 | <=3                  | 197| 35.1|
|------------------------------|                      |    |     |
|                             | 4-6                  | 325| 57.8|
|                             | >=7                  | 40 | 7.8 |

| Monthly income              | <53.6 USA dollar     | 83 | 14.8|
|------------------------------|                      |    |     |
|                             | 53.6-107 USA dollar  | 147| 26.2|
|                             | 107.2 -160.7 USA dollar | 108 | 19.2|
|                             | >160.7 USA dollar    | 224| 39.9|

| Availability of TV/radio    | Yes                  | 470| 83.6|
|------------------------------|                      |    |     |
|                             | No                   | 92 | 16.4|

| Time takes to reach HF      | <30 min              | 240| 42.7|
|------------------------------|                      |    |     |
|                             | 30-60min             | 276| 49.1|
|                             | >60 min              | 46 | 8.2 |

*Others* = Students, no category

Table 2: Obstetrics characteristics of mothers who gave birth in the last 12 months in Gondar town, North West Ethiopia, 2019 (n = 566)
| Variables                        | category | Frequency | Percent |
|---------------------------------|----------|-----------|---------|
| **Age at 1st marriage**         | <=15     | 35        | 6.5     |
|                                 | 16-20    | 227       | 40.7    |
|                                 | 21-25    | 243       | 43.5    |
|                                 | >=26     | 52        | 9.3     |
| **Age at 1st pregnancy**        | <=15     | 6         | 1.1     |
|                                 | 16-20    | 173       | 30.8    |
|                                 | 21-25    | 294       | 52.3    |
|                                 | >=26     | 89        | 15.8    |
| **Gravidity**                   | 1        | 183       | 32.6    |
|                                 | 2-4      | 326       | 58.0    |
|                                 | >=5      | 53        | 9.4     |
| **Parity**                      | 1        | 200       | 35.6    |
|                                 | 2-4      | 320       | 56.9    |
| Experience of bad obstetrics history | Yes | 136 | 24.2 |
|-------------------------------------|-----|-----|------|
|                                     | No  | 426 | 75.8 |
| ANC visit                           | Yes | 502 | 89.3 |
|                                     | No  | 60  | 10.7 |
| No of ANC visit                     | 1 times | 22 | 4.3 |
|                                     | 2 times | 39 | 7.7 |
|                                     | 3 times | 110 | 22.0 |
|                                     | 4 times | 261 | 60.0 |
|                                     | >4 times | 70 | 14.0 |
| GA at 1st visit                     | 1st tm | 222 | 44.2 |
| Advice during ANC about place of delivery | Yes | 479 | 95.4 |
|------------------------------------------|-----|-----|------|
|                                          | No  | 23  | 4.6  |
| Place of delivery                        | Home | 79  | 14.1 |
|                                          | Health facility | 483 | 85.9 |
| Reasons for institutional delivery       | High quality service | 264 | 54.8 |
|                                          | Advice during ANC | 174 | 36.1 |
|                                          | Previous bad obstetrics history | 50 | 10.3 |
|                                          | Fear of complication | 225 | 46.7 |
|                                          | Previous better outcome | 40 | 8.3 |
|                                          | Others | 2 | 0.4 |
| Home delivery preference reason          | Culture recommended | 36 | 45.5 |
|                                          | Previous better outcome | 48 | 60.7 |
|                                          | Lack of transport | 16 | 20.2 |
|                                          | More trust on TBA | 4 | 5.1 |
|                                          | Poor quality service in health facility | 1 | 1.2 |
|                                          | Husband/family don’t allow | 2 | 2.5 |
|                                          | Need of privacy | 4 | 5.1 |
Other* = short period of time

| If home delivery, who assisted | Others* |
|-------------------------------|---------|
| TBA                           | 2       |
| No one                        | 29      |
| Family/relatives              | 19      |
|                               | 31      |

Table 3: Bivariate & Multivariate logistic regression results of factors associated with institutional delivery service utilization among women who gave birth in the last 12 months in Gondar town, North West Ethiopia, 2019 (n= 566).

| Variables                          | HI (%) ( %) | Home (%) | COR(95%CI) | AOR(95%CI) |
|------------------------------------|-------------|----------|------------|------------|
| Residence                          |             |          |            |            |
| Urban                              | 449(87.8)   | 63(12.3) | 3.3(1.7-6.4) | 3.2(1.6-6.4) |
| Semi city                          | 34(68.0)    | 16(32.0) | 1.00       | -          |
| Educational status of mother       |             |          |            |            |
| Unable to read and write           | 54(58.1)    | 39(41.9) | 1.00       | -          |
| Able to read/write                 | 46(79.3)    | 12(20.7) | 2.7(1.3-5.9) | 2.8(1.3-6.3) |
| Primary education                  | 86(86.0)    | 14(14.0) | 4.4(2.2-8.9) | 4.3(2.1-9.1) |
| Secondary & preparatory education  | 135(93.1)   | 10(6.9)  | 9.7(4.5-20.9) | 7.9(3.4-18.0) |
| Diploma and above                  | 162(97.6)   | 4(2.4)   | 29.2(9.9-85.6) | 17.3(4.2-71.2) |
| Income                             |             |          |            |            |
| <53.6 USA dollars                  | 56(67.5)    | 27(32.5) | 1.00       | -          |
| 53.6-107 USA dollars               | 121(82.3)   | 26(17.7) | 2.2(1.2-4.2) | 1.6(0.8-3.3) |
| 107.2-160.7 dollars                | 97(90.7)    | 10(9.3)  | 4.7(2.1-104) | 2.5(1.03-6.06) |
| >160.7 USA dollars                 | 208(92.9)   | 16(7.1)  | 6.3(3.2-12.4) | 2.4(1.1-5.3) |
| Means of communication            | Yes       | No       | 95% CI     | p-value     |
|----------------------------------|-----------|----------|------------|-------------|
| Yes                              | 422(89.8) | 48(10.2) | 4.5(2.6-7.5) | 3.3(1.9-5.9) |
| No                               | 61(66.3)  | 31(33.7) | 1.00       | -           |

| Time takes to reach health facility | Less than 30 min | 30-60 min | Greater than 60 min | 95% CI     | p-value     |
|-------------------------------------|------------------|----------|---------------------|------------|-------------|
| Yes                                 | 221(92.1%)       | 239(86.6%) | 23(50%)             | 11.6(5.5-24.5) | 0.2(0.00-1.2) |
| No                                  | 19(7.9%)         | 37(13.4%) | 23(50%)             | 6.5(3.3-12.6) | 0.2(0.00-1.03) |

| Age at 1st marriage                | >=15            | 16-20     | 21-25               | 95% CI     | p-value     |
|-------------------------------------|-----------------|-----------|---------------------|------------|-------------|
| Yes                                 | 26(72.2%)       | 179(78.9%) | 226(93%)            | 1.00       | -           |
| No                                  | 10(27.8%)       | 48(21.1%) | 17(7%)              | 1.4(0.6-3.2) | 0.1(0.001-10.4) |

| Previous bad obstetrics history    | Yes             | No        | 95% CI     | p-value     |
|------------------------------------|-----------------|-----------|------------|-------------|
| Yes                                | 124(91.2%)      | 12(8.8%)  | 1.9(1.1-3.7) | 2.3(1.2-4.7) |
| No                                 | 359(84.3)       | 67(15.7)  | 1.00       | -           |

| GA at 1st ANC visit                | 1st trimester   | 2nd trimester | 3rd trimester | 95% CI     | p-value     |
|------------------------------------|-----------------|---------------|--------------|------------|-------------|
| Yes                                | 212(95.5%)      | 232(95.1%)    | 26(72.2%)    | 8.1(3.1-21.4) | 3.13(0.2-54.8) |
| No                                 | 10(4.5%)        | 12(4.9%)      | 10(27.3%)    | 7.4(2.9-18.9) | 4.2(0.3-53.8) |

