

Institutional Delivery Services Utilization and Associated Factors Among Mothers Who Gave Birth in The Last Year in Mandura District, North West Ethiopia, 2019.

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Abstract

Background: The risk of death from complications relating to pregnancy and childbirth for women's lifetime is higher in developing countries. Improving maternal and child health through a well-organized institutional delivery service is central to achieve reduced maternal and child mortality. Despite the efforts that have been made to improve maternal health outcomes in Ethiopia, institutional delivery is still unacceptably low. This study was aimed to assess institutional delivery service utilization and associated factors in the study area.

Methods: Community-based cross-sectional study was conducted. A multi-stage sampling technique was used to employ a total of 546 women. Data were collected using an interviewer-administered questionnaire. Logistic regression models were used to determine factors associated with the outcome variable. Adjusted Odds ratios with 95% CI were computed to measure the strength of association and statistical significance was declared at p-value <0.05.

Results: The Prevalence of institutional delivery in the study area was 38% (34%-42%). Factors significantly associated with institutional delivery were ANC visit 1.80(1.12-2.91), knowledge on danger sign 3.60(2.25-5.76), urban residency 2.09(1.15-3.81), Parity 0.49(0.25-0.95) accessibility of health facility 4.60(2.01-10.89), husbands educational level: primary 2.50(1.27-4.91), secondary and above 2.36(1.24-4.48), mothers occupation: governmental employee 2.05(1.00-4.18), and Private employee 2.42 (1.09-5.35).

Conclusions: The prevalence of institutional delivery in the District was low. Antenatal visits, residency, knowledge on pregnancy danger signs, parity, accessibility of health facilities, maternal occupation, and husband education were significantly associated with institutional delivery. Strengthen the community-based awareness creation program regarding the danger signs of pregnancy and benefits of institutional delivery through the health developmental army, health extension workers, and local health care service providers; empowering women to get a job access, advocating education in the community, and improving antenatal care utilization would be among important measures to improve institutional delivery utilization.

Background

Institutional delivery is health care that women receive during pregnancy, at a time of delivery, and as soon as after delivery in health facilities by skilled delivery attendant which is very crucial for the well-being of both of the mother and the child (1). Globally, more than 20 million women worldwide become pregnant annually (2), more than 71 percent of births were assisted by skilled health personnel in 2014, an increase from 59% in 1990(3).

Five major direct obstetric complications contribute more than 70 percent of global maternal deaths (hemorrhage (25%), infection (15%), the complication of unsafe abortion (13%), hypertension (12%) and obstructed labor (8%)) (4). Over the past two decades, Latin America and the Caribbean region have

made significant progress in reducing maternal morbidity and mortality that as a result of encouraging skill delivery (5). But maternal and child mortality and morbidity occurring in Asia and Africa have been leading the world in pregnancy-related complications (6).

As of 2015, the maternal mortality rate remains highest in sub-Saharan Africa at 546 maternal deaths per 100,000 live births compared to the global maternal mortality ratio(MMR) of 216 maternal deaths per 100,000 live births(7). The urban/rural divide also affects maternal, newborn, and child health and access to health care (8). Mortality is consistently lower in urban areas than in rural areas with remote communities often having poorer access to health care (9).

Institutional delivery service which gives an access to the skilled attendant at birth during antenatal care and delivery is promoted as a key strategy for improving maternal and newborn care in low and middle-income countries (10). Despite the efforts that have been made in recent years to improve maternal health outcomes in Ethiopia, skilled birth attendants utilization is still unacceptably low (11). The percentage of live births delivered by a skilled provider remained virtually unchanged for a period of 5 years after 2000, but increased substantially after 2005; from 6% in the 2000 and 2005 Ethiopia Demographic Health Survey(EDHS) to 10% in 2011 EDHS, 26% in 2016 EDHS(13, 14) and reached 50% in 2019(15).

Ethiopia has been making significant progress on reducing maternal mortality and had achieved its millennium development goals(MDG) (to reduce maternal mortality) goal of 350 maternal deaths per 100 000 even though now stands at 353 in every 100,000 according to the 2013 United Nation(UN) and Ethiopian ministry of health estimate 2019 (13).

The MMR declined from the 2011 EDHS estimate of 676 deaths per 100,000 to 412 deaths per 100,000 of 2016 EDHS. This remarkable decline in maternal mortality is due to slight increments in facility delivery (12, 17, 18). In the 2009 fiscal year of Ethiopia report, (71%) of pregnant women were reported to have delivered at health facilities assisted by skilled health personnel. But the utilizations of skill delivery in regions had big discrepancies like Afar (30%), Somalia (31%), and Benshangul Gumuze(53%) were utilized as compared with Addis Ababa and Harare(100%)(19). The progress made so far in improving skilled delivery attendance has been impressive and the engagement of the Health Development Army (HDA) has been the engine for the achievement as compared to 26% of 2016 (19) which was 50% in 2019 mini EDHS(15).

In Ethiopia, the major causes of maternal deaths are preventable which accounts 69%; that include antepartum and postpartum hemorrhage (APH and PPH), prolonged/obstructed labor and ruptured uterus, severe pre-eclampsia and eclampsia, sepsis, and abortion complications (12).

Proper utilization health institutes and skilled birth attendant and promote hygienic conditions during delivery can reduce the risk of complications and infections that may lead to death or serious illness for the mother, baby, or both (14, 16, 17).

Some previous studies from different parts of the world identified factors that lead to low utilization of health facilities for delivery service. These are related to the place of residence and socioeconomic statuses such as women's age, ethnicity, education, religion, culture, the clinical need for care, and decision-making power (1, 4, 12).

Even though many published and unpublished studies have been conducted regarding the utilization of institutional delivery services at the global and regional levels, the study area is uncovered yet. Therefore, this study was intended to assess the proportion of institutional delivery and associated factors with it, in the context of the study area.

Methods

Study area

This study was conducted in the Madura district, which is found in the Metekle zone, Benishangul Gumuz regional state, North-west Ethiopia. The district is designated at 546 km from Addis Ababa and 338 km from the regional town, Assosa. The district is located is at 10 050" and 110 50" North latitude and 360 10'360 30" east longitude with an elevation of 1050-1400 above sea level which is low land. The annual temperature of Madura oscillates between 18 0c -38.7 0C with annual rainfall lies between 900 - 1200mm. The total population of district Madura projected from 2018 national census projected report was 56,760 for the year 2019. The pyramidal age structure of the population has remained predominately young with 47.4% under the age of 15 years of these children under five years of age accounts 16.18%. The average household size of the district was 4.5. Among the total inhabitants, 87% were Gumuze, Agew (8.9%), Amhara (3.9%), and all other ethnic groups constitute 0.2% of the population.

The main source of income for the inhabitants of the district is mixed agriculture. Out of the total population, about 85% of households are dependent on crop and animal productions. Most income generation activities by local inhabitants in the district are geared towards satisfying daily needs (to supplement food gaps) including wood extraction for charcoal and fuel. The administrative structures of Mandura were 3 urban and 17 rural kebeles. There are twenty-two Health Posts, two Health centers, and no Hospital in the district. Each health post has two Health Extension workers and one clinical nurse that provides service.

Study design and period

Community based descriptive cross-sectional study was conducted from October to November 2019.

Source population

All mothers who gave birth in the last year before the time of data collection who were living in Mandura District were the source population.

Study population

All mothers who gave birth in the last year before the time of data collection from selected kebeles were the study population.

Eligibility criteria

Inclusion Criteria

All mothers who gave birth the last year before data collections in Mandura district were included.

Study variables

Dependent variable

Institutional delivery service utilization

Independent variables

Pre-disposing factors: Maternal age, marital status, occupation, religion, maternal educations, partner educational status, parity, and age at 1st pregnancy.

Enabling factors: Place of residence, knowledge's on danger sign, attitudes of women, the distance of health care, possessing radio/TV, availability & accessibility of service, availability of transportations

Reinforcing and Need factors: Family preference, self-care preference, frequency of antenatal care (ANC) visit, and types of pregnancy.

Operational definition and definition of Terms

Institutional delivery service utilization: Refers to mothers who had delivered their last baby in hospitals, health centers, private clinics, NGO health facilities, or Health Posts by skilled personnel (33).

Skilled attendants: Refer to people with midwifery skills (midwives, doctors, and nurses with additional midwifery training) who have been trained to proficiency in the skills necessary to manage normal deliveries and diagnose, manage or refer obstetric complications'.

Accessibility of institutional delivery service: Availability of health facility providing delivery service within 2 hours distance by walk or <5 km (33).

Predisposing factors: Are factors that exist prior and make susceptible or inclining to acquire some behavior like the use of skilled birth attendants (30).

Enabling Factors: Are usually thought of as barriers to behavior changes created by societal factors; such as availability of services and their accessibility (both geographic and economic), limited facilities, and lack of income.

Reinforcing factors: Are the influences of people that encourage or discourage behavioral change (30).

ANC visitor: If a woman visited health care facility during pregnancy for getting pregnancy-related service

Close to health facility: If a woman traveled <5 km to reach the health care facility.

Far from health facility: If a woman traveled >5 km to reach health care facility.

Home delivery: When a mother gave birth at her home or others' home (neighbor, relatives, or family) or when a birth takes place outside of health institution.

Woman's autonomy: If a woman decided on the place to give birth by herself or with her husband jointly.

Women's knowledge: A woman would be considered knowledgeable for danger signs of pregnancy if she scores 50% and above for knowledge questions when one is given for correct answer and zero for incorrect answer (33).

Sample size determinations

For the first objective, the sample size was determined by using a single population proportion formula. By considering the assumptions of 95% level of confidence, 5% margin of error, and 18% the prevalence of institutional delivery service utilization which was conducted in the Pastoralist Community of Northeast Ethiopia (43). And also, by considering the design effect of two and 10% non-response rate, the final sample size was found to be 498 participants.

For the second objective, the sample size was calculated using factors significantly associated with institutional delivery service utilization from previously conducted studies. It was calculated using STATA software by considering the assumptions of the 95% level of confidence, 5% margin of error, 1:1 case to control ratio, and 80% power of the study. The factors like place of residence, availability of radio/TV, and Educational status of the mother taken from a study conducted in Checha district, Pawe Dawro Zones with the same topic. The maximum sample size was 248. Considering design effect 2 and the potential non-response rate of 10%; the final sample size was 546. We use this sample size for our study because it is larger than the previous one.

Sampling method and procedure

Multi-stage sampling was employed. First, stratified the study area by urban and rural was done. Second, Random sampling was held from seventeen rural and all three urban kebeles (lowest administrative unit in Ethiopia) to select a total of nine kebeles; three from urban and six from rural. Then Systematic random sampling was used with every K^{th} (two) cases from each kebele to get representative participants. Proportional sampling was done based on the number of mothers who gave birth in the last year living in the selected kebele using last year's pregnant mothers' registration book as sampling frame in the health post (figure 1).

Data collection instruments and procedures

Pre-tested questionnaires were used for data collection. The questionnaire was translated into the local language, and to check for its consistency, back-translated into English. Data were collected by trained team face to face interview. The questionnaire contains, questions adapted from instruments used in several studies on delivery service utilization and questions developed by student investigators. The main domains of the questionnaire were predisposing factors, enabling factors, reinforcing, and need factor on potential associated factors for institutional delivery service utilization.

Nine health extension workers were recruited as data collectors to conduct the face-to-face interview and two BSC nurses and the Principal Investigator supervised the data collection process. Two days of training was given to the data collectors and supervisors before the actual data collection regarding the aim of the study, data collection tool, and procedures going through the questionnaires question by question.

Data quality assurance

The collected data were checked for completeness and consistency daily by supervisors. Before the actual data collection took place, a pre-test was done on 5% of the participant out of the study area to ensure the validity of data collection tools. Based on the findings of the pre-test, data collection tools were modified. After checking for completeness, the collected data were checked and reorganized to exclude errors before data entry.

Data processing and analysis

Both descriptive and analytical analysis was carried out to describe, to see the crude and adjusted effect of each variable. The binary logistic regression model was fitted to assess the effect of each independent variable towards the acquisition of institutional delivery service utilization. To identify factors associated with delivery service utilization among women in the Mandura district. First, bi-variable logistic regressions were performed for each independent variable with institutional delivery service utilization among Mandura district and crude odds ratio with 95% confidence intervals were obtained. Then, variables observed with P value<0.2 in the bi-variable analysis were subsequently included in the multivariable logistic regression to determine independent predictors, and model fit was checked by the Hosmer–Lemeshow goodness-of-fit and Potential multi-collinearity among the independent variables was also checked of delivery service utilizations among in Mandura district. The findings of the study were presented using text, tables, and graphs.

Results

Socio-demographic characteristics of the respondents in the district, 2019

A total of 546 mothers who gave birth in the last 12 months were interviewed making a response rate of 100%. The mean age (Standard deviation [SD]) of the respondents was 27.8 (\pm 5.9). The majority of the respondents were in the age range of 20-34 years which accounts for 434(79%) of respondents. In their

ethnicity, 294(53.4%) were Gumuz followed by Amhara 128(23%). Out of the total respondents, 401(73.4%) were Orthodox followed by Muslim 49 (8.9%). The majority, 528(96.7%) of the mothers were married.

Regarding educational status, 319(58.4%) of respondents and 296 (54.2%) of their husbands were unable to read and write. Four hundred thirteen (413(75.6%)) of the respondents were housewives, while 348 (63.7%) of the husbands were farmers. When considering to income, two hundred sixty (47.6%) of respondents household had an average monthly expenditure of between 500-1500 Ethiopian Birr(ETB); whereas 123 (22.5%) respondents household had an average monthly expenditure of between 1501-2500 ETB and the highest monthly income accounts 110 (20%) which was estimated greater than 2501 ETB.

Regarding their means of communication, 230(42.1%) respondents had either radio or TV in their houses. Two hundred seventy (49.4%) respondents had to walk for less than 30 minutes on average while 140 (50.7%) participants had to walk for more than 30 minutes on average to reach the nearest health facility. The occupational status of participants, 413 (75.5%) of participants were housewife followed by 15.2% of participants were governmental employees. When considering the occupational status of their husbands in the district, 348 (63%) were farmers followed by 114(20.9%) were governmental employees (Table 1).

Obstetric characteristics of the respondents in Mandura District, 2019

Regarding age at first birth, 116(39.4%) of the study subjects were given their 1st birth before the age of eighteen. Three hundred three (55.5%) of respondents were reported that their last pregnancy was not planned. Regarding the prenatal service utilization, 472 (86.4%) of the respondents had attended ANC visits. Among those women who had ANC visits were 166(30%) of respondents had four visits, 168(30.8%) of them had three visits followed by 119 (20.8%).

Regarding the accessibility of health facility, 438(80.2%) respondents were accessible for health facility service, and the other which accounts for 19.8% were not accessible for health facility services. i.e. no health facility that could give delivery service within a 5 km radius. From Study subjects, 218 (39.9%) had ANC visits in the health center and hospital i.e. the other study subjects were having their ANC service at the health post level.

When considering the awareness level of health problems of pregnancy and delivery-related complications were, only 222 (40.7%) respondents had favorable knowledge of problems. The other 324(59.3%) of respondents were not having sufficient knowledge of pregnancy and delivery related health problems and danger signs. Also considering their availability of transportation, 356(65.2%) of respondents (245 (89.7%) of rural and 40.6 (40.6%) of urban) had no means of transportation to visit health facilities. Regarding levels of women autonomy (decision making for the place of delivery), 90.7% of respondents were decided their delivery place by themselves and 62.8% of respondents were known preference of husbands their place of delivery that was preferred to give their birth at health institutions.

However, 26.4% were not known about the preference of their husbands for the place of delivery (Table 2).

Institutional delivery service utilization in Mandura District

The prevalence of institutional delivery service utilization in the Mandura district was 38.8% with 95% CI (34%-42%). Women from the urban area are more likely to receive delivery care from health facility than women from a rural area (urban 61.5% CI (55% -67%) and rural 16.1% with CI (11%-20%)) of in Mandura district who gave their last birth in the health facility as shown below in the graph (Figure 2)

Mothers gave a variety of reasons for preferring to deliver at home. Of these, feel more comfortable (51.2%), delivering at home where their usual experience accounts (30.2%) and their health facilities were too far from the house 16% were among the commonest reason (figure 3).

The majority of the respondents gave reasons for institutional delivery, (73.7%) to get a better outcome from health facility to them and their baby, the respondents were informed to deliver at health institution during antenatal care and by family members (8%), presence of health institution close where they live (5%), were the commonest reason (figure 4).

Factors associated with institutional delivery service

Bi-variable analysis performed for each variable to identify candidate variables for multivariable analysis with the utilization of institutional delivery services. Thus, place of residence, educational status of the mother, husband education, occupational status of the mother, occupational status their husbands, accessibility of health facility, health facility distance, means of communication, availability of transportation, frequency of ANC visit, parity and knowledge of the mother on pregnancy-related complications were candidate variables for multi-variable analysis with a p-value of <0.2. The multi-variable analysis revealed that residence of women, women occupation, husband education, frequency of ANC visit, accessibility of health facility with delivery within 5 km, number of parity, availability of transportation, and knowledge on danger sign were found to be a significant association with using institutional delivery.

Women from urban areas were 2.09 times more likely to use institutional delivery service as compared to rural women (AOR=2.09, 95%CI:1.15-3.81). Governmental employed women were 2.05 times more likely to utilize institutional delivery as compared with housewife women (AOR=2.05, 95%CI: 1.00-4.18) and private/self-employed women were 2.42 times more likely to use institutional delivery service as compare to housewife (AOR=2.42, 95%CI: 1.09-5.35). Regarding the husband's educational status, women whose husbands with primary educational status were 2.50 times more likely to use institutional delivery service than mothers who had husbands unable to read and write (AOR=2.50, 95%CI:1.27-4.91). Similarly, women whose husband's educational status was secondary and above were 2.36 times more likely to use institution delivery service than mothers who had husbands unable to read and write (AOR=2.36, 95%CI:1.24-4.48).

Mothers who had at least 3 and above visits for ANC follow up during the last pregnancy were 1.80 times more likely to use facility delivery service than attending at least two and below (AOR=1.80, 95%CI:1.12-2.91). Women who had good knowledge of pregnancy and delivery related health problems were 3.60 times more likely to use institutional delivery service than women who had unfavorable knowledge (AOR=3.60,95%CI:2.25-5.76). The number of parity also had a significant association with institutional delivery. Women with two and more parity were 49% less likely to deliver within the health facility as compared to parity one (AOR=0.49, 95%CI: 0.25-0.95). Women who were accessible to a health facility with delivery service were 4.6 more likely to use institutional delivery service than women that had not to access delivery services within a 5 km radius (AOR=4.6, 95%CI: 2.01-10.89)(Table 3).

Discussion

Institutional delivery service is the most proven intervention in reducing maternal and child Mortality and disability. The proportion of women who gave birth in health institution in the district was 38.8% with CI (34%-42%). This result was consistent with that of a study done in Assayita district, North East Ethiopia which was 36.1%(24). However, it is higher than studies conducted in the Assosa zone, Benshangul Gumuze region which was (24.8%)(1) and Checha district, Gurage zone, SNNPR, Ethiopia which was 31% (44). This improvement might be that the function of multipurpose health extension workers and women development army plays a pivotal role in providing information on services related to maternal and child health. However, it was lower as compared to studies of (47), (22), (15), (34) and (32), which were 60%, 73.2%, 48%, 74.7%, and 54.2% respectively. The difference might be due to women in those study areas had better accessibility of health facilities with delivery service and accessibility of transportation since study areas reviewed in the above were non-emerging regions.

Place of residence was another significantly associated factor with the use of institutional delivery service utilization. Urban women were more likely to give birth at health institutions as compared to their rural counterparts. This finding was in line with previous studies (24, 30, 36, 50). This might be urban women tend to have more health care service, transportation and communication accessibilities than rural women. In addition, ANC utilization which has a direct relationship with institutional delivery utilization is usually better utilized in urban settings than rural (14).

Women who had favorable knowledge on pregnancy and delivery related problems were more likely to utilize institutional delivery service than their counterparts. This result was in line with Previous other similar studies conducted in developing countries (22, 31, 36, 47, 51) which revealed that delays in seeking health care during pregnancy are influenced by individual and community knowledge on maternal health care services. Besides, knowledge is an important factor that affects attitude, practice, and health care seeking behavior of individuals. Therefore, women who had sufficient knowledge about pregnancy danger signs would speculate the potential adverse pregnancy outcomes; as a result they would be motivated to deliver at the health facilities.

Accessibility of health facilities had a significant association with institutional delivery service utilization among study subjects in the district. Women who had access to health facilities were more likely to use institutional delivery service than inaccessible for health facilities. This finding was in agreement with studies (40, 44, 52). This might be due to increased distance from the health facility and an increased in transport cost and lost production time, as well as possible lower exposure to health information.

Women who attended antenatal care visits at least three and more times were more likely to use institutional delivery care than women who attended less than two and not intended in the study area. This Finding was supported by different studies (1, 20, 23, 24, 53).

This might be because antenatal services could provide opportunities for women to get information on the status of their pregnancy which in turn alerts them to decide where to deliver. It is also a fact that many ANC visits expose the women to more health education and counseling which are both likely to increase service utilization. Besides, the use of ANC might signify the availability of nearby health institutions provided delivery care service.

Parity was also another significant factor that was associated with the utilization of institutional delivery service. Women with lower parity were more likely to deliver in the health facility. This finding was in line with studies (23, 30, 31). This might be because women with lower parity tend to give careful attention to seeking delivery assistance due to their lack of experience in pregnancy and fear of complication. Conversely, women with more children believe themselves to be more experienced in childbirth, and for this reason; they are less likely to use facility delivery service.

An educational status of women's husband was an important factor associated with institutional delivery service utilization. Women who had husband with at least primary and above level of education were more likely to give birth in health institutions. This finding was consistent with studies (32, 40, 43). The possible justification for this could be educated husbands might have a better understanding of the complication of home delivery and the benefit of institutional delivery. Therefore, they might assist their partner in deciding on the place of delivery that could be understood the increasing level of education in the community had a contribution to increasing institutional delivery service utilization.

The women's occupational status was also significantly associated factor with institutional delivery service. Governmental and private employee women were more utilized institutional delivery service as compare to housewives. This finding was consistent with other studies which were conducted in Dangila district(45), Afambo district, Afar, Ethiopia(33), Pastoralist Community of in Afar, Northeast Ethiopia (43), and Amsterdam, Netherland (33, 52). This might be explained by women's employment could be attributed by a higher level of education with better knowledge and more Autonomous with control of their earning in seeking care.

Limitations Of The Study

Since the women were asked for their exposure within a year back, recall bias might be the potential source of error. And also, since the cross-sectional nature of the study design, it may not be strong to demonstrate direct cause and effect between dependent and independent variables.

Conclusions

This study revealed that the utilization of institutional delivery service in the study area was low with a high disparity of urban and rural residents as compared to the national level. Factors identified associated with institutional delivery service utilization were: the place of residence; husbands' educational status, number of ANC visits, occupational status of women, parity, and women's knowledge of danger signs during pregnancy, and accessibility of health facility with delivery service. Promoting the education of the women and their husbands, empowering women to have a job, proper utilization of ANC services, improving the infrastructure for accessibility of health care facilities, and ensuring women's knowledge towards danger signs during pregnancy and the benefits of institutional delivery are the preliminary actions to be considered by the health care providers, district health office and local movement administrators.

Abbreviations

ANC Antenatal Care

AOR Adjusted Odds Ratio

APH Ante Partum Hemorrhage

CI Confidence Interval

COR Crude Odds Ratio

CSA Central Statistical Agency

EDHS Ethiopian Demographic Health Survey

EFY Ethiopian Fiscal Years

HDA Health Development Army

MMR Maternal Mortality Ratio

PPH Post-Partum Hemorrhage

SBA's Skilled Birth Attendants

SSA Sub-Saharan African

TBA Traditional Birth Attendant

UN United Nation

WHO World Health Organizations

Declarations

Ethics approval and consent to participate

Primarily, ethical clearance was obtained from the College of Medical and health science Institutional Review Board (IRB) Committee, of Bahir Dar University. Then, written consent was obtained from all participants to be part of the study after a clear explanation about the purpose of the study. Confidentiality was ensured throughout the process by coding.

Consent for publication

Not applicable

Availability of data and material

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

Competing interests

The authors declare that they have no competing interests.

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No fund was received

Authors' contributions

KA, GT & MB conceived the study, approved the proposal with extensive revisions, participated in the data analysis, and had written the manuscript. All authors read and approved the final manuscript and agreed to be accountable for all aspects of the work.

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Tables

Table 1
Socio-demographic characteristics of the study participants by Residence, Mandura district,
Northwest Ethiopia, 2019(N = 546)

Variable	Categories		
		Frequency	Percent (%)
Age	< 19	40	7.33
	20–34	434	79.5
	> 34	72	13.2
Marital status	Married	528	96.7
	Divorced/widowed/	18	3.3
Religion	Orthodox	401	73.4
	Muslim	49	9.0
	Protestant	37	6.8
	Catholic	30	5.5
	Other***	29	5.3
Ethnicity	Amhara	128	23.4
	Oromo	31	5.7
	Agew	69	12.6
	Gumuze	294	53.8
	Shenasha	24	4.4
Maternal occupation	House wife	413	75.6
	Governmental employer	83	15.2
	Others	50	9.2
Educational status of mothers	Unable to read and write	319	58.4
	Primary (1–8)	100	18.3
	Secondary and above	127	23.3
Average monthly household income	< 500	53	9.7
	500–1500	260	47.6
	1501–2500	123	22.5
	> 2501	110	20.1

Husbands educational status '	Unable to read and write	296	54.2
	Primary education(1-8)	83	15.2
	Secondary and above	167	30.6
Husbands occupation	Farmer	348	63.7
	Governmental employee	114	20.9
	Other**	84	15.4
Means of communication	Radio	36	6.6
	TV	194	35.5
	None	316	57.9

Table 2
Obstetric characteristics of respondents Mandura district, Northwest Ethiopia, 2019(N = 546)

Variable	Category	Number	Frequency %
Walking time taken to the nearest health facility	<=30 mint	270	49.5
	> 30 mint	276	50.5
Age of the mother at 1st birth	<=18	215	39.4
	> 18	331	60.6
Number of parity	1	130	23.8
	2-4	298	54.6
	=>5	118	21.6
Number of live birth	1	135	24.7
	2-4	293	53.7
	>=5	118	21.6
Types of pregnancy	Planned	303	55.5
	Not planned	243	44.5
Have ANC visit	Yes	472	86.4
	No	74	13.6
Number of ANC visits	No visit	57	10.4
	1 visit	36	6.6
	2 visits	119	21.8
	3 Visits	168	30.8
	4 visits	166	30.4
Place of ANC follow up	Health post	277	50.7
	Health center/Hospital	218	39.9
	Home	7	1.3
Knowledge status	Favorable knowledgeable	222	40.7
	unfavorable knowledgeable	324	59.3

Health facility with delivery service in the kebele < 5 km	Yes	438	80.2
	No	108	19.4
Availability of transportation to visit the health facility	Yes	190	34.7
	No	356	65.2
Cost affordability to pay for transportation	Yes	199	36.4
	No	335	61.4
Decision-maker place of delivery	Myself	495	90.7
	Family members	49	9.0
Preference of husband for the place of delivery	Home delivery	56	10.3
	Institutional delivery	343	62.8
	Do not know	147	26.9
Preference of husband as an attendant	Skilled delivery attendant	306	56.0
	Relatives or family members	237	43.4

Table 3

Factors associated with institutional delivery service utilization among mothers who gave birth in the last year in Mandura District, Northwest, Ethiopia, 2019 (N = 546)

Variable Category		Place of delivery		COR(95%CI)	AOR(95%CI)
		health facilities	home		
		n (%)	n (%)		
Residence	Rural	44 (16.1)	229(83.8)	1	1
	Urban	168 (38.4)	105(61.5)	8.32(5.512.4)**	2.09(1.2–3.8)**
Occupation	Housewife	112 (27.1)	301(72.8)	1	1
	Governmental employee	63(75.9)	20 (24.1)	8.5(4.89-14.)*	2.05(1.004.18)*
	Private employee /merchant	37(74)	13(26)	7.6(3.9–14.9)*	2.4(1.1–5.4)*
Educational status of the mother	Unable to read and write	69(21.6)	250(78.3)	1	1
	Primary education(1–8)	51 (51)	49 (49.0)	3.8 (2.3–6.1)*	0.7 (0.3–1.7)
	Secondary and above	92 (72.4)	35 (27.5)	9.5(5.9–15.3)*	1.02(0.39–2.7)
Average monthly household income	< 500	16(30)	37(70)	1	1
	500–1500	69(26)	191(64)	0.8(0.4–1.5)	0.5(0.2–1.2)
	≥ 1501	127(54.6)	106(45.4)	1.6(0.8–3.2)	0.4(0.1–1.2)
Husbands educational status	Unable to read and write	57 (19.25)	239 (80.7)	1	1
	Primary (1–8)	37 (44.5)	46 (55.4)	3.4(2.0-5.7)*	2.5 (1.3–4.9)*
	Secondary and above	118 (70.6)	49 (29.3)	10.1(7-15.7)	2.4 (1.2–4.5)*
Husbands occupation	Farmer	75 (21.5)	273 (78.4)	1	1
	Gove employee	83(70.6)	31 (29.3)	9.7(5.9–15.8)*	2.5 (0.8-7.0)
	Others***	54 (64.2)	30 (35.7)	6.55(3.91–10.95)*	2.6(.95 – 6.4)
Means of communication	Radio/TV	135 (58.6)	95 (41.3)	1	1

None	77 (24.3)	239 (75.6)	.23 (0.16–0.3)	0.9(0.47–1.89)
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*P. Value < 0.05 **Value < 0.01 *** (Others)-merchant, private employer, daily labor

Continued from Table: 3

Variable Category		Place of delivery		COR(95%CI)	AOR(95% CI)
		health facilities	home		
		N(%)	N (%)		
time is taken to the nearest health facility	<=30	94 (37.1)	159 (62.8)	1	1
	> 30	118 (40.2)	175 (59.7)	0.2(.13-0.29)*	1.42 (0.82-2.45)
Age at 1st birth	<=18	69 (32.0)	146 (67.9)	1	1
	> 18	143 (43.2)	188 (56.7)	1.60(1.12-2.30)*	0.59 (0.33-1.06)
parity	1	75 (57.6)	55 (42.30)	1	1
	2-4	101(33.8)	197(66.1)	0.37(0.24-.574)*	0.49(0.25-0.95)*
	=>5	36(30.5)	82(69.4)	0.32(0.19-0.54)*	0.82 (0.34-1.96)
Knowledge status	Poor knowledge	50 (17.7)	231(82.2)	1	1
	good knowledge	162 (61.1)	103 (38.8)	7.26(4.9-10.7)**	3.60(2.25-5.76)**
Health facility accessibility	No	9 (8.3)	99 (91.6)	1	1
	Yes	203 (46.3)	235 (53.6)	9.5(4.6-19.2)	4.46 (1.9-10.2)*
Decision maker for the place of delivery	Her self	185(37)	310(63)	1	1
	Family members***	27(55)	22(45)	2.05(1.13-3.71)*	2.5(0.73-8.8)
Number of ANC visits	<=2 visit	64(30.1)	148 (69.8)	1	1
	>= 3vist	148(44.3)	186 (55.6)	1.84(1.27-2.64)*	1.80(1.12-2.9)**

*P. Value < 0.05 **P.Value < 0.01 *** Family members (husbands, mother-in-law relatives)

Figures

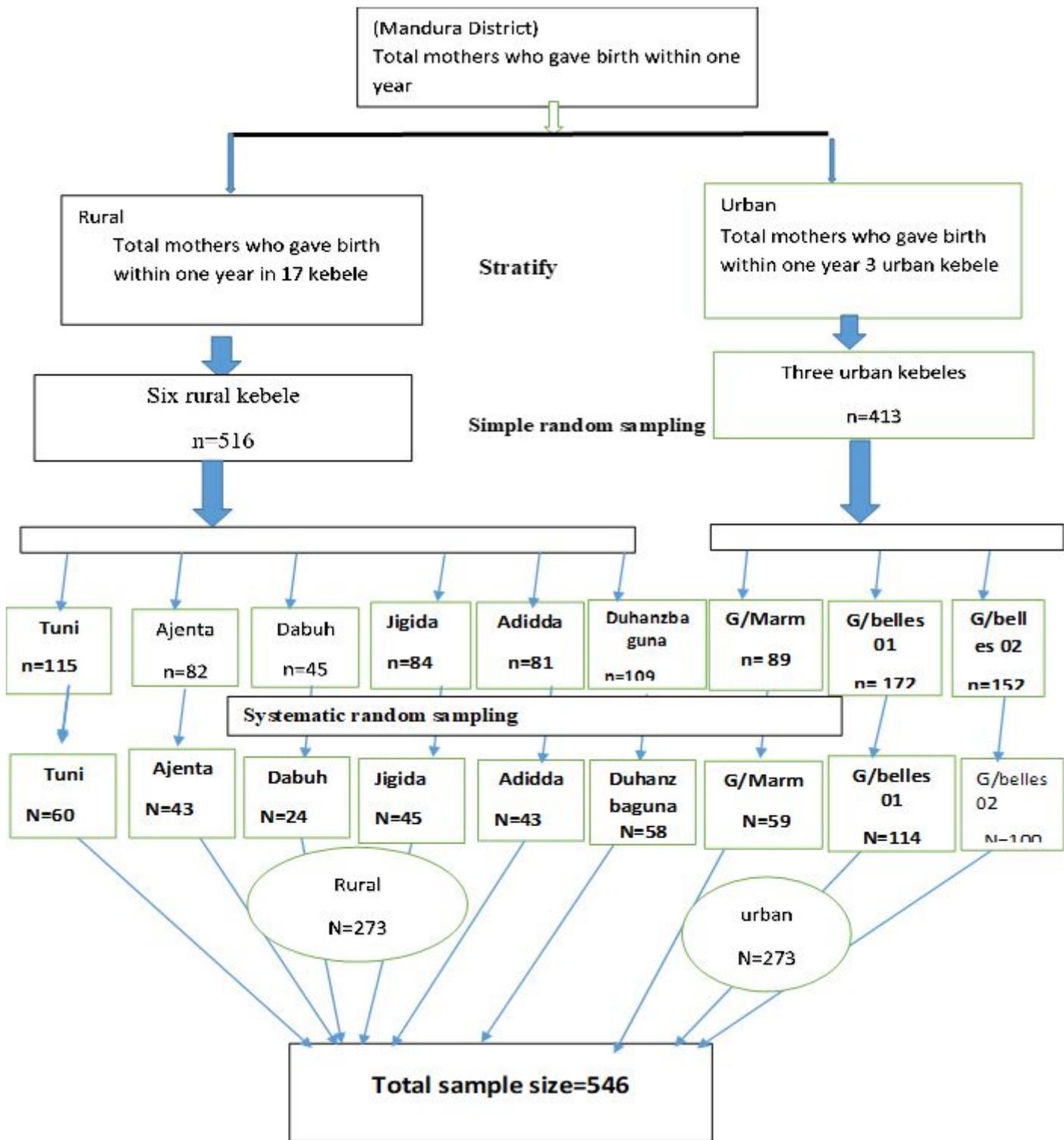


Figure 1

Schematic presentations of sampling procedures on delivery service utilizations and associated factors among mothers in Mandura District, 2019.

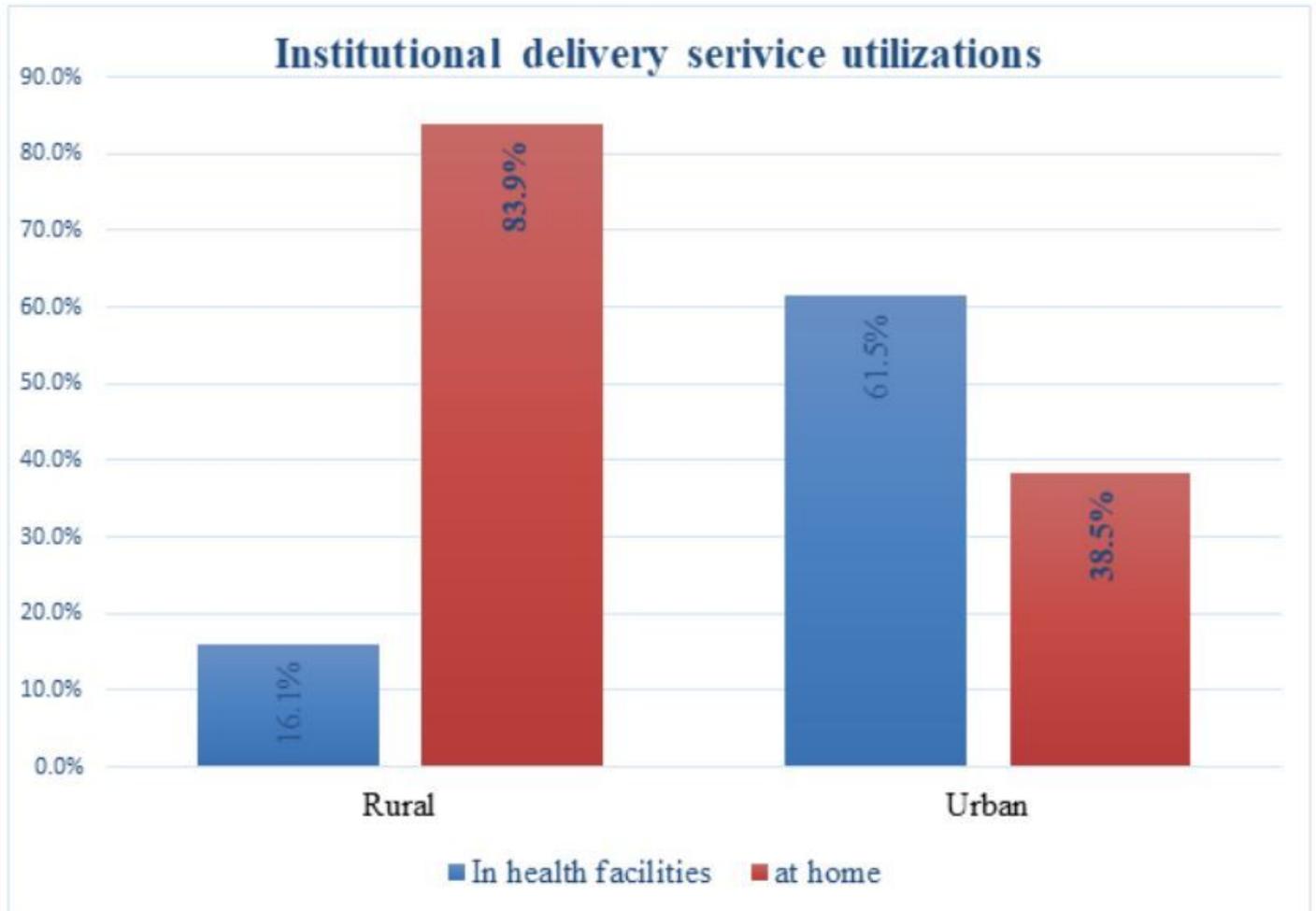


Figure 2

The proportion of women utilizing institutional delivery service among urban and rural in Mandura district, 2019

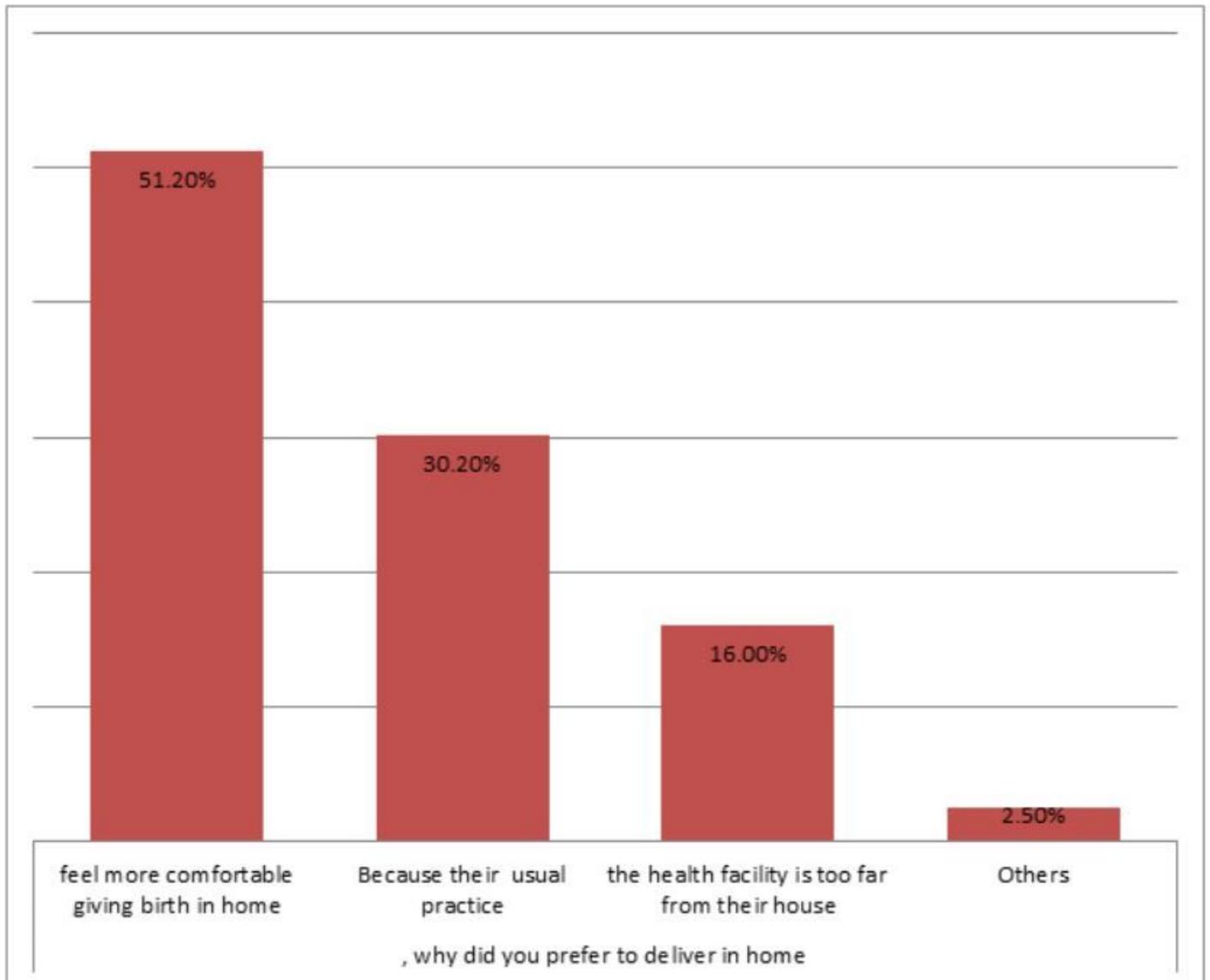


Figure 3

Reasons of women gave birth in home among study subjects in Mandura district, 2019

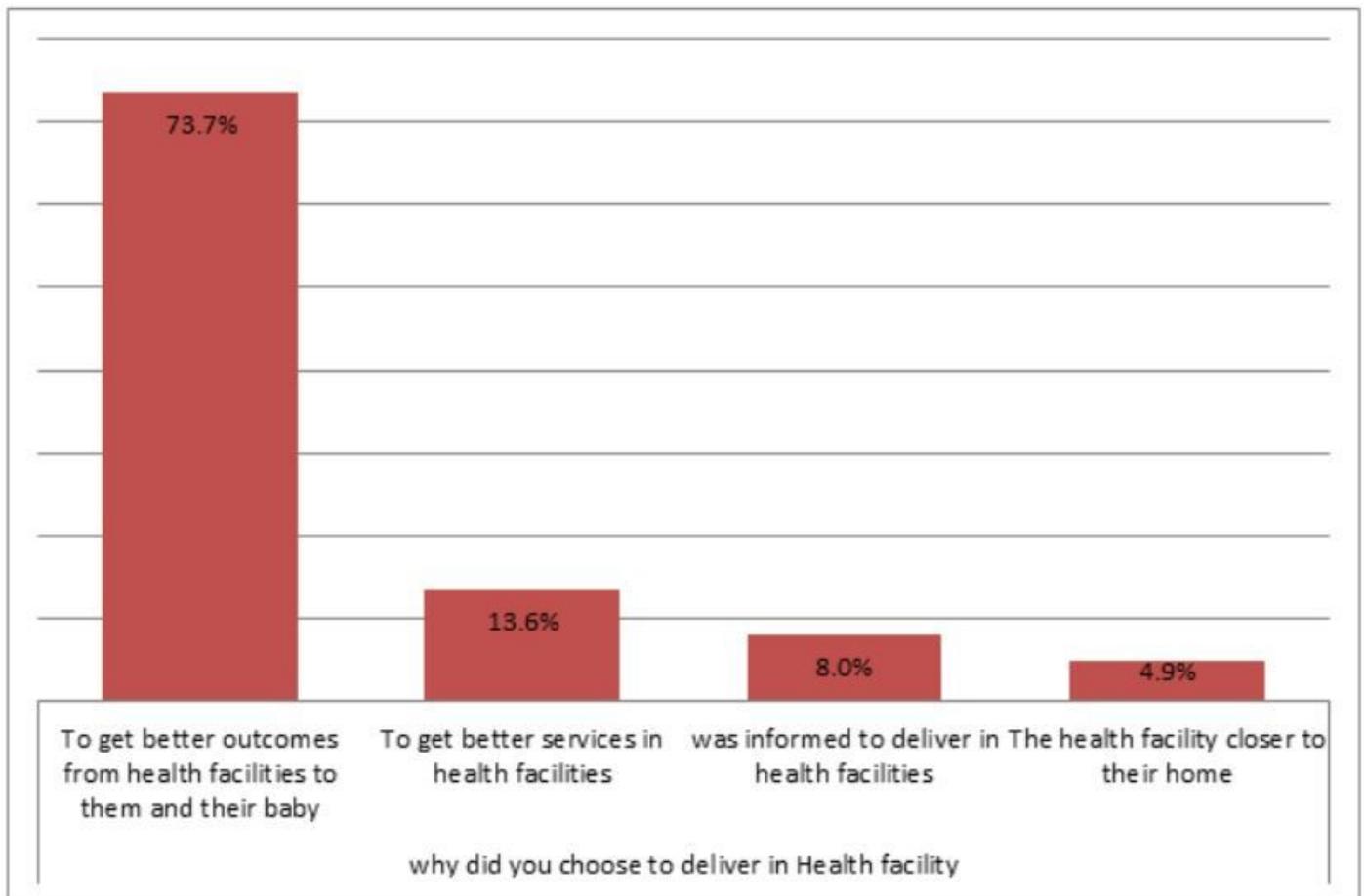


Figure 4

Reasons of women utilized institutional delivery service among study subjects in Mandura district, 2019

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Englishlanguageversionquestionnaire.pdf](#)