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BAHIR DAR UNIVERSTY COLLEGE OF MEDICINE AND HEALTH SCIENCES SCHOOL OF PUBLIC HEALTH DEPARTMENT OF EPIDEMIOLOGY AND BIOSTASTICS

DELIVERY SERVCES UTILIZATION AND ASSOCIATED FACTORS AMONG-MOTHERS WHO GAVE BIRTH THE LAST ONE YEAR IN MANDURA DISTRICT-METEKEL ZONE NORTH WEST ETHIOPIA.

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List of abbreviations and acronyms

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
ETB	Ethiopian birr
HDA	Health development Amy
KM	Kilometers
MMR	Maternal mortality ratio
PPH	Post-partum hemorrhage
SBAs	Skilled birth attendants
SSA	Sub- Saharan African
TBA	Traditional birth attendant
TV	Television
UN	United nation
WHO	World health organizations

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Abstract

Background: The risk of death from complications relating to pregnancy and childbirth over the course of women's lifetime is higher in the developing countries. Increasing the health service of mothers and children through well-organized institutional delivery service is central to achieve reduced maternal and child mortality. Ethiopian government design deferent strategies to increase institutional delivery. However, it is not well understood about service utilization in the study area.

Objective: To assess delivery service utilization and associated factors among mothers who gave birth in the last one year in Mandura district, Benshangul gumuze region, North West, Ethiopia, 2019.

Methods: Community based cross-sectional study was conducted. By multi-stage sampling, sample was taken from three urban and six rural kebeles, total of 546 women who gave birth within the last one year preceding the study-using interviewer administered questionnaire. Bi-variable and multi-variable logistic regression models were used to determine factors associated. Odds ratios with 95% confidence interval was computed to measure the strength of association and statistical significance was declared at p-value <0.05

Results: Prevalence of institutional delivery was 38% CI (34%-42%). Factors significantly associated with institutional delivery were ANC visit (AOR= 1.80, 95%CI:1.12-2.91**),** knowledge on danger sign (AOR=3.60, 95%CI: 2.25-5.76), urban residency (AOR=2.09, 95%CI: 1.15-3.81), accessibility of health facility (AOR =4.6, 95% CI:2.01-10.89), husbands educational level, (primary (AOR=2.50, 95%CI: (1.27-4.91), secondary and above (AOR=2.36, 95%CI:1.24-4.48),maternal occupation (Governmental employee (AOR=2.05, 95%CI:1.00-4.18) and Private employer, (AOR=2.42, 95%CI:1.09-5.35).

Conclusion and recommendation: prevalence of institutional delivery is low in mandura district as compere to national. ANC visit, favorable knowledge on danger signs, accessibility of health facility and level of education were significantly associated with institutional delivery.

Strength to community based conversation and enhance the role of developmental army , improve information regarding the danger signs of pregnancy and benefits of institutional delivery through available communication networks, improve promoting antenatal care four standard visits for pregnant were recommended.

Key words*:* Institutional delivery service, Factors, Mandura, Ethiopia, 2019.

1. Introduction

1.1 Background

Health care that a mother receives during pregnancy, at the time of delivery and soon after delivery is important for the survival and well-being of both the mother and the child. Institutional delivery is a delivery that has taken place in any medical facility owned by skilled delivery assistance(1). More than 20 million women worldwide become pregnant annually(2).More than 71 percent of births were assisted by skilled health personnel globally in 2014, an increase from 59% in 1990(3).

Globally more than 70 percent of maternal deaths are due to five major complications (which are direct obstetric complications), hemorrhage (25 %), infection (15 %), complication of unsafe abortion (13 %), hypertension (12 %) and obstructed labor (8 %) (4). Over the past two decades, the Latin America and the Caribbean region has made significant progress in reducing maternal morbidity and mortality that as results of encouraged 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 MMR of 216 maternal deaths per 100,000 live births(7). Most maternal deaths in Africa are related to direct obstetric complications that occur around the time of childbirth mainly hemorrhage, hypertension, sepsis, and obstructed labor, which combined account for 64% of all maternal deaths. 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). Access to 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, the proportion of women who receive assistance from SBAs is still unacceptably low(11). Major causes of maternal deaths in Ethiopia are preventable that include hemorrhage (APH and PPH), prolonged/obstructed labor and ruptured uterus, severe pre-eclampsia and eclampsia, sepsis, and complications of abortion which account for 69% of the deaths (12). Ethiopia has been making significant progress on

reducing maternal mortality, and had achieved its 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 UN and Ethiopian ministry of health estimate 2019 (13)

In Ethiopia, 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 EDHS, to 10% in 2011 EDHS, 26% in 2016 EDH(14) and reached 50% in the 2019(15). Access to proper medical attention and 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).

The maternal mortality rate 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 facility delivery(17, 18). In 2009 fiscal year of Ethiopia report, (71%) of pregnant women were reported to have delivered at health facility assisted by skilled health personnel. But the utilizations of skill delivery in regions had big discrepancy like Afar (30%), Somalia(31%) and Benshangul Gumuze(53%) were utilized as compare Addis Ababa and Harare(100%)(19). The progress made so far in improving skilled delivery attendance has been impressive and the engagement of Health Development Army (HDA) has been the engine for the achievement as compare to 26% of 2016 (19) which was 50% in the 2019 EDHS(15).

According to Ethiopia demographic health survey, 2011 in Benshangul gumuze regional state indicated that about 8.9 % of women received assisted delivery care by skilled care providers. EDHS 2019 study showed that also the discrepancy between urban and rural level, which was utilization of institutional delivery. Urban-rural disparity was almost 70 % of women in urban areas engaged in skilled compared to 40 % of their rural counterparts. Whereas in Benshangul gumuze regional state, among urban (72.1%) and with high disparity of rural area (8.9%) were assisted in health facility.

1.2 Statements of the problem

High unskilled birth attending and low institutional delivery practice leading to high-risk birth outcomes are emerging as significant problems that increase preventable cause of maternal death(20). From direct causes of death, hemorrhage was the leading cause of maternal death, followed by hypertensive disorders and sepsis. Regional estimates varied substantially; half of maternal deaths in Africa are due to direct obstetric complications, with hemorrhage being the leading cause (21). Maternal sepsis and hypertensive disorders are important and preventable causes of maternal mortality (9). In Ethiopian health profile, institutional delivery utilizations between urban and rural coverage of skilled attendance at birth were 40% in rural areas, compared to 70% in urban areas in EDHS report 2019, but 20 percent was reported in pastoralist area that can understand service disparity between urban and rural as well as place to place were high (15, 16).

Various studies from many parts of the world identified factors that lead to low utilization of health facilities for delivery service. It includes factors related to place of residence and socioeconomic status such as women's age, ethnicity, education, religion, culture, clinical need for care and decision-making power (1, 4, 12). The location, quality and demand factors of health services were also found to be important (11). It is a well-established fact that most maternal deaths occur due to complications that arise during labor, delivery and the immediate postpartum period with obstetric hemorrhage being the main medical cause of maternal death(16).

In Ethiopia, countrywide only 48% of births occur in health facilities(15). Whereas the institutional delivery coverage is lowest in pastoralist communities of the country which consist of more than 10% of the total population(22). For example, in Afar Region, which is one of the pastoralist dominated region of the country, utilization of institutional delivery services is significantly lower in comparison to the rural settled communities in neighboring states (11, 23). According to the Ethiopian demographic and health survey, institutional delivery in Somalia Region was 23% while it was 95% in predominantly Addis Ababa(15).

Even though, maternal waiting room, Ambulance service, women development army and pregnant women panel discussion program were installed to encourage institutional delivery service and there were many both published and unpublished studies conducted regarding to utilizations of institutional delivery services at global and regional level. However, little is known about the utilizations of institutional delivery service and associated factors with limited evidence in the district even though installed the above strategy. Therefore, this study is intended to assess level of institutional delivery and identifying possible associated factors with it at context of the study area.

1.3. Significance of the study

The study can be important to understand the magnitude and determinant factors that affecting of institutional delivery service in Mandura district. In addition, the outcome of this study has been important to understand effects of each factor on the institutional delivery service utilizations in the study area. The result of this study may also help the local government and other stakeholders to plan and allocate resource; set intervention strategies to come up with a solution and implementation of different maternal health care and related services and promoting institutional delivery. The study might also be used for regional health administrators to promote the utilization of institutional delivery care services and mitigate the factors that hinder the community to use the maternal health service in the study area.

2. Literature review

2.1. Utilizations of institutional delivery services

Maternal death and stillbirths are intolerably high in sub-Saharan Africa mostly due low utilizations of maternal healthcare during pregnancy and delivery. Ensuring utilization of institutional delivery services by skilled birth attendants is essential to prevent unnecessary maternal and newborn death(24).A study conducted in India at 2012 showed that about 14%, 46%, and 35% of adolescent women from rural areas received full antenatal care, safe delivery and postnatal care services respectively(25).

A study conducted in South Asia and Sub-Saharan Africa and Asia in six country (Kenya, Nigeria Tanzania, Bangladesh, India and Pakistan) revealed that more than half of the births occurred outside health facility(26). The other study conducted in Tanzania and Kenya showed that 50%(26) and 46.7%(27) of respondents delivered in a health facility in their most recent delivery respectively. Similar study conducted in Kenya, skilled birth attendants (doctors, nurses and midwives) attended 48.2% of these deliveries while the rest were attended by unskilled birth attendants (neighbors, relatives and traditional birth attendants (TBA))(28).

A comparative cross sectional study in Nigeria showed that considering in different factors that can affect utilizations of institutional delivery service among urban(65%) and rural(4.7%) were a statistically significant difference(29). The other comparative study in Ethiopia, Raya district showed that urban 44% and rural 23% were significantly different that stated mothers who live in urban were almost two times more likely to be assisted by skilled birth Attendant during delivery (30). The other study also revealed, rural women less likely deliver in health facility compared to urban reside women(20). Whereas, study conducted in Gambela, Dima district showed that, mothers who were living in rural residence had three times more likely utilize institutional delivery service than those mothers with urban residence had.

But proportionally showed that 2011 to 2016 and 2019 of EDHS, facility delivery was more common among women residing in urban area than rural counterpart surveys(15, 20) The other study conducted in Assosa district from urban 72% and from rural 9%, in Bench magi zone from urban 52% and from the rural 26% were utilized facility delivery service respectively(31). Even though utilization showed improvement as compared to earlier national figure in Ethiopia, Institutional delivery service had different status at different time and place. Study conducted on institutional delivery at 2015 in Wolayita

Sodo was 38%(12), at 2016 in Benshangul Gumuze, Assosa was 24%(1) and at 2017 in Mizan Aman city administration, Bench Maji zone 54% (32) was utilizing institutional delivery respectively, which was higher among urban (72.1%) than rural area (8.9%) as showed proportionally (1).

The other community based cross sectional study conducted in Afar, Afambo district revealed that 22.4% of mothers delivered in the health institution; indicating that, most of the mothers delivered their babies at home in study area(33). Similar community based cross sectional study conducted in Amhara region, Wolidia district(34), Bahir dar City administrative(35)and Akansha Guagusa Woreda(36),institutional delivery among women who gave birth were 74%, 81.2% and 18.77% respectively. The Discrepancy of institutional delivery service was the indicated gap among place to place due to different factors.

2.2. Factors affecting institutional delivery service

The study which was conducted in Southern Tanzania showed that advice on place of delivery during ANC, number of ANC visits and knowledge of risks (danger sign) were significantly associated with use of institutional delivery service (37). A meta-analysis study conducted on developing countries 3Es (women's economic, educational and empowerment status) shows that significantly associated with utilization of maternal health services(38). Revealed that there was direct linkage to the uptake of three of the most basic maternal health services Socio-economic factors are key with utilization of critical services that influence maternal health in developing countries with approximately one fifth (18.9%) of the world's population(38).

2.2.1. Predisposing factors

A Study conducted eastern Africa (Kenya) Socio-demographic characteristics which determined that, education, age, income, occupation and parity were significantly associated to delivery service utilization(39).A Study conducted in Ethiopia, Assayita(24) and Assosa(1) identified that (socio-demographic factors) women's age, marital status and educational level were significantly associated with institutional delivery care utilization. The other study which was reviewed in Ethiopia showed that, People living in urban and rural areas with primary and above educational level of the mother and husband, who had positively significant association with institutional delivery service utiliza-

tion(40). The other study conducted northern and central Ethiopia revealed factors that affected institutional delivery were district in which the women where lived ,women age at interview, women's education, wealth status, women's occupation were all significantly associated(41)

The other parts of Ethiopia study conducted Oromiyia retrospective bivariate analysis on institutional delivery service utilizations, age of the mother, family size, occupational status, educational status, monthly family income, were the factors found to be significantly associated with institutional delivery service utilization(42). And the study also which was conducted Afar, Afambo district; age of mothers, educational level of mothers, wealth status of mothers were significantly association with gave birth in health facilities(33). Other study showed that strong evidence by meta- analyses study which was conducted in Ethiopia identified that people living in urban areas, with primary and above educational level of the mother and husbands were significantly associated with institutional delivery service utilizations(40).

A study conducted in Guagusa district maternal age, religion, occupation, were significantly associated(36). The other cross sectional study in Wolayita district number of parity also significantly associated and as number of parity increases, the probability to give birth at health facility were decreased accordingly(12).

2.2.2. Enabling and Need factors

Variables that have reviewed were Distance to health services, knowledge on danger sign, residence and Transportation to Health facility are as enabling factors and types of pregnancy, ANC visit, Time at ANC start family preference and community preference (autonomy) are need factors as above reviewed(11). Across sectional study in Assosa district showed that, residence, good knowledge, availability transportation service had significant association with the utilization of delivery service(1). The other study which was also conducted in pastoralist community likewise, mothers who were living within 30 minutes walking distance or less from health facility compared to those who lived more than 30 minute distance were higher (43). Women who should travel more than 60 min were less likely to deliver at health facility than those women who travels less than 30 min to the nearest health facility that can provide safe delivery service and access to health service to significantly associated (44).

The other study which was reviewed systematic analysis in Ethiopia showed that People living in urban and rural areas, with primary and above educational level of the mother and husband, who encountered problems during pregnancy and living at a distance >5 km from nearby health facility had significant association with institutional delivery service utilization(40). A study conducted Benshangul Gumez (Assosa), age at first pregnancy, ANC follow up, information on facility delivery, problem during pregnancy, knowledge on (ANC, family planning and maternal health care service), and availability transportation service showed significant association with the utilization of delivery service(1).

Studies conducted Northern, Ethiopia;(Dangla(45) and Bahir dar(35) Knowledge on danger signs, plan to give birth at health institution, having ANC follow up during pregnancy and time taken to get to a nearby health institution were significantly associated with institutional delivery service utilization. First ANC visit (first trimester) and second trimester were independent factors affecting institutional delivery service utilization. That was also across sectional study conducted Woldia unwanted type of pregnancy (unplanned pregnancy) was found to be Negatively a predictor of institutional delivery services utilization(34). A Study conducted in southern Ethiopia, wolayita district(12), distance from nearest health facility, wanted pregnancy, problem faced during delivery, birth order, antenatal care, also significantly associated to institutional delivery service(12).

A study conducted in Guagusa revealed that factors influencing institutional delivery services were being rural resident, ANC follow up, having information on facility delivery, occurrence of problems during pregnancy being knowledgeable on maternal health services, availability of Information source as TV/Radio had association with institutional delivery (31, 36). Also similarly study reviewed, Wukro and Butajira, antenatal care (4+) use and number of pregnancies were significantly associated(41). A study in Awash, Fentanel district assured that, women who had to travel 30 min to reach at the nearby health facilities were more likely to deliver at health facility as compared to those women who had to travel more than 30 min to reach to the nearby health facilities. Women who had good knowledge, Ante Natal Care (ANC) follow up, resided in a place where distance to reach at the nearby health facilities takes < 30 min and women whose husband involved in decision regarding delivery place were more likely to deliver at health facility i.e. all variables in the above significantly associated to utilizing institutional delivery service(46).

The other study which was conducted Benshangul paw district, showed that antenatal care visit during their recent pregnancy, delivery plan of recent pregnancy, maternal knowledge on danger sign, and distance to reach the nearby facility were significantly associated with utilization of institutional delivery service (47). The implications reviewed from the above hider institutional delivery service had to be improved.

2.2.3. Reinforcing factors

A study conducted in Ghana women with lower decision-making autonomy regarding their own health care have lower odds of facility delivery compared to women who were involved in health care decision (48). A study reviewed in Ethiopia, in Guagusa revealed consulting others to made decision on place of delivery have significantly associated with the dependent variable(36). But mother who have autonomous in decision making about place of delivery were less likely to deliver in health facility (41). A comparative cross sectional study conducted Raya district, regarding final decision making about place of delivery; mothers who decided jointly were 3.3 times higher of utilizing of skilled birth attendants during delivery when compared to self-decision making in the district. Moreover, in urban study subjects mothers who finally decided jointly were almost four times more likely to utilize skilled birth attendants during delivery(30). Also reviewed the above A study conducted Afar, Fentale, involvements of husbands at ante natal care (ANC) follow up and family in decision of delivery place had significant association on institutional delivery service utilizations (46, 49)

3. Conceptual framework

This framework shows that relationship between the independent variable and dependent variable. Independent variables include pre-disposing factors such as (age, marital status, and educational status); Enabling factors such as (place of residency knowledge on danger sign and distance from health facility) and need factors such as (ANC follow up frequency family preference, community preference) and relations to institutional delivery service utilizations. Source (1, 22, 30, 40)

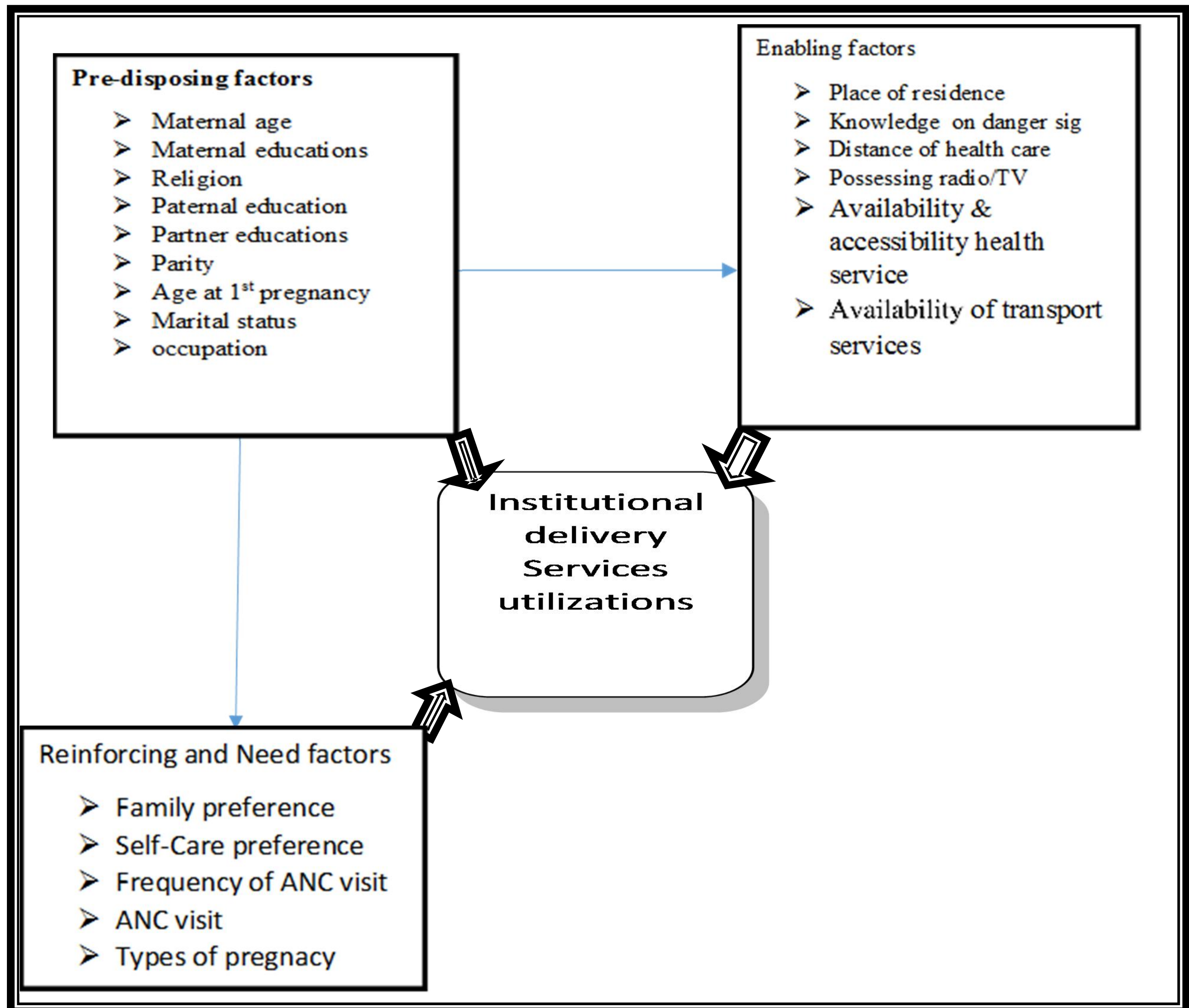

Figure 1: Conceptual framework on Delivery service utilization and associated factors among mothers who gave birth in Mandura, North West Ethiopia, 2019.

4. Objective

4.1. General objective

To assess delivery service utilization and associated factors among mothers who gave birth the last one year prior to the time of data collection in Mandura district, Benshangul Gumuze, Northwest Ethiopia. 2019

4.2. Specific objectives

- To determine institutional delivery service utilizations among mothers who gave birth the last one year prior to the time of data collection in Mandura district, Benshangul Gumuze, North West Ethiopia.
- To identify associated factors affecting institutional delivery service utilizations among mothers who gave birth in the last one year prior to the time of data collection in Mandura district, Benshangul Gumuze, North West Ethiopia.

5. Method

5.1. Study area

The study was conducted in Madura district, which is found in 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 ^{0}50"and 11^{0} 50"north latitude and 36^{0} 10'36^{0} 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. 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 population. Religion practice in the district was traditional religion (47.6%), Ethiopian orthodox Christian (39.26%) and Muslim (7.59%).

The main source of income for the inhabitants of the district is mixed agriculture. Out of 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 proving service.

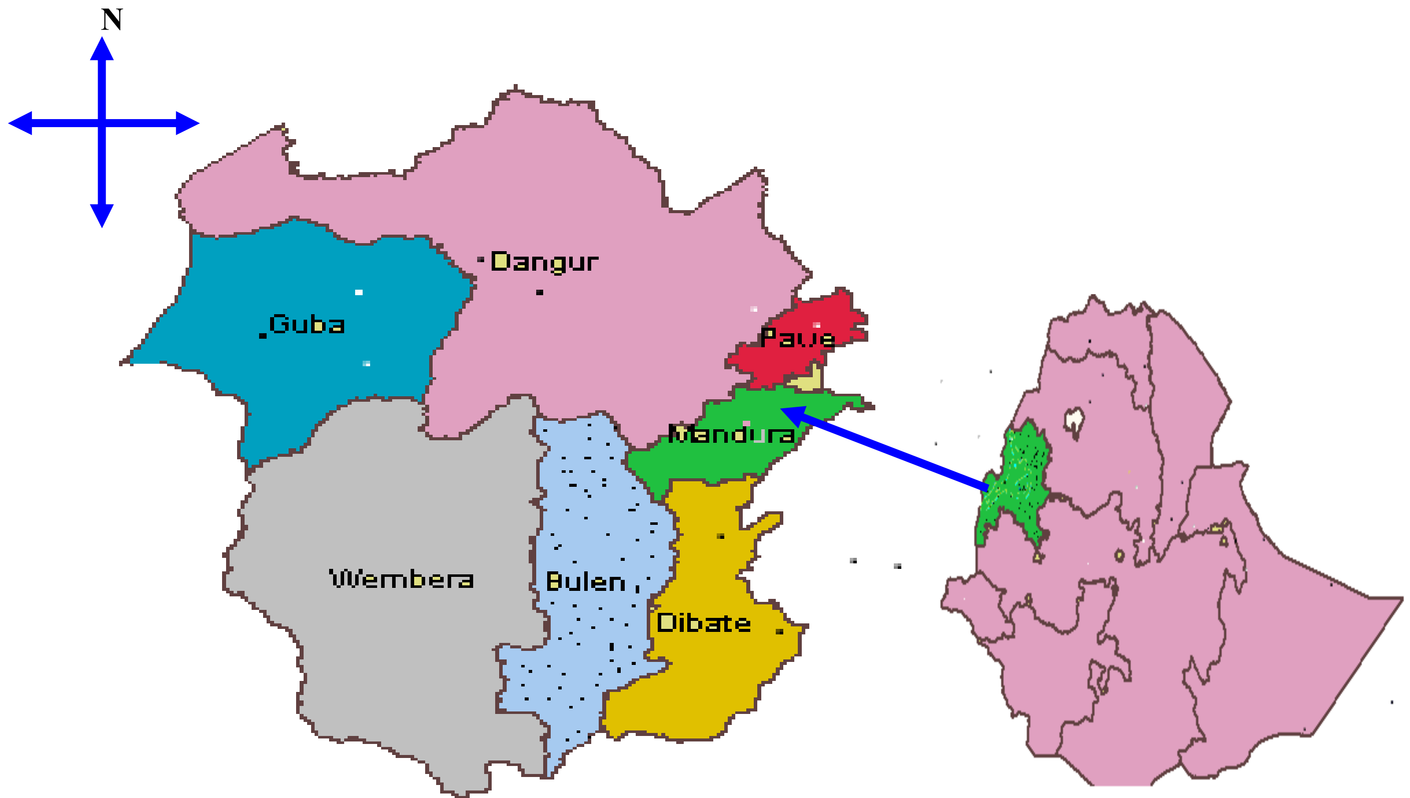

Figure 2:-Sketch map of Mandura district, 2019 (source, doi:10.1371/journal.pone.0161483.g001).

5.2. Study design and period

Community based descriptive cross sectional study was conducted for a study population among in Mandura district mothers who gave birth within the last one year prior to the time of data collection from October to November 2019

5.3. Source population

The source population comprise of mothers who gave birth in last one year prior to the time of data collection who were living in Mandura District.

5.4. Study population

Mothers who gave birth in the last one year prior to the time of data collection residing in the District from randomly selected rural and urban kebeles in Mandura district.

5.5. Eligibility criteria

5.5.1. Inclusion Criteria

All mothers who gave birth the last one year prior to data collections in Mandura district.

5.5.2. Exclusion Criteria

Women who had delivered during the reference period in the study area but were severely ill who were unable to talk or listen during the data collection period.

5.6. Study variables

5.6.1. Dependent variable

Institutional delivery service utilizations

5.6.2. Independent variable

Associated Factors that affect institutional delivery service utilization

Pre-disposing factors

- Maternal age
- Maternal educations
- Partner educations
- Parity
- Age at 1st pregnancy
- Marital status
- Occupation
- religion

Enabling factor

- Place of residence
- Knowledge's on danger sign
- Attitudes of women
- 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 ANC visit
- Types of pregnancy(planed or unplanned)

5.7. Operational definition and definition of Terms

Delivery service utilization: - Refers to mothers who had delivered in Hospital, Health centers, private clinic, 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' (WHO).

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

Predisposing factors: factors that exist prior and make susceptible or inclining to acquire

Some behavior like use of skilled birth attendant or(30)

Enabling Factors: are usually thought as barriers to behavior changes created by societal factors. Availability of services and their accessibility (both geographic and economic) are important factors Example. Limited facilities, lack of income

Reinforcing factors: are 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 travelled <5 km to reach health care facility.

Far from health facility: - If a woman travelled >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.

Knowledgeable: Woman would be considered knowledgeable if she scores 50% and above for knowledge questions when one is given for correct answer and zero for incorrect answer(33)

5.8. Sample size determination

By prevalence: The sample size was determined by using single Population proportion formula. By considering the assumptions of 95% level of confidence, 5% margin of error, 80% power of the study and taking the prevalence institutional delivery service and associated factors which was conducted in Predominantly Pastoralist Community of Northeast Ethiopia 18% of institutional delivery used (43)and design effect is 2.

The final sample size was used

$n = Z^2 p\ (1 - q)/W^2$

n - Desired sample size for a population

z - Standard normal deviation, which is 1.96 at 95% level of confidence

P1 - Proportion of institutional delivery service utilization estimated at 0.18 (based on prevalence of institutional delivery utilizations which was conducted Predominantly Pastoralist Community of North-east Ethiopia)

$n = Z^2 p\ (1 - q)/W^2$

n =1.96^2(.18)x(.82) $/0.05^2$

n = (3.84)x(0.18)x(0.82)/0.0025

n =0.566/0.0025

n =226

In addition, considering 10% non-response rate and design effect 2 =249x2 =498.

Total sample Size was 498 participants.

By associated factors: Factors associated with institutional delivery service utilizations. Several studies showed that, factors were selected as the main exposure of interest for the calculation of the Sample size. Using statcalc by taking proportions on a study conducted in checha district, pawe Dawro Zones for the risks factors of place of residence, availability of radio/TV and Educational status of mother factors that had significant association at different studies that has showed the above. The maximum sample size was 248. Considering design effect 2 and the potential non-response rate of the interviews 10% the sample size was (248 X2) =546 i.e.273 for each urban and rural.

Table 1: Sample size for determination for institutional delivery service utilization and associated factors in Mandura district, Northwest Ethiopia 2019.

Determinant factors	Power	confidence level	Ratio (Unexposed: Exposed	P1	AOR	P2	N
Place of residency (urban/rural)	80	95	1	19	3	41.3	152
Educational status of mothers	80	95	1	56	2.2	73.8	248
Availability of radio/TV	80	95	1	59	2.7	79	85

5.9. Sampling method and procedure

Multi-stage sampling was employed. First, stratified the study area by urban and rural. Second, Random sampling was held from seventeen rural and all three urban kebeles to select nine kebeles (three in urban and six from rural). Then Systematic random sampling was used with every two case from each kebele for both groups to get representative participants from each kebele. Proportional sampling was done based on the number of mothers who gave birth in the last one year residing in the selected kebele using last year pregnant mothers registration book as sampling frame in the health post.

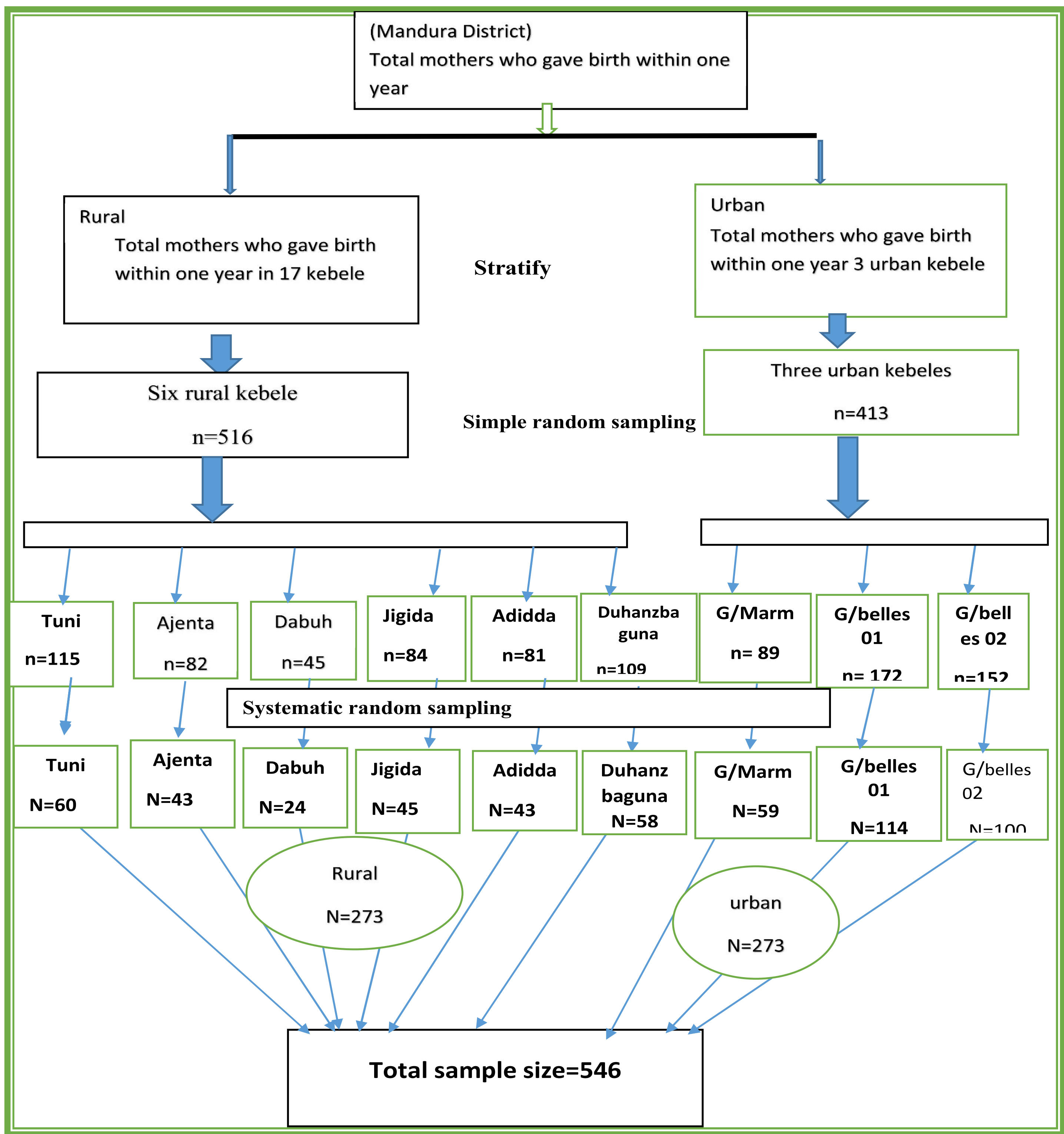

Figure 3: Schematic presentations of sampling procedures on delivery service utilizations and associated factors among mothers in Mandura district, 2019.

5.10. 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 was collected by trained team face to face interviewing. The questionnaire contains, questions adapted from instruments used in several studies on delivery service utilization and questions developed by student investigator. The main domains of the questionnaire were pre-disposing factors, enabling factors, reinforcing and need factor on potential associated factors for institutional delivery service utilizations

Nine health extension workers were used as data collectors to conduct the face-to-face interview and two BSC nurses and the Principal Investigator supervised data collection process. 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.

5.11. Data quality assurance

The collected data was checked for completeness and consistency on daily basis by supervisors. Before the actual data collection was took place, pre-test was done on 5% of the participant in out of 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 was checked and reorganized to exclude errors before data entry.

5.12. Data processing and analysis

The finding of the study was presented using text, tables, and graphs. Both descriptive and analytical analysis was carried out to describe, to see crude and adjusted effect of each variable. Binary logistic regression model were fitted to assess the effect of each independent variable towards the acquisition of institutional delivery service utilization. To identify factors associated with delivery service utilizations among women in 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 to 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.

5.13. Ethical Consideration

The proposed study was approved by Bahir Dar University, Colleague of medicine and health science, and School of public health, Department of Epidemiology, and Biostatistics and Institutional review board of college of medicine and health sciences. Official letters were written to the respective officials of the Mandura health office to obtain permission. After giving information and thoroughly explaining the aim of the study to head office, permission was obtained. Verbal consent was taken from participants. Participants were assured that data would not be disclosed to anybody, they were not requested to give their name and information was kept confidentiality as well as their privacy.

6. Result

6.1. 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 were 27.8 (±5.9). The majority of the respondents were in the age range of 20-34 years which accounts 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 to 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 housewife, while 348 (63.7%) of the husbands were farmers. When considering to income, two hundred sixty (47.6%) of respondents household had average monthly expenditure of between 500-1500 ETB whereas 123 (22.5%) respondents household had average monthly expenditure of between 1501-2500 ETB and the highest monthly income accounts 110 (20%) which was estimated greater than 2501.

Regarding to 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%) rural participants had to walk for more than 30 minutes on average to reach the nearest health facility. The occupational status of participants, four hundred thirteen (75.5%) of participants were housewife followed by 15.2% of participants were governmental employer. When considering occupational status of their husbands in the district, 348 (63%) were farmers followed by 114(20.9%) were governmental employee (Table 3).

Table 2: Socio demographic characteristics of the study participants by Residence, Mandura district, Northwest Ethiopia, 2019

Variable	Categories	Distributions of study participants	
		Total=546	
		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

6.2. Obstetric characteristics of the respondents in Mandura district, 2019

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

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

When considering awareness level of health problems of pregnancy and delivery related complications were, only 222 (40.7%) respondents had favorable knowledge on problems. The other 324(59.3%) of respondents were not having sufficient knowledge on pregnancy and delivery related health problems and danger signs. Also considering to their availability of transportation, 356(65.2%) of respondents (245 (89.7%) of rural and 40.6 (40.6%) of urban) had not means of transportation to visit health facility. Regarding to levels of women autonomy (decision making for place of delivery), 90.7% respondents were decide their delivery place by themselves and 62.8% respondents were known preference of husbands their place of delivery that were preferred to give their birth at health institutions. However, 26.4% of were not known about the preference of their husbands for place of delivery (Table 4).

Table 3: Obstetric characteristics of respondents Mandura district, Northwest Ethiopia, 2019

Variable	Category	Total participants	
		Number	Frequency %
Walking time taken to 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 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<5km	Yes	438	80.2
	No	108	19.4
Availability of transportation to visit 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 place of delivery	Home delivery	56	10.3
	Institutional delivery	343	62.8
	Do not know	147	26.9
Preference of husband as attendant	Skilled delivery attendant	306	56.0
	Relatives or family members	237	43.4

6.3. Institutional delivery service utilization in Mandura district,

Prevalence of institutional delivery service utilization in mandura district was 38.8% with 95% of CI (34%-42%). Women from urban area are more likely to receive delivery care from health facility than women from 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 blow in the graph (Figure 4)

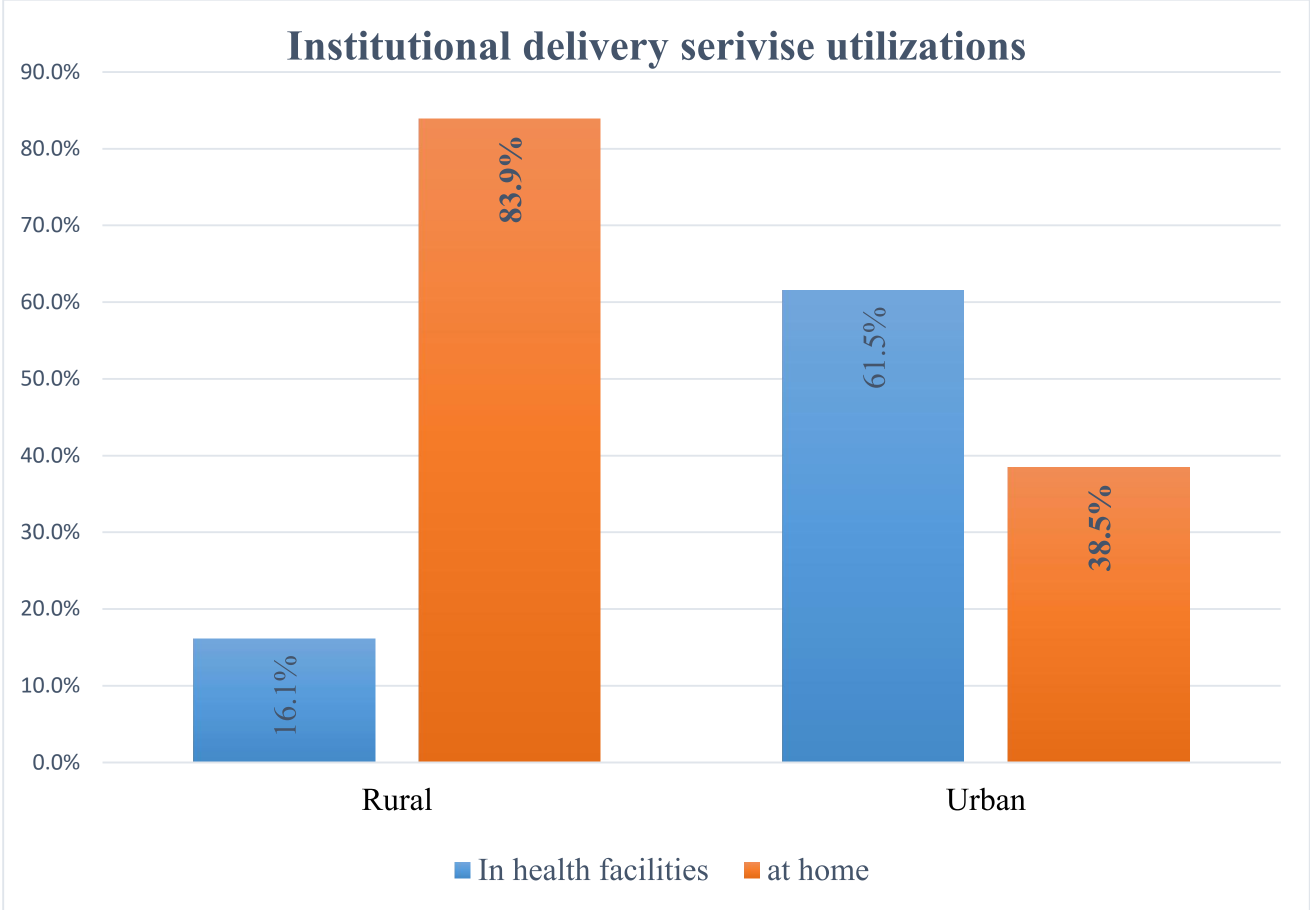

Figure 4: The proportion of women utilizing institutional delivery service among urban and rural in Mandura district, 2019

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 house 16% were among the commonest reason.

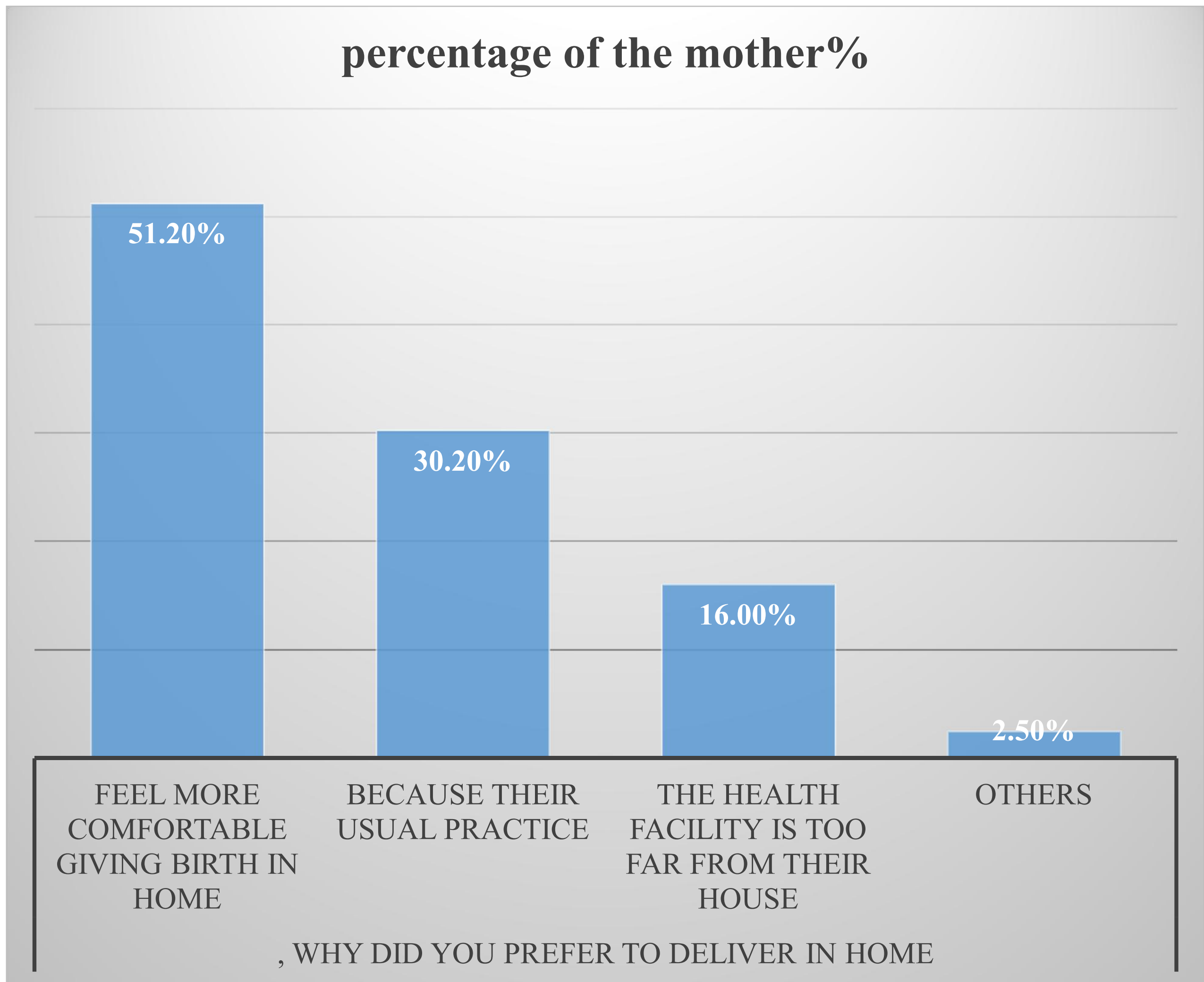

Figure 5: Reasons of women gave birth in home among study subjects in Mandura district, southwest Ethiopia, 2019

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

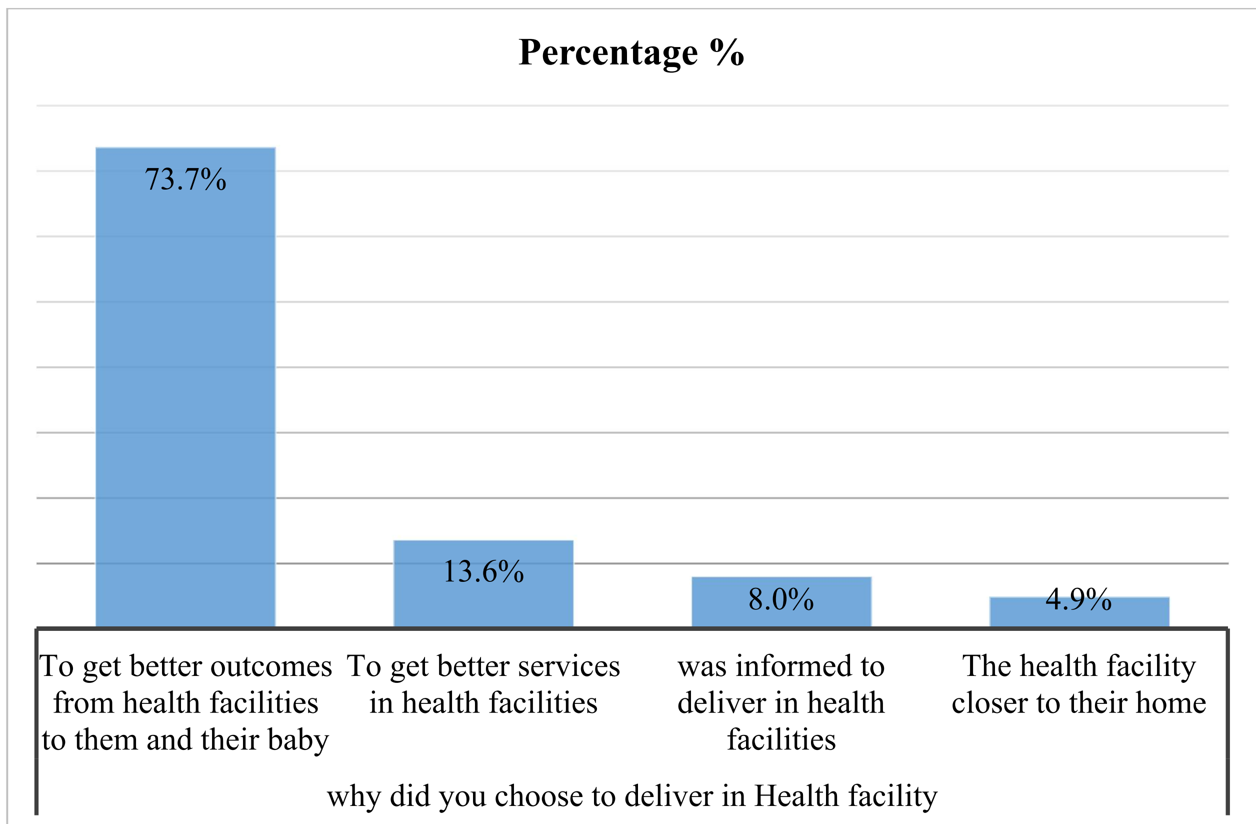

Figure 6: Reasons of women utilized institutional delivery service among study subjects in Mandura district, Southwest Ethiopia, 2019

6.4. Factors associated with institutional delivery service utilization in Mandura district, Northwest Ethiopia

Bi-variable analyses involving all variables were performed to identify candidate variables for multi-variable analysis with the utilization of institutional delivery services. Consequently, place of residence, educational status of the mother, educational status of their husbands, 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, number of parity and knowledge of the mother on pregnancy related complications showed strength of association p value <0.2. Therefore, that included in multi-variable analysis. The multi-variable analysis revealed that residence of women, women occupation, parental 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 significant association with using institutional delivery. Women from urban areas had 2.09 times higher odds of using institutional delivery service as compared to the rural women (AOR=2.09, 95%CI:1.15-3.81). Women being governmental employer were 2.05 times more likely to utilize institutional delivery (AOR=2.05, 95%CI: 1.00-4.18) and women being private/self-employers were 2.42 times more likely to use institutional delivery service as compare to housewife (AOR=2.42, 95%CI: 1.09-5.35) respectively**.** Regarding to paternal educational status, women whose husbands with educational status primary education were 2.50 times more likely to use institutional delivery service than mothers with who had husbands unable to read and write (AOR=2.50, 95%CI:1.27-4.91). Similarly, women whose husbands educational status were secondary and above were 2.36 times more likely to use institution delivery service than mothers with 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 favorable knowledge on 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). Number of parity also had marginally significant effect. Women with two and more parity were 49% less likely to deliver within the health facility as compere to one parity (AOR=0.49, 95%CI: 0.25-0.95). Women who were accessible to health facility with delivery service were 4.6 more likely to use institutional delivery service than women that had not access with delivery services in 5 km radius (AOR=4.6, 95%CI: 2.01-10.89). (Table.5

Table 4: Determinants of institutional delivery service utilizations among mothers who gave birth in the past 12 months in Mandura district, Northwest, Ethiopia, 2019 (n=546)

Variable		Place of delivery		Crude OR(95% CI)	Adjusted OR(95% CI)
		In health facilities	In home		
		Frequency (%)	Frequency (%)		
Residence	Rural	44 (16.1)	229(83.8)	1	1
	Urban	168 (38.4)	105(61.5)	8.32(5.5-12.4)**	2.09(1.2-3.8)**
Occupation	House wife	112 (27.1)	301(72.8)	1	1
	Governmental employee	63(75.9)	20 (24.1)	8.5(4.89-14.)*	2.05 (1.00-4.18)*
	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)

*P. Value <0.05 **P.Value<0.01 *** (Others)-merchant, private employer, daily labor

Continued from Table: 4

Variable		Place of delivery		Crude OR(95% CI)	Adjusted OR(95% CI)
		In health facilities	In home		
		Frequency (%)	Frequency (%)		
Walking time taken to 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 of the mother 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)
Number of 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	Unfavorable knowledge	50 (17.7)	231(82.2)	1	1
	Favorable 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 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-low relatives)

7. Discussion

Institutional delivery service is the most proven intervention in reducing maternal and child Mortality and disability. This community –based cross sectional study identified those very important determinants that are related to institutional delivery service utilizations among study subjects in mandura district. The study aimed to determine and identify the factors that influence institutional delivery service utilizations. Factors that influencing institutional delivery service utilization of women in the district were residence, maternal occupation, husbands' level of education, number of children, number of ANC follow up, knowledge regarding to danger signs on pregnancy related complications, accessibility of institutional delivery service and transportation services in the kebele were found to be significant predictors.

The results of the study showed that the proportion of women who gave birth in health institution in the district were 38.8% with CI (34%-42%). This result is consistent with that of a studies done in Assayita district, North East Ethiopia which was 36.1%(24). However, it is higher than studies conducted in Assosa zone, Benshangul gumuze region which was (24.8%)(1) and Checha district, Gurage zone, SNNPR, Ethiopia which was 31%(44). This improvement might that the function of multipurpose health extension workers and women development army play a pivotal role in providing information on services related to maternal and child health. However, it was lower as compared to studies conducted Pawe district was 60% (47), Arbaminch Town, Gamo Gofa Zone, southern Ethiopia which was 73.2% (22),EDHS 2019 which was 48% (15), Woldia Town, Ethiopia was 74.7% (34) and Mizan aman City administration , Bench maji Zone, South West Ethiopia was 54.2% (32), respectively. The difference might be explained by the fact that women in those study areas had better accessibility of health facility with delivery service and accessibility of transportation since study areas reviewed in the above were non-emerging regions.

There was statistically significant association between place of residence and use of institution for delivery service. The result revealed that urban women were more likely to give birth at health institution as compared to their rural counterparts. This finding is in agreement with previous studies conducted in Nigeria and other parts of Ethiopia, Ayssaita District, Raya, Alamata District, North West Ethiopia and Mizan-Aman Town, Southwest Ethiopia(24, 30, 36, 50) respectively. This might be urban women tend to have advantage from increased access to delivery service (availability of health facility

with delivery service and accessibility of transportation) and got enough information at a time of ANC visit relatively. In addition to that, health promotion, mass media programs were urban-focused compared to the rural counterparts. Whereas rural women due to inaccessibility of health facility, inaccessibility transportation service and more likely inadequate information at ANC visit might have low utilization as compare to urban level of resident.

Women who had favorable knowledge on pregnancy and delivery related problems were more likely to be utilized institutional delivery service than who had unfavorable knowledge on delivery and pregnancy related health problems among the district. This result is in line with conducted in developing country revealed that delays in seeking health care during pregnancy are influenced by individual and community knowledge on maternal health care services. Previous other similar studies at pawe district, Arbaminch Town, Gamo Gofa Zone, SNNPR, Ethiopia, Sekela District, North West of Ethiopia, Bench Maji zone, Southwest Ethiopia and North West Ethiopia (22, 31, 36, 47, 51) respectively. This might could explained that, knowledge is an important factor that affects attitude, intention, and behavior. Therefore, women who had sufficient knowledge about delivery danger signs might have perceived service benefits of a health institution, like complication management by skilled health care workers in time of labor. This might imply those mothers who are able to recognize danger signs, knowledgeable and good perception on important of maternal health care services could have greater fear of the possible outcomes of the signs. Therefore, they would be encouraged and motivated to deliver at health facility

Accessibility of health facility had significant association with institutional delivery service utilization among study subjects in district. Women who had access to health facility were more likely to use institutional delivery service than inaccessible for health facility. This finding is in agreement with a study done on institutional delivery service utilization in Roma Bhutan Amsterdam, Netherland(52), Meta-analysis in Ethiopia(40) and in Checha district, Gurage zone, SNNPR, Ethiopia (44). This might be explained that increasing distance from health facility and increase in transport cost and lost production time, as well as possible lower exposure to health information. Therefore, making health institution accessible might be increase the chance of using institutional delivery. There for increasing health facility accessibility according to the standard of WHO especially for rural setting.

In this study also 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 atended in the study area. Finding is reported in diferent studies agreed similar sugution that in Nepal (23) , Assosa

district, Benishangul gumuz regional State, Western Ethiopia, Oromia Ethiopia, Ayssaita district, North east Ethiopia and Liben zone,Somalia regional state (1, 20, 24, 53) respectivly.

This might be due to the fact that antenatal services can 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. In addition, use of ANC might signify the availability of a nearby health insttution proviede delivery care service. Therefore, identification and early initiating ANC follow-up with provision of maternal health service information particularly, encourage mothers to utilize institutional delivery service.
Parity was also another marginaly significant factor which was associated with utilization of institutional delivery service. Women with lower parity were more likely to deliver within the health facility. This finding agrees with several other studies in Nepal(23) and in our country in different areas(30, 31). This might be explained that 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.

Educational statuses of their husbands were an important factor to allow women to utilize institutional delivery service. Women who had husbands with at least primary and above level of education were more likely to give birth in health institutions. The finding is consistent with studies were pastoralist community, in Afar, Northeast Ethiopia (43),Meta-analysis in Ethiopia(40), in Bench Maji zone, South West Ethiopia (32). The possible justification for this could be educated husbands might have better understanding about complication of home delivery and benefit of institutional delivery. Therefore, they might be assist their partner in deciding on place of delivery that could be understood increasing level of education in the community had contribution to increase institutional delivery serves utilizations.
Occupational status of the women also significant predictor for institutional delivery service. Women being governmental employer and private employer were more utilize institutional delivery service as compare to housewife. The study is consistent also 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 have explained that women’s employment attributed by higher level of education with better knowledge and more Autonomy with control of their earning in seeking care. However, housewives are less likely to have knowledge about pregnancy and childbirth due to lesser freedom of movement outside the household and less likely to seek information services importance for pregnancy care that might decrease institutional delivery serves utilizations.

8. Limitations of the study

Qualitative methods, such as focused group discussions were not conducted, as they would have better addressed some of the questions raised.

Social desirability bias since respondents to answer questions in manner that would be viewed favorable by interviewers

9. Conclusion

Utilization of institutional delivery service was low with high disparity of urban and rural level as compare to national level in the study setting as compare to national level. This study also identified that, place of residence; husbands' educational status, parity, number of ANC visit, accessibility of transportation, occupational status of women, women knowledge status, and accessibility of health facility with delivery service were found to be determinants for utilization of institutional delivery service in Mandura district.

10. Recommendations

Benshangul gumuze regional state health bureau

- To improve accessibility of health institution that can provide safe delivery services
- Strengthen programs need to get health information and BCC services to increase the knowledge of mothers and their partners about pregnancy related health problems, the benefits of institutional delivery and skilled birth attendants

Mandura Woreda health office

- Outreach and mobile ANC care service and strength knowledge status of the mother on pregnancy related problems for distant and health inaccessible area
- To improve knowledge of the mothers and ANC service utilization their need to expand information education communication for pregnant mothers.
- Strengthen to community based conversation and enhance the role of developmental army

Researchers:

- Moreover, to explore further factors related with the use of facility delivery, qualitative studies need to be conducted in study area

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Annexes

Annex I: participant information sheet (English)

Title of research project: Institutional Delivery Service Utilization and associated Factors among rural and urban mothers who Gave Birth in Mandura district, Benshangul Gumuze regional state, North West Ethiopia. 2019

Name of the principal investigator: kassahun Asires (BSC)

Name of Advisors: Melkamu Bedimo (BSC, MPH, Associate professor)

Gizachew Tadesse (BSC, MPH in Epidemiology)

Name of the organization: Bahir Dar Universty, Collegue of Medicine, and Health Science, school of public health, Department of Epidemiology and Biostatics.

Procedures

Dear---------------

I am ---------------------from--------------------.

Mr. Kassahun Asires is working his Master's thesis on institutional delivery service utilizations and associated factors.

I am here to collect data for this research and we selected you based on a sampling technique to be randomly to be participant of the study. Data collectors will ask you some questions about history of socio-demographic questions, knowledge practice and attitudes of institutional delivery service utilizations and factors that was affect, during your child bearing We hope you will participate in the survey. The survey will take 20minutes.

Risks/discomfort

There is no risk to you participating in this study.

Benefits

Your participation in this research may not directly provide you a certain benefit as an individual. It may benefit all Mothers in future including you

Confidentiality

Any record relating to you will be strictly confidential. Your names will not be used in any reports from this study.

Voluntariness

You do not need to participate in the study if you do not want to. You have the right to with draw from the research study at any time. By not participating in the study, you will not be penalized and you will not loss anything.

Persons to contact

If you want to talk to someone about this study, if you feel you have not been treated properly, if you are hurt by joining the study, if you have any question, you can contact with:

Principal investigator: Kassahun asires cell phone number- 0920288799

Advisors:

Melkamu Bedimo (BSC, MPH, Associate professor) cell phone number-0930111853

Gizachew Tadesse (BSC, MPH in Epidemiology) cell phone number -0918134416

Annex II: Introduction and informed consent form

Hello, my name is -----------------. I am serving as data collector on the behalf Bihar Dar University, College of Medicine and Health Science, Department of epidemiology and biostatics to assist the investigator kassahun Asires to obtain information for the investigation of institutional delivery service utilizations and factors that affectin this area. You have been selected to participate in this study because you are the gave birth in the last 1 year. You will be one of approximately 546 people who will participate in this study. Your participation in this study is voluntary. There is no penalty if you refuse to participate in this study. Your participation will involve face-to-face interview with the duration of 20 minutes. You can skip any questions you don't want to answer or even stop the interview. Your participation in the study poses no risk for you. The information received from you is important for the study. There is no direct benefit from the participation in this study, but your participation will contribute to better understanding of risk factors of institutional delivery service utilizations. The information provided by you fully confidential and will be used only for the study. Your name will not appear on the questionnaire. Only the general findings will be presented in the report. If you have any questions regarding this study you can contact the Principal Investigator kassahun Asires, phone 09 20288799

Do you agree to participate? Thank you. If no, thank her and skip to other participants

If yes, shall we continue? Interviewers'name ____________________

Date________________________________

Signature____________________________

ID-------------------

Annex III: Questionnaire

Institutional Delivery Service Utilization and associated Factors among Rural and Urban Mothers Who Gave Birth in Mandura district, Benshangul Gumuze, Western Ethiopia. 2019

INSTRUCTIONS

1. All questions are to be addressed to mothers who gave birth the last 1 year prior to data collection

Part I Socio Economic & demographic factors

S. NO	Questions	Answer to questions
101	Age	In years---------------
102	Residence	1. Rural 2. Urban
103	Marital status	1. Married 2. Divorced 3. Widowed 4. Single 5. Separated
104	Religion	1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. Others(specify)______
105	Ethnicity	1. Amhara 4. Oromo

		5. Agew 6. Gumez 7. Shenasha 8. Others, specify ________
106	Occupation	1. House wife 2. Governmental Employee 3. Private Employee 4. Farmer 5. Merchant 6. Daily Laborer 7. Student 8. Others, specify __________
107	Mother's educational Status	1. Unable to read and write 2. Primary education(1-8) 3. Secondary education(9-12) 4. College or University
108	Average monthly household in come	In Ethiopian Birr _____________
109	Husband's educational Status	1. Unable to read and write 2. Primary education(1-8) 3. Secondary and above (9-12) 4. College or University diploma and above

110	Husbands occupation	1. Farmer 2. Governmental employee 3. Private Employee 4. Merchant 5. Daily laborer 6. Other, specify____________
111	Do you have any of the following means of communication?	1. Radio 2. TV 3. None
112	How many hours do you take to reach the nearby health facility on foot (estimate by data collectors)?	In hour ______________

Part II Enabling factors (knowledge and obstetric questions)

201	What was your age at first birth	In years---------------
202	How many births have you ever had (parity)?	In numbers -----------------
203	Number of live births	In numbers -----------------
204	Number of still births ever had	In numbers -----------------
205	Was your last pregnancy planned?	1. Yes 2. No
206	where do you deliver your last child	1. At home 2. In health facilities
207	Do you have ANC visit in the last pregnancy?	1 Yes 2 No
208	If Yes, number of visits	In numbers -----------------

<table>
<tr><td>209</td><td>Where did you attend ANC follow up?</td><td colspan="3">1. Health Center
2. Hospital
3. Health post</td></tr>
<tr><td>210</td><td>During ANC follow up did you get any information about pregnancy & delivery Complications?</td><td colspan="3">1. Yes
2. No</td></tr>
<tr><td>211</td><td>. If yes to 210, where did you recommended to deliver</td><td colspan="3">1. Health facility 2. Home</td></tr>
<tr><td>212</td><td>Did you face any problem during pregnancy or delivery?</td><td colspan="3">1. Yes 2. No</td></tr>
<tr><td>213</td><td>If yes 21, which of the following problems</td><td colspan="3">1. Ante partum hemorrhage
2. Excessive bleeding during labor
3. premature rupture of membranes
4. Intrauterine fetal death
5. preterm labour
6. Elevated blow pressure</td></tr>
<tr><td rowspan="5">214</td><td rowspan="5">What are the advantages of attending delivery in health institutions?</td><td rowspan="2">For anticipating problems</td><td>Yes</td><td>No</td></tr>
<tr><td>1</td><td>2</td></tr>
<tr><td>For early detection of health Problems</td><td>1</td><td>2</td></tr>
<tr><td>For better health care to the women</td><td>1</td><td>2</td></tr>
<tr><td>For better care to the newborn</td><td>1</td><td>2</td></tr>
<tr><td>215</td><td></td><td></td><td>Yes</td><td>No</td></tr>
</table>

	What are the complications that can occur during delivery?	1. severe hemorrhage	1	2
		2. mal presentation and mal position	1	2
		3. retained placenta (lasting more than 30 minutes)	1	2
		4. Pelvic contracture	1	2
		5. prolonged labor (lasing more than 12 hours)	1	2
		6. Fetal distress	1	2
Part III:-Health facility and Health service factors				
301	Is there health facility with delivery attendant within 2 hours walking or within 5 km radius in the kebele	1. Yes 2. No		
302	Is there any transportation system to visit health facility (Can you got transportation services to visit Health Center with skill delivery attendant?)	1. Yes 2. No		
303	Can you afford to pay transportation services to visit Health Center?	. Yes 2. No		
	What do you think about getting delivery service in health facility			
304	Attending Normal delivery	1. Yes 2. No 3. Do not know?		
305	. Preventing delivery complications	1. Yes 2. No 3. Do not know?		
306	Managing delivery complications	1. Yes 2. No 3. Do not know?		
307	Early detection of Health Problems	1. Yes 2. No 3. Do not know?		

308	Better health care to the women	1. Yes 2. No 3. Do not know?
309	better care to the newborn	1. Yes 2. No 3. Do not know?
310	Delivery complications can be severe and may be hazardous to my well-being	1. Yes 2. No 3. Do not know?
311	Being attended by a skilled delivery attendant may be beneficial to my well-being	1. Yes 2. No 3. Do not know?
312	. How did you rate the easiness for you to get institutional delivery services if the?	1. Very easy 2. It was impossible 3. Fair 4. I cannot assess.
IV. REINFORCING AND NEED FACTORS		
401	Was your last pregnancy planned?	1. Yes 2. No
402	Who was decision maker about the past place of delivery	1. Myself 2. My husband 3. Both of us 4. Mother- in- law 5. Others ____________
403	Preference of husband to place of delivery	1. Home Delivery 2. Institutional Delivery 3. Do not know
404	Preference of husband as your deliver attendant	2. Skilled Delivery attendant 3. Trained traditional Birth attendant 4. Traditional birth attendant 5. Relatives of family members

		6. Do not know
405	Preference of other family members as your place of delivery	1. Home Delivery 2. Institutional Delivery 3. Do not know
406	Preference of other family members about your delivery attendant	1. Skilled Delivery attendant 2. Trained traditional Birth attendant 3. Traditional birth attendant 4. Relatives of family members 5. Do not know
407	Preference of other community members as your place of delivery	1 Home Delivery 2. Institutional Delivery 3. Do not know
408	preference of other community members as your delivery attendant	1. Skilled Delivery attendant 2. Trained traditional Birth attendant 3. Traditional birth attendant 4. Relatives of family members 5. Do not know
409	If your answer to **Qn** 206 is **Home**, why did you prefer to deliver in home?	. I feel more comfortable giving birth in home 2. Because it is my usual practice 3. I don't like the service in health facilities 4. I have bad experience in giving birth in health facilities 5. Unwelcoming approach of health workers in health facilities 6. the health facility is too far from my house 7. labor was urgent to reach health facilities 8. lack of money for transport

		9. influenced by my husband not go to health facilities 10. family members prefer to give birth in home 11. others reasons, specify--------
410	If your answer to **Qn** 206 is health facility, why did you choose to deliver in Health facility?	To get better services in health facilities 2. To get better outcomes from health facilities to me and my baby 3.Bad experience from past home delivery 4.I was informed to deliver in health facilities 5. The health facility closer to my home 6. Others, specify----------------
411	If you gave birth in health facilities, which health facility	1. Health center 2.Hospital 3.Private post

Thank You

Interviewer Name ----------------------------

Date --------------------------

Signature ----------------------

Annex IV: participant information sheet and questioners (Amharic)

ID------------------------------

ጤናይስጥልኝስሜ--------------------------------
ይባላልየህመጠይቅየተዘጋጀበትዓላማበማንዱራወረዳባለፉትአስራሁለትወራትየእናቶችበጤናተቋማትየመዉለድሁኔታወችእናየእናቶችበጤናተቋማትእነዲወልዱየሚያደርጉሁኔታወችበተመለከተመረጃለመሰበሰብእናለማጥናትነዉ።እናእርስዎእዚህጥናትዉስጥእንዲካተቱልኝሰለመረጥኩዎትለምጠይቀዎትጥያቄዎችመረጃዎችበመስጠትእንዲተባበሩኝበትህትናእጠይቀዎታለሁ።

በዚህመጠይቅዉስጥየሚካተቱጥያቄዎችሰለማህበራዊአናሰነህዝበሁኔታ፣ስለባለፈዉየፅንስእናየወሊድሁኔታ፣ስለባለፈዉየእርግዝናክትትልእናየወለድሽበትቦታ፣እንዲሁምስለበቤትዉስጥዉሳኔስለመስጠትየመሳሰሉትእናሌሎችምተካተውበታል።ሁሉምየምትሰጭኝመረጃወችበሚስጥርይያዛሉ።በዚህመጠየቅዉስጥየአንቺመለያዎችየሚሆኑማለትምስምሽናትክክለኛአድራሻሽኣይካተቱም።የምትሰጪቸዉትክክለኛመልሶችብቻናቸዉየወረዳዉንየእነቶችበጤናተቋማትየመዉለድሁኔታወችአንድናዉቅየሚረዱን።ጥናቱተሳታፊበመሆንዎበቀጥታእርሰዎንተጠቃሚሊያደርግአይችልምነገርግንየትናቱተሳታፊበመሆንዎበአገልግሎትአሰጣጡችግሮችንበመለየትየተሻለአገልግሎትእንድንሰጥያግዘናልስለሆነምየዚህጥናትመሳካትየርሰዎአስተዋፅኦታላቅነዉበመሆኑምለአሰተዋፅኦበአፀፋዉታላቅምስጋናእለግሰዎታለሁ፡፡ሀሳቡንበትክክልተረድተዉታልመጠይቁንመቀጠልእንችላለ�El

1. ነኝ ☐ 2. አይደለሁም ☐
2. ክፍልአንድ፡- የማህበራዊእናስነ-ህዝባዊጥያቄዎች

ተ.ቁ	ጥያቄ	መልስ
101	ዕድሜ	በዓመት-------------------
102	የመኖሪያቦታ	1. ገጠር 2. ከተማ
103	የጋብቻሁኔታ	1. ያገባች 2. የፈታች 3. የሞተባት 4. ያላገባች 5. የተለያዩ
104	ሀይማኖት	1. ኦርቶዶክስ 2. ሙሰሊም 3. ፕሮቴስታንት 4. ካቶሊክ 5 ሌላካለ-------
105	ብሔር(ጎሳ)	1. አማራ 2. ኦሮሞ 3. አገው 4. ጉሙዝ 5. ሽናሻ 7 ሌላ (ይገለጥ) __________
106	ስራ	1. የቤትእመቤት 2. የመንግስትሰራተኛ 3. የግልሰራ 4. ገበሬ 5. ነጋዴ 6. የቀንሰራተኛ 7. ተማሪ 8. ሌላ (ይገለጥ) _____________
107	የትምህርትደረጃ	1. ማንበብእናመፃፍየማትችል 2. አንደኛደረጃ (1-8)

		3. ሁለተኛደረጃ (9-12) 4. ኮሌጅወይምዩኒቨርስቲ
108	የቤቱአማካይወርሀዊገቢስንትነዉ	የኢትዮጵያብር __________
109	የትዳርአጋርዎትየትምህርትደረጃ	1. ማንበብእናመፃፍየሚችል 2. አንደኛደረጃ(1-8) 3. ሁለተኛደረጃ 4. ኮሌጅወይምዩኒቨርስቲ
110	የትዳርአጋርዎትስራ	1 ገበሬ 2. የመንግስትሰራተኛ 3. የግልሰራ 4. ነጋዴ 5. የቀንሰራተኛ 6. ሌላ (ይገለጥ) ______
111	የሚከተሉትየመገናኛዘዴዎችበቤትሽዉስጥይገኛሉ?	1. ሬድዮ 2. ቴሌቭዥን 3. የለም
112	በቅርብሽወደሚገኘዉየጤናተቋምበእግርለመሄድየሚፈጅብሽሰዓትስንትነዉ?	በሰዓት__________
ክፍልሁለት፡-ምቹ (አስቻይ)ሁኔታዎች እና የግንዛቤ ደረጃ		
201	የመጀመሪያልጅሽንበስንትአመትሽዎለድሽ	በዓመት---------------
202	ስንትልጆችበህዎትዎለዱ	በቁጥር
203	አጠቃላይስንትጊዜዎልደዋል	በቁጥር
204	በዎሊድጊዜየልጅሽሂዎትማለፍአጋጥሞሽያቃል	በቁጥር---------
205	የመጨረሻእርጉዝናሽበእቅድነበር	1. አዎ 2. አይደለም
206	ለመጨረሻጊዜስትዎልጅየትዎለድሽ	1. ቤት 2. ጤናተቋም
207	የነፍሰጡርክትትልነበረሽ	1. አዎ 2. የለም
208	ተ.ቁ 206 አዎሲንትጊዜ	በቁጥር---------------
209	የትነውክትተልስታደርጊየነበር	1. ጠናኬላ 2. ጤናጣቢያ 3 ሆስፒታለል
210	ክትትልበምተሄጅበትጊዜስለእርግዝናናዎሊድላይስለሚከሰቱችግሮችመረጃሰምተሽል	1. አዎ 2. የለም
211	አዎከሆነ፣ ክትትልበምተሄጅበትጊዜየትመውለድእንዳለብሽመረጃሰጠውሻል	1. ጠናኬላ 2. ጤናጣቢያ 3 ሆስፒታለ
212	በርግዝናሽላይ፣ከመውለድሽበፊትወይምበመውለድጊዜየገጠመሽችግርነበር	1. አዎ 2. የለም

213	ጥቁ 211፣አዎ፣ምንአይነትችግርነበር	1. በወሊድጊዜደምመፍሰስ 2. በምጥጊዝከፍተኛደምመፍሰስ 3. የንሽርትውሃመፍሰስ 4. በማህፀንውስጥየፅንስመሞት 5. ጊዜውያልደረሰሞት 6. ከፍተኛየደምግፊት		
214	በጤናተቋምመውለድጥቅሙምንድነው		አዎ	አየለም
	ችግሮችንቀድሞለመከላከል		1	2
	ለተሸለየጤናአገልግሎትለናቲየዋ		1	2
	ለተሸለየጤናአገልግሎትለህጻኑ		1	2
215	በወሊድጊዜምንአየነትችግርሊከሰትይችላል		አዎ	አይደለም
		ከፍተኛደምመፍሰስ	1	2
		የአቀማመጥችግር	1	2
		ከ30 ደቂቃበላይየእንግዴልጅአለመውረድ	1	2
		የማህጸንበርመጥበብ	1	2
		የምጥመራዘምከ 12 ሰአትበላይ	1	2
		የህጻንመታሰር	1	2
ከፍልሶስት፡የጤናተቋማሁኔታናየጠናአገልግሎ ሁኔታ				
301	በቀበሌው5 ኪሜ በታች ወይም በሁለት ሰዓት የግር ጉዞ ሊደረስበት የሚችል በሰለጠነባለሙያየማዋለድአገልግሎትየሚሰጥጤናተቋ ምአለ	1. አዎ 2. የለም		
302	ወደጤናተቋምለመሄድመጓጓዣይገኛል	1. ለአዎ 2. የለም		
303	ለትራነሰፖርትክያለመክፈልበቂአቀምአለሽ	1. ለአዎ 2. የለም		
	ስለጤናተቋምየወሊድአገልግሎትምንታስቢያለ ሽ	2.		
304	ጤናማየወሊድአገልግሎትለማግኘት			
305	የወሊድችግሮችንለመከላከል	1. አዎ 2. የለም 3. አላቅም		
306	የተፈጠሩየወሊድችግሮችንለማከም	1. አዎ 2. የለም 3. አላቅም		

307	የጤናችግሮችንቅድሚያለመለየት	1. አዎ 2. የለም 3. አላቅም
308	የተሻለጤናአገልግሎት ለናትየዋ ለማግኘት	1. አዎ 2. የለም 3. አላቅም
309	የተሻለጤናአገልግሎት ለ ህጻኑ ለማግኘት	1. አዎ 2. የለም 3. አላቅም
310	በወሊድ ጊዜ ሊፈጠር የሚችለው ችግር ለህጻኑ እና ለናቲቱ አስችጋሪ ስለሚሆን	1. አዎ 2. የለም 3. አላቅም
311	በጤናተቋምለመውለድያለውንሁኔታአንቺእንዴትታይ ዋለሽ	1. በጣምቀላል 2. ብዙምአየከብድም 3. በጣምከባድ
312	ባለሽልምድስለጤናአገልግሎትአሰጣጥያለሽአመለካከት ምንድንነው	1 ጥሩ 2. መጥፎ 3 አላቅም
313	ጥ.ተ.ቁ፣ 311 መልሰመጥፎከሆነ፣ለምንድንነው	1. አገልግሎትአሰጣጡጥራትየገጎደለውስለሆነ 2. በአገልግሎትአሰጣጥውጤቱስላላረካኝ 3. የጤናባለሙያዎችሁኔታ 4. ክፍያውዉድስለሆነ 5. ሌላ----------------
314	ጥ.ተ.ቁ፣ 311 መልሰጥሩከሆነ፣ለምንድንነው	1. ያገልግሎትአሰጣጡጥራትስላለው 2. የጤናባለሙያዎችአገልግሎትአሰጣጥጥ ሩስለሆነ 3. አገልግሎቱካገኘሁበሑላሁጠቱስላረካኝ 4. ክፍየውስለማይበዛ
315	ቤትስለመውለድያለሽአመለካከትምንየመስላል	1 ጥሩ 2. መጥፎ 3 አላቅም
316	ጥ.ተ.ቁ፣ 314 መልሰጥሩከሆነ፣ለምንድንነው	1. ምቾትስለሚሰማኝ 2. የበተሰብእንክብካቤለማግኘት 3. ጤናተቋምላይጥሩገጠመኝስለሌለኝ 4. የጤናበለሙያወችስለማይመቹኝ
ክፍልአራት፡- የዎሊደአገልግሎትለይየማህበረስብእናየግልተነሳሽነትንበተመለከተ		
401	የመጨረሻዉእርግዝናሽአቅደሽበትነው	1. አዎ 2. አይደለም
402	የመውለጃቦታሽንሚመርጥልሽማነው	2. ራሴ 2. ባለቤቱ 3. ሁለታችን 4. እናቴ 5. ሌላ----
403	ባለቤትሽየትብትዎልጅይመርጠል	1. ቤት 2. ጤናተቋም 3. አላቅም
404	ማንቢያዋልድሽባለቤትሽድሰይለዋል	1. ጤናባለሙያ፣ 2 ልምድአዋላጅ 3.ቤተሰብ

405	ሌሎችየበተሰብአባላቶችሽየትብትዎልጅየመርጠሉ	1. ቤት 2. ጤናተቋም 3. አላቅም
406	ሌሎችየበተሰብአባላቶችሽማንቢያዋልድሽደስይላቸዋል	1. ጤናባለሙያ፣ 2 ልምድአዋላጅ 3.ቤተሰብ
407	ማህበረሰቡየትመውለድንያበረታታል	1. ቤት 2. ጤናተቋም 3. አላቅም
408	ማህበረሰቡ ማን እንዲያዋልድሽ ውለድንያበረታታል	1 ጤናባለሙያ፣ 2 ልምድአዋላጅ 3.ቤተሰብ
409	ቤትከሆነ የወለድሽው (ጥያቄ 206 ቤት ከሆነ) ማን አዋለደሽ	1. ብቻየን 2.ጤ/ኤክስቴነሽን 3. ልምድአዋላጅ 4. ቤተሰቦቼ
	ለምንቤትመውለድንመረጥሽ	1. በጣምስለሚመቸኝ 2. ከዚህበፊትበነበረኝልምድተነስቼ 3. ጤናተቋምመዉለድስለሚያስጠላኝ 4. ጤናጸቋሙሩቅስለሆነ 5. መጓጓዣስለሌለ 6. በቤተሰቤፍላጎት
410	ጥያቄ 206 ጤናተቋምከሆነለምን	1. ጥሩአገልግሎትለማገኘት 2. መጥፎገጠመኝስለነበረብኝ 3. ጤናተቋምነድዎልደመረጃስለተሰጠን 4. ጤናተቋሙቅርብስለሆነ
411	ጥያቄ 408 ጤናተቋምከሆነምንአይነትጤናተቋምተጠቀምሽ	1. ጤናኬላ 2. ጤናጣቢያ 3. ሆሰፒታል

መሰግናለሁ

የጠያቂውስም ----------------------------

ቀን ---------------------------

ፊርማ -----------------------

Annex V: Declaration form

Declaration

I, the undersigned, declare that this thesis is my original work, where my work is indebted to the work of others, it has not been accepted or presented for a degree in this or any other university and that all sources of materials used for the thesis have been fully acknowledged.

Name of Investigator: Kassahun Asires (BSC)

Signature: _______________

Name of the institution: Bahir Dar University

Date of submission: ______________

Approval sheet

Thereby certify that I have read and evaluated this thesis entitled "delivery service utilization and associated factors among mothers who gave birth in the last one year in Mandura district, Benshangul gumuze region, North West, Ethiopia by kassahun Asires. I recommend that it to be submitted as fulfilling the thesis requirement.

Melkamu Bedimo (Bsc, Mph, Associate Professor)

Signature --

Date--

Gizachew Tadesse (Bsc, Mph in Epidemiology)

Signature --

Date--

As a member of the Board of Examiners of MPH Thesis Open Defense Examination, I certify that I have read and evaluated the Thesis prepared by Kassahun Asires and examined the candidate. I recommend that the thesis to be accepted as fulfilling the Thesis requirement for the degree of Master of public health in Epidemiology.

Name and Signature of the internal examiner:

Kebadnew Mulatu (MPH, Assistant professor in Epidemiology).

Signature --

Date--