PREVALENCE OF OBSTRUCTED LABOR AND ASSOCIATED FACTORS AMONG WOMEN DELIVERED AT HOSPITALS IN WESTERN PART OF SOUTHERN NATION, NATIONALITIES, AND PEOPLES' REGION, ETHIOPIA.

A Thesis Submitted to School of Public Health Post Graduate Programs Directorate

Haramaya University

In Partial Fulfillment of the Requirements for Degree of Master of Public Health in Reproductive Health

Yekatit Melesse (BSc)

Major Advisor: MergaDheresa (PhD)

Co-advisors: TesfayeAssebe (PhD)

December, 2020

Harar, Ethiopia

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APPROVAL SHEET

SCHOOL OF GRADUATE STUDIES

HARAMAYA UNIVERSITY

As thesis research advisor, I hereby certify that I have read and evaluated this thesis prepared under my guidance by Yekatit Melesse entitled Prevalence of Obstructed Labour and associated factors among women delivered at hospitals of western part of Southern Nation, Nationalities and Peoples' Region, Ethiopia. I recommend that it be submitted as fulfilling the thesis requirement.

1. Dr. MergaDheresa (PhD) _____ /_____/____ 2020 G.C

Major Advisor Signature Date

2. Dr.TesfayeAssebe (PhD _____ ___/___/ 2020 G.C

Co-advisor Signature Date

As members of the Board of Examiners of the MPH thesis open defense examination, we certify that we have read and evaluated the thesis prepared by Yekatit Melesse and examined the candidate. We recommend that the thesis be accepted as fulfilling the thesis requirements for the degree of Public Health in Reproductive Health.

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Internal Examiner Signature Date

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External Examiner Signature Date

Final approval and acceptance of the thesis is contingent upon the submission of final copy of the thesis to council of graduate studies (CGS) through the departmental or school graduate committee (DGC or SGC) of the candidate.

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BIOGRAPHICAL SKETCH

My name is Yekatit Melesse I was born in 1987 in Jimma, Oromia region, Ethiopia. I completed primary school at Hermata primary school and secondary school in Jimma high school. I attended university at Mizan Tepi University and graduated in June 2015 in BSc in Public health. Then I have served as Graduate assistance II in Mizan –Aman Health Science College until I joined MPH Programme at Haramaya University in 2019.

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ABBREVIATION AND ACRONYM

ANC	Antenatal Care
AOR	Adjusted Odd Ratio
BPH	Bachuma Primary Hospital
CI	Confidence Interval
EBR	Ethiopian Birr
EDHS	Ethiopian Demographic Health Survey
IHRRC	Institutional Health Research Ethics Review committee
LUH	Liaquat University Hospital
MMR	Maternal Mortality Rate
MTUTH	Mizan-Tepi University Teaching Hospital
NGOs	Non Governmental Organization
OL	Obstructed Labour
PRM	Pregnancy-related mortality
SDG's	Sustainable Development Goals
SNNPR	South Nation Nationality Peoples Region
SPSS	Statistical package for Social Science
TGH	Tepi General Hospital
WHO	World Health Organization
WMPH	Wacha Meleszenawi Primary Hospital

ABSTRACT

Background: Obstructed labour is one of the most common preventable causes of maternal and prenatal morbidity and mortality in developing countries. The most frequent cause of obstructed labour is cephalo-pelvic disproportion- a mismatch between the fetal head and the mother's pelvic brim. The fetus may be large in relation to the maternal pelvic brim, such as the fetus of a diabetic woman, or the pelvis may be contracted, which is more common when malnutrition is prevalent.

Objective: The aim of this study is to assess the prevalence and factors associated with obstructed labour among women who delivered at hospitals of western part of SNNPR, Ethiopia. From March 1-30, 2020.

Methodology:- Institutional based cross-sectional study design was employed on 742 women who deliver in western part of SNNPR public hospitals. All public hospitals were covered purposively then proportional allocation was done for each hospital to get study participants based on number of delivering mothers in the hospital. All pregnant women who came for delivery service in the hospital were enrolled continuously. The data were collected by face to face interview and secondary data review by using structured and pre-tested questionnaire. Data was entered to EpiData Manager Version 4.0 software and SPSS version 20 was used for analysis. Bivariate logistic Regresion was used to determine the association between predictors and outcome variable. The multivariate analysis adjusted odd ratio with 95%confidence level was used to determine associated factors with obstructed labour. For all the statistical tests, $p<0.05$ was considered as statistically significant.

Result: The prevalence of obstructed labor among study participants was found to be 111 (15.8%, 95%CI, 13.1%, 18.5%). The risks of obstructed labour was significantly associated with age <20 years (AOR; 8, 95% CI 2.98, 22.12), duration of labor >24 hours. (AOR: 4.4, 95% CI 2.56,7.67) and previous history of any complications experienced following labour and delivery (AOR;4.2,95% CI 2.63,6.98).

Conclusion: The study shows that prevalence of obstructed labour was 15.8%. Maternal age, duration of labour and previous history of any complications experienced following labour and delivery were significantly associated with obstructed labour.

Keywords: Obstructed labour, cepalo-pelic disproportion

1. NTRODUCTION

1.1. Back ground

Labour is considered obstructed when the presenting part of the fetus cannot progress in to the birth canal, despite strong uterine contractions. The most frequent cause of obstructed labour is cephalo-pelvic disproportion-a mismatch between the fetal head and the mother's pelvic brim. The fetus may be large in relation to the maternal pelvic brim, such as the fetus of a diabetic woman, or the pelvis may be contracted, which is more common when malnutrition is prevalent. Some other causes of obstructed labour may be malpresentation or malposition of the fetus (shoulder, brow or occipito-posterior positions). In rare cases, locked twins or pelvic tumors can cause obstruction. (WHO,Geneva, 2003)

Principles of management of obstructed labour are correcting fluid, control infection, resting bladder and immediate relief of obstruction. The method for relieving obstruction depends on causes of obstruction and extents of complications. Cesarean section followed by operative vaginal deliveries in malposition of fetal head in alive fetus and destructive deliveries in dead fetus were options of operative management (Dutta DC, 2004).

Recognizing the factors associated to obstructed labour is important to prevent the complications. Delayed and neglected management of obstructed labour causes significant maternal morbidity mainly due to infection and hemorrhage and in the long term leads to obstetric fistulae, skeletal and neurologic complications. Maternal mortality from obstructed labour is largely the result of ruptured uterus or puerperal infection whereas prenatal mortality is mainly due to asphyxia. (Ranjana.Sinha.A, 2017)

In most sub Saharan countries, women are traditionally expected to give birth at home, and if complications arise there is often delay in accessing health care services. This may be due to three delays; delay in making the decision to seek for medical care, delay in reaching the facility or delay in offering of medical services while the patients in already in the facility. Inadequately developed health care systems including poor infrastructure, poor transportation and poor obstetrics care are also major contributors to obstructed labour. (Abdella.A, 2010).

1.2. Statement of the problem

Globally maternal mortality is the leading cause of death among females age 15-49 years old, an estimated 303,000 maternal deaths was reported in 2015. Of this, 99%(302,000) of maternal death occur in developing countries where 85% of the world population live. More than half of these deaths occurred in sub-Sahara Africa accounting 66% (201,000) maternal death. (WHO *et al.*, 2015). Annual reduction of MMR was only 2.3% per year. To bring a remarkable change on MMR, countries targeted a new strategy called sustainable Development Goals "SDGs''. Which includes the target of reducing global maternal mortality to less than 70 deaths per 100000 live births, and no country should have exceeding a MMR of 140 maternal deaths per 100000 live birth by 2030, (WHO, 2015b). The approximate life time risk of maternal death in developed countries was 1 in 4900 as compared to 1 in 150 in low-income countries. (WHO *et al.*, 2015).

Ethiopia is one of the countries in sub-Saharan Africa with markedly high maternal mortality ration 676 per 100,000 live births in before 2011. The recent report indicated pregnancy-related mortality ration (PRM) is declined to 412 deaths per 100,000 live births (with a 95% confidence interval of 273 to 551). Thus, for every 1,000 live births in Ethiopia, approximately four women died during pregnancy, childbirth, or within 2 months after child birth. Also it is one of the six countries that contribute for about 50% of global maternal deaths worldwide and the chance that women die estimated at 1 in 14. (CSA, 2016).

Worldwide the incidence of obstructed labour varies between 3%-6%. The lower figure was applied in more developed regions and the higher figured to developing areas. It is responsible for about 9% of maternal death. Which is varies region to region 4.1% to all maternal deaths in Africa; for Asia this amounted to 9.4% and 13.4% for Latin America and the Caribbean. (Bank W, 2015).

Maternal mortality from obstructed labour is caused by complication of ruptured uterus, postpartum hemorrhage, and puerperal sepsis, while substantial long term maternal morbidity include, intrauterine infections following prolonged rupture of membranes, obstetric fistula, trauma to the bladder and/or rectum due to pressure from the fetal head or damage during delivery, and ruptured uterus with consequent hemorrhage, shock or even death. Trauma to the bladder during vaginal or instrumental delivery may lead to stress incontinence. The number of maternal deaths as a result of obstructed labour or rupture of uterus in developing countries varies between 4% and 70% of all maternal death. (EMA, UNFPA, 2016).

The major causes of maternal deaths in Ethiopia are similar to most developing countries. In Ethiopia the proportion of maternal death ascribed to the different causes varies from year to year. Overall the case fatality rates of ruptured uterus/ obstructed labor and preeclampsia/eclampsia indicate an increasing trend while that of abortion remain stable .Among these mortality rates obstructed labor contributes 36% of maternal death in Ethiopia (Abdella.A, 2010).

Obstructed labour also has implications for the fetus or neonate-frequent results in asphyxia that can result in stillbirth, neonatal demise, intracranial hemorrhage, cerebral palsy, and developmental disability, due to severe molding of the head leading to tentora tear or traumatic delivery, caput, fetal distress, and acidosis due to fetal hypoxia and maternal acidosis and neonatal sepsis. (Say.L *et al*., 2014).

Women who were delivered for the first or second time may be young and as such be at a higher risk of obstructed labour than those who have delivered more times. Grand multiparas women may also be at a higher risk of obstructed labour from malposition and malpresentation due to lax uterus. (Daniel Shiferaw and SileshiTomas, 2019)

Despite the fact that obstructed labor in Ethiopia seems to be a common cause of maternal and prenatal morbidity and mortality there is lack of research evidence to substantiate this .In order to increase knowledge base for more successful intervention against obstructed labor, understanding factors associated with it is critical in order to take prompt action to prevent neonatal, and maternal morbidity and mortality.

There is a dearth of research on factors associated with obstructed labour in this particular study area, therefore, the aim of this study is to assess prevalence and associated factors of obstructed labor among women delivered in western part of SNNPR public hospitals to provide information for better improvement of maternal and fetal health.

1.3. Significance of the study

The finding of this study will provides information on prevalence of obstructed labour and associated factors among pregnant mothers by analyzing the impact of different variables on obstructed labour and associated factor.

Specifically;

- This study give information about prevalence and associated factors of obstructed labour to four Zonal Health Bureaus, Hospitals and other non-governmental organizations who works in collaboration with the health facilities to plan for reducing maternal mortality.
- Hence, reducing maternal mortality has been one of the priority agendas of the Ethiopian government; the result of this study may also help policy makers at each hierarchy; national, regional and zonal levels.
- Moreover, the knowledge generated from this study will enrich literatures available on the issue and may trigger other researchers to conduct similar study in various parts of the country.

1.4. OBJECTIVES

1.4.1. General objective:

To assess the prevalence and factors associated with obstructed labour among women who delivered at Hospitals in western part of Southern Nation, Nationalities, and Peoples' Region, Ethiopia. From March, 1-30-2020.

1.4.2. Specific objectives:

- To assess prevalence of obstructed labor among women delivered at Hospitals of western part of Southern Nation, Nationalities, and Peoples' Region, Ethiopia.
- To identify factor associated with obstructed labour among women delivered at Hospitals in western part of Southern Nation, Nationalities, and Peoples' Region, Ethiopia.

2. Literature review

2.1. Magnitude of Obstructed labour

The number of maternal deaths as a result of obstructed labour is 8% globally but this number varies in developing country, it ranges 4-70% of all maternal deaths and it is also associated to high prenatal mortality rate (Cron J, 2016).

In Asia, cross sectional observational study was conducted in Pakistan at Larkana Sindh with aim to describe important epidemiological associations of obstructed labour, to determine factors leading to it, and to chart out serious squeal that may follow particularly with or without timely or delayed clinical intervention showed, total deliveries in units during study period were 9000; among them 468 (5.2%) patients found to have obstructed labour. (Shaikh *et al.*, 2012).

In Africa, Study done to investigate the role of individual and health facility factors and the risk for obstructed labour and its adverse outcomes in south-western Uganda shows, among total of 12,463 obstetric records, 10.5% were found to be obstructed labour. (Kabayenga *et al*, 2011).

In Ethiopia as observed in different studies from across the country the prevalence of obstructed labour is estimated between as low as 4.1% and as high in institution based cross sectional retrospective study conducted in West Harerge zone in 2016 reveal that among total of 385 delivered women 34.4% were cases of obstructed labour. (Tezita TamiruWube *et al*, 2018).

Another retrospective cross-sectional study carried out of assess the magnitude and associated factors of obstructed labour, and its fetal and maternal outcome among women delivered in Gimbi public hospital of Western Ethiopia in 2015 reveal from 321 total delivery registration reviewed prevalence of obstructed labour was found to be 18.1% (Danel. S,*et al*, 2017). Similar Hospital based cross sectional study was employed in Adama, Hospital Medical College, Oromia Regional state in 2016 and out of 384 deliveries during study period 9.6% were found to be cases of obstructed labour. (Asnakech Tadess Gudina *et al*, 2016).

A hospital based cross sectional study was conducted in 2009 incidence, causes and outcome of obstructed labor among women delivery in jimma university specialized hospital, confirm that the prevalence of obstructed labour was 179(12.2) from total of 1468 deliveries at the hospital.(Shimelis, *et al*, 2014).

Another hospital based cross-sectional study was done in Halaba in 2015 women delivered at HalabaKulito Primary Hospital. From 344 deliveries from delivery registration book among this the prevalence of obstructed labor was 18.6%. (Abdo RAand Halil HM,2019.)

Another institutional based cross sectional study conducted in Mizan-Tepi University Teaching Hospital to asses prevalence of obstructed labour among mother delivered in 2015 shows from total of 151 delivery 12(7.95%) was found to be obstructed labour. (Henok and Asefa, 2015). In similar study area Health facility based cross sectional study to assess magnitude and factors contributing to obstructed labour in 2017 shows that from total of 327 participant 51(15.6%) was found to be obstructed labour, (Sisay.S *et.al*,2017).

2.2. Factor associated with obstructed labour

2.2.1. Socio demographic factors

Maternal Age are demographic variable which cause obstructed labour, teenage pregnancy are associated with obstructed labour due to labour with immature pelvis and pregnancy in adolescents imposes great physiologic burdens on girls which influences the time of delivery. Evidenced from A hospital based cross-sectional study was done in HalabKulito Primary Hospital in 2015, the result showed that mothers age less than 19 years were nearly 7 times more likely to have obstructed labour than their counterparts (AOR=6.9, 95%, CI (2.2, 21.6)). (Abdo RAand Halil HM,2019.)

In Ethiopia cross sectional retrospective study carried out to assess the magnitude and associated factors of obstructed labour, and its fetal and maternal outcome among women delivered in Gimbi public hospital of Western Ethiopia show that obstructed labour was 11 times higher among mothers of the age group 15-19 than mothers of the age group ≥ 35 years (AOR 11.22, 95% CI: 4.43-28.42). (Daniel.S, *et al*, 2017). Similarly cross sectional study conducted in Mizan Tepi University teaching hospital to assess magnitude and contributing factors of obstructed labour show from those mother diagnosed to have OL 94.1% of them were the age group less than 19(Sisay.S, *et.al*,2017).

Place where women resides influences or delayed to seeking care. A hospital based descriptive cross sectional study was conducted in Department of Gynecology and Obstetrics units I,II and III of Liaquat University Hospital (LUH) Hyderadbad. Reveled that more than 60% women in obstructed labour had reported from rural areas (P=0.01); and more than eighty percent of them were illiterate (P=0.01) and belonged to lower socio-economic class (P=0.02) (Shaikh SR, Memon KN, Usman,2015).

In Ethiopia institutional based cross sectional study conducted in Adama Hospital medical college showed that from women diagnosed to have obstructed labour, 78.6% were rural residents when compared with those came from urban. On the other hand, these mothers may have increased OL risk in relation to educational status educational status of the women influence their decision making for seeking health care. (Asnakech Tadess Gudina *et al*, 2016).

2.2.2. Obstetric factors

In Ethiopia cross-sectional retrospective study carried out to assess the magnitude and associated factors of obstructed labour, and its fetal and maternal outcome in west wollega, at Gimbi hospital reveal that risk of obstructed labour was 24.96 times higher among nullipara mothers than grand multipara as (AOR 24.96,95% CI: 10.73 -56.85). Similarly the risk of OL is 4.76 times higher among mother who delivered a baby with normal birth weight than underweight new born (AOR 4.76, 95% CI: 1.20-18.90). (Daniel S, et al, 2017).

A hospital based cross-sectional study was done in HalabaKulito primary Hospital in 2015,the result showed that Mothers who didn't have antenatal care follow up were nearly 3times more likely to have obstructed labour than mothers who had antenatal care follow up (AOR=3.1,95% CI (1.5,6.4)). (Abdo RAand Halil HM,2019.) Like wisely the presence of any form of malpresentation to labour were 10 times more likely to have obstructed labour than their counterparts (AOR=9.2, 95% CI (3.3, 25.6). (Abdo RAand Halil HM,2019.)

Hospital based cross sectional study conducted in Adama Hospital to assess magnitude of obstructed labour and associated risk factors in 2016 revealed that fetal weight greater than 4 kilo gram (OR: 11.2; 95% CI: 2.4, 13.2) had statistically significant association with obstructed labour or being macrosomic has 11.2 times higher risk of developing OL than normal weight. (Asnakech Tadess Gudina *et al*, 2016). On the other hand health facility based cross-sectional study design cary out in Mizan Tepi university teaching hospital on mothers admitted to obstetric ward in 2017 revealed that Birth weight of baby between 2500grams-4000gr significantly, 99.5%, less likely to encounter obstructed labour compared to birth weight less than 1500 grams (P=0.02, AOR=0.005(2.218-190.886). (Sisay.S, *et.al, 2017*).

2.3. Conceptual frame work

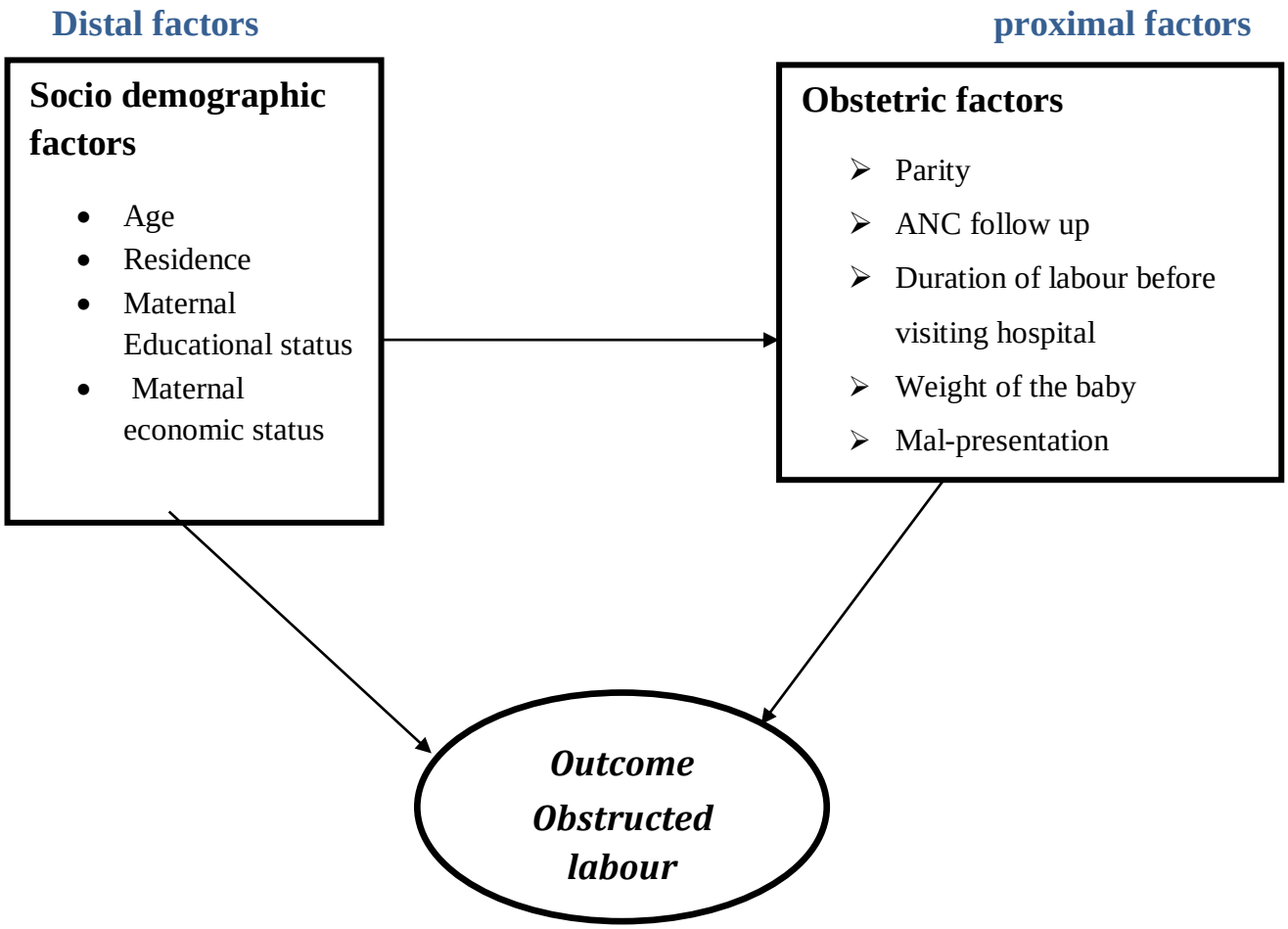

Figure 1 Conceptual framework for obstructed labour and associated factors which are developed from different literature review to illustrate linkage between dependent variables and independent variables of obstructed labor.(Kabakyenga et al.2011, Daniel .S and Sileshi.T (2019),Shaikh SR *et.al*, 2015).

3. METHODOLOGY

3.1. Study Area and Period

This study was conducted in western parts of SNNPR; this study area includes four zones such as Kaffa, Sheka, Bench-Sheko and Debub mierab omo zones.

Kafa zone, with its capital of Bonga is located at a distance of around 460 km from Addis Ababa. The zone has 12 woredas and 2 town administrations.

Bench Sheko Zone, with its capital of MizanAman town is located around 585km away from Addis Ababa. The zone has two town administration and 6 rural districts.

Sheka zone is located in SNNPR, around 700 km from the capital city, Addis Ababa, with its center, Masha and Tepi town. There are three weredas and two town administrations. As the zonal health bureau report indicates.

Debub mierab omo zone is located in SNNPR around 582km from the capital city, Addis Ababa

The current total population is 1,355,422 out of which 51% are female and 49% are male,(Population projection of Zonal Health Department). It has 5 Hospitals (2 General , 2 Primary hospitals and one teaching hospital) and 96 health centers, all health facilities give delivery service. There is, two Universities, one Health sciences college and 1 teaching college. (Bench Sheko Zone profile 2011 E.c).

3.2. Study design

Institutional based quantitative cross sectional study design was employed.

3.3. Source population

The source population was all women attending their delivery at western part of SNNPR public Hospitals. From March, 1-30, 2020.

3.4. Study population

All women who were attend their delivery at western part of SNNPR public Hospitals during data collection period.

3.5. Inclusion and exclusion criteria

3.5.1. Inclusion criteria

All women who were gave birth in the Hospitals during the data collection time.

3.5.2. Exclusion criteria

Women who are mentally incapable and those who are severely ill clients are also excluded.

3.6. Sample size determination

The required sample for the first specific objective was calculated by using a single population proportion sample size calculation formula considering the following assumptions.95% confidence interval (CI), 5% margin of error, and population proportion formula through assumption of proportion of the obstructed labour were 7.95% from cross sectional study in Mizan Aman General Hospital southern, (Sisay S. et al, 2017).

$$n=\frac{z^2pq}{d^2}$$

d = margin of error of 0.02 with 95% confidence interval.

P= estimated prevalence rate of obstructed labour is = 0.08% (0.92)

α = 0.05 (level of significance)

None response rate = 5%

n= the required sample size

Single population proportion formula will be:

$$n = \frac{[1.96]^2 0.08[0.92]}{0.02^2} = 707$$

By considering 5% of non-response rate, final sample size become = **742**

To determine the required sample size for the second specific objective of this study, by considering various factors which significantly associated with the outcome variables with confidence level of 95%, margin of error of 5% and power of 80%, ratio 1:1 and by using Open Epi Infor 7 StatCal software program for double population proportions formula the sample size was calculated for those selected variables and the maximum sample size was taken for final required sample size.

Table 1: Double population proportion based sample size determination for a study on prevalence of obstructed labour and associated factors among women delivered at western part of SNNPR public hospitals.

Variables	**Obstructed labour**		**AOR**	**Final sample size Considering 5% non response rate**	**References**	**Remark**
	Exposed	Unexposed				
ANC follow up	63.7% Had no follow up	16.1% Had follow up `	3.1	88	(Abdo RAand Halil HM,2019.)	
Mal presentation	65.2% Yes	84.7% No	10	383	(Abdo RAand Halil HM,2019.)	

Finally, the sample size for the first specific objective which is calculated for the prevalence of obstructed labour is greater than the second specific objective. Therefore the sample size of the first specific objective is taken as the final sample size which is **742.**

3.7. Sampling procedure

There are five hospitals found in western part of SNNPR area. There are Mizan -tepi teaching hospital, Tepi general hospital, Gebertsadek shawo general hospital, Bachuma and meleszenawi primary hospital. All public hospitals were included in the study purposively. Then proportional allocation was done for each Hospital to get study participants based on number of delivering mothers in the hospital. All pregnant women who came for delivery service in the hospital were enrolled continuously until the required sample size was achieved for each hospital. The number of study participants from these health facilities was determined from the previous delivery client flow report. The monthly client flow was determined by taking the average delivery report from the last quarter of 2019 report for each hospital. The step of selection is shown below in **Figure** 2.

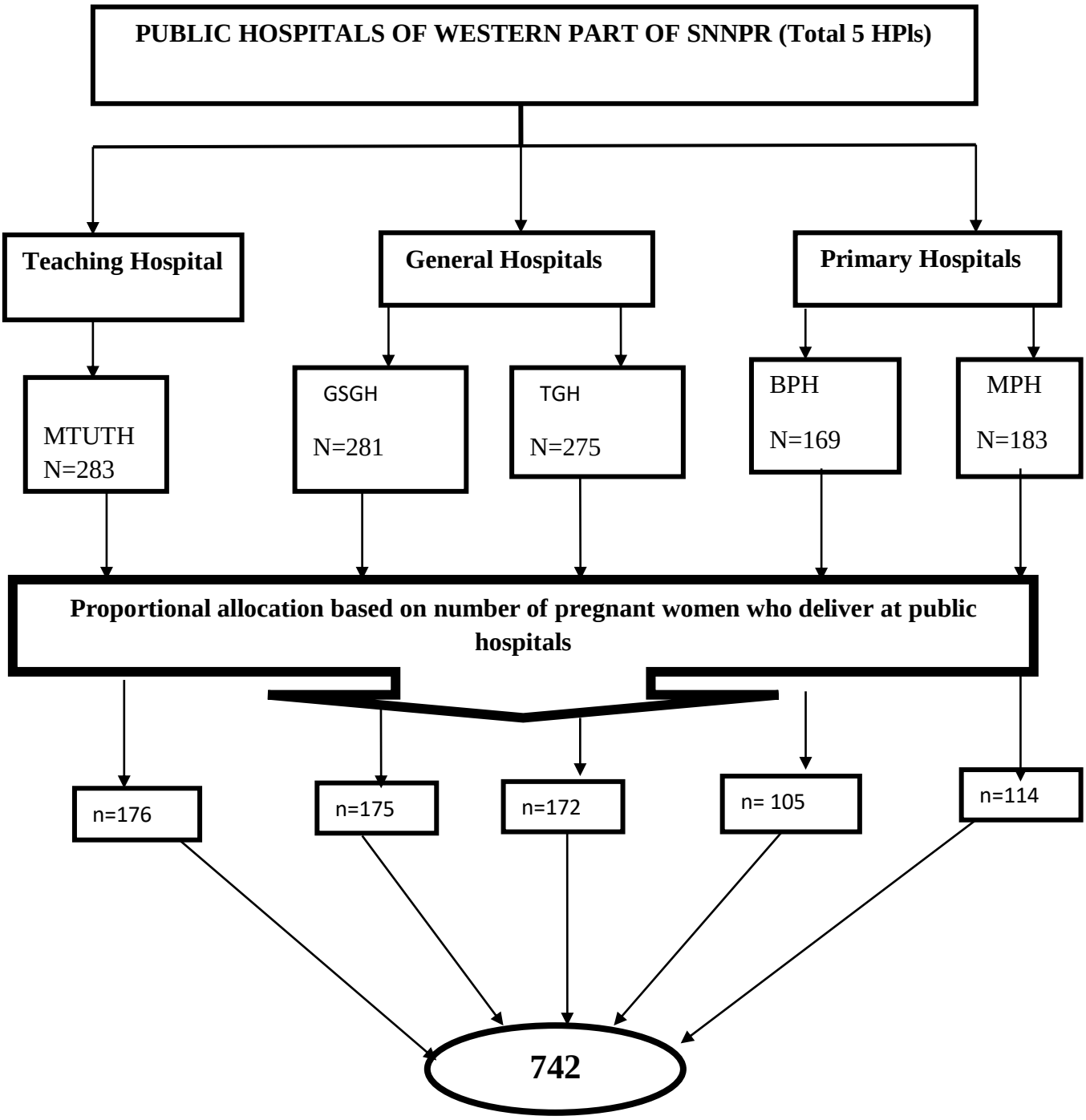

Figure 2 Schematic presentation of the sampling procedure.

Data collection method

The main instrument of data collection was an interviewer-administered pre designed structured questionnaire and Secondary data review. The questionnaire was developed based on the data collection tool of other relevant literature. (Abdo RAand Halil HM,2019 and Bansal. A *et al*., 2019). The questionnaires contain socio-demographic background of the mothers, obstetric history, which was help to identify risk factor for obstructed labour. Data collection was carried out by five diploma midwifery data collectors with two BSc Midwifery supervisors for a period of one month. Recruitment of the study participants was facilitated by delivery service providers in each hospital. The questionnaires were initially prepared in English and then translated in to Amharic then back into English by linguistic teacher to check its consistency. When the participant is interested, the consent was obtained and the data was collected. All information was collect from mothers after delivery who give birth in hospital and maternal delivery record were reviewed at the same times to differentiate which mother comes with obstructed labour and the cause before they left the health facilities.

3.8. Study variable

3.8.1. Dependent variables

Obstructed Labour.

3.8.2. Independent variables

- Socio demographic characteristics (age, area of residency, maternal educational status, Maternal economical status).
- Obstetrics factors (parity, numbers of ANC follow up, duration of labor before visiting hospital, weight of the baby, Mal-presentation).

3.9. Operational Detention

Obstructed labour: Obstructed labor is operationally defined as failure of the presenting part to descend in birth canal despite adequate uterine contractions for mechanical reasons. (Shimelis F. et al 2010). The diagnosis of obstructed labor is made by Physician or gynecology residents working in the hospital. Data collectors were check the cause by using client record.

Malposition: abnormal positions of the vertex of the fetal head (with the occiput as the reference point) relative to the maternal pelvis.

Malpresentation: any fetal presentation other than vertex.

Antenatal follow-up: When the mother who has one or more visit at any health institution during her recent pregnancy and document in her cards.

Grand multipara: when the number of previous similar deliveries was at least five.

Prolonged labor: duration of labor greater than 24 hours.

Cephalo pelvic disproportion: disproportion between size of fetus relative to the pelvis of mother

Parity: women who has previous viable infant.

Prim Para: A women who has giving birth for the first time.

Multi Para: A women who has two up to four children

3.10. Data quality control

To ensure the quality of the data, structured and pretested questionnaire was used. Five percent of the questionnaires were pretested at Tercha primary Hospital out of study area before the actual data collection starts. This will help for further clarification of instruments and to help data collectors to familiarize with the instrument and to estimate the time needed. The structured questionnaire was first prepared in English and then translated into Amharic again translated back to English to increase the questionnaire consistency. Two days intensive training were provided about the instruments, ways of data collection, ethical issues and aims of the study for data collectors and supervisors by principal investigator (PI). Finally, ambiguous and unclear questions were modified before the data collection. To keep completeness and consistency, data collectors was closely supervised before and during the data collection process by the supervisor. The principal investigator (PI) was supervise the correct implementation of the procedure and check completeness and logical consistence after data collection. During data analyses, double data entry was done by two individuals to minimize errors.

3.11. Data processing and analysis

Data were checked for completeness before entered to a computer. Then it was coded and entered to EpiData Manager 4.0 software was transformed to SPSS version 20 for further analysis and for descriptive summary like frequency, prevalence, cross tabs and graphical presentation. The association between predictors and outcome variable which are obstructed labour was analyzed using bivariate and multivariablelogistic regression. It was checked by crude odds ratio and 95% confidence level. Then those which shows significant association (p value≤0.25) obtained by bivariate analysis were candidate variables for multivariable analysis. Lastly model fitness was checked using Hosmer-lemshow test (>0.05) and to check multi-collinearity variance inflation factors (<10) was used before proceeding to multivariate analysis. With the multivariate analysis adjusted odd ratio with 95%confidence level was used to determine the magnitude of associated, the significance of association was set at p-value <0.05

3.12. Ethical consideration

The study was reviewed and approved by Haramaya University College of Health and Medical Sciences and Institutional Health Research Ethical Review committee (IHRERC). The ethical clearance was obtained from IHRERC and Official letter was sent for all public hospitals. The data collection were begin after permission and co-operation obtained from all Hospitals. An informed written and signed voluntary consent were obtained from each study participants after the objectives of the study are explained. A thumbprint or signature was used on the consent form. Only those who are sign written consent were participating in the study and confidentiality of response was maintained throughout the research process by giving code for participant. The entire study participants was informed that data will be kept private and confidential and used only for research purpose. The participants were also assured that they have the right to refuse or withdraw if they are not comfortable at any time. Personal privacy and cultural norms were respected. Health education on risk factors, consequences was provided to all of the participants after the completion of data collection.

4. Result

4.1. Socio-Demographic characteristics of study participants

From 742 selected participants, seven hundred four of them were involved in the study and that gives the response rate of 95%.Of these more than two-third of study participants 451(64.1%) were between age group of 20-30 years. The mean age of the respondents were 28.5 with SD of 5.8 within the range of 17 to 45 years old. More than 587 (83.4%) of study participants were married. 382(54.3%) of study participants were urban dwellers, and 335(47.6%) of study participants were housewives. (table 1)

Table2.Socio-Demographic characteristics of participants in SNNPR, Ethiopia 2020(n=704).

Variables	Category	Frequency	Percentage (%)
Age (n=704)	<20	24	3.4
	20-30	451	64.1
	>30	229	32.5
Marital Status(n=704)	Married	587	83.4
	Single	45	6.4
	Divorced	35	5.0
	Widowed	37	5.3
Religion(n=704)	Orthodox	262	37.2
	Muslim	120	17.0
	Protestant	258	36.6
	Other	64	9.1
Ethnicity(n=704)	Bench	165	23.4
	Sheko	53	7.5
	Sheka	62	8.8
	Maint	43	6.1
	Amhara	147	20.9
	Deze	24	3.4
	Kefa	157	22.3
	Other	53	7.5
Residence(n=704)	Rural	322	45.7
	Urban	382	54.3
Education(n=704)	Unable to read and write	190	27.0
	able to read and write	153	21.7
	Attend primary school	158	22.4
	Attend secondary school	109	15.5
	College diploma and above	94	13.4
Occupation(n=704)	Governmental Employee	117	16.6
	Self-Employee	152	21.6
	House wife	335	47.6
	Student	83	11.8
	Unemployment	11	1.6
	Other	6	.9

Income(n=704)	Less than 2000 ETB	436	61.9
	Greater/equal 2000 ETB	268	38.1
Have your own income(n=704)	Yes	293	41.6
	No	411	58.4

4.2. Obstetric history of study participants

Among 704 study participants in the study, 654(92.9%) of them had 1-4 live births. 595(84.5%) of study participants attended ANC follow up. 307(51.6%) of ANC attendants started ANC follow up in the second trimester of their pregnancy (Table 2)

Table 3.Obstetrichistory of study participants in western SNNPR, Ethiopia 2020(n=704).

Variable	Category	Frequency	Percent (%)
Parity ***(n=704).***	1-4	654	92.9
	>4	50	7.1
ANC follow up ***(n=704).***	Yes	595	84.5
	No	109	15.5
If yes when did started ***(n=595).***	first trimester	211	35.5
	second trimester	307	51.6
	third trimester	58	9.7
	don't know	19	3.2
Number # of times ANC visit (n=595)	Once	54	9.1
	Twice	101	16.9
	three times	219	36.8
	four times	165	27.7
	Above 4	56	9.4
Gestational age ***(n=704).***	<37 weeks	90	12.8
	37-42 weeks	507	72.0
	>42 weeks	107	15.2
History of institutional delivery*(n=704).*	Yes	446	63.4
	No	258	36.6

4.1. Prevalence of Obstructed labor among study participants

Among 704 completed maternal record reviewed, the prevalence of obstructed labour among study participants was found to be 111 (15.8%), 95%CI (13.1%, 18.5%).

The main cause of obstructed labor includes, Cepalo-pelvic disproportion (CPD) 47(42.3%),malposition 37(33.3%) and malpresentation17(15.3%). Six hundred eight (86.4%) of participants labour took 12-24 hours, 105(14.9%) of them were delivered through cesarean section. One hundred forty six (20.7%) of study participants had complications related with labor and delivery. The main types of complications were post-partum hemorrhage accounting 78(53.4%) of study participants had post-partum complications followed by infection 52(35.6%) and uterine rupture 13(8.9%)(Table 3).

Table4. Obstructed labor related factors among participants in western SNNPR, Ethiopia 2020(n=704)

Variable	Category	frequency	Percent (%)
Causes of Obstructed labor***(n=704)***	CPD	47	42.3
	Malposition	37	33.3
	Malpresentation	17	15.3
	Others	10	9.1
Duration of labor***(n=704)***	12-24 hr	608	86.4
	>24hr	96	13.6
Mode of delivery***(n=704)***	Normal Delivery	514	73.0
	Cesarean Section	105	14.9
	Instrumental Delivery	85	12.1
Have any complications***(n=704)***	Yes	146	20.7
	No	558	79.3
Types of complications	Rapture of uterus	13	8.9
	Infection	52	35.6
	postpartum hemorrhage	78	53.4
	Other	3	2.1
Birth weight***(n=704)***	<4000gm	656	93.2
	>4000	48	6.8

4.3. Factors associated with obstructed labour

4.3.1. Multivariable Logistic regression analysis for factors associated with obstructed labor

In bivariate logistic regression analysis variables such as age, have their own source of income, institutional delivery, gestational age and duration of labor were significantly associated with obstructed labor. Variables with P-Value less than 0.25 in bivariate logistic regression analysis were selected for multivariable logistic regression analysis to identify variables with independent association with obstructed labor.

Multicollinarity test using VIF and tolerance was cheeked and there was no correlation between independent factors. Furthermore the final multivariable logistic regression model was cheeked with goodness of fit test using Hosmer and Lemeshow Test. Accordingly the model was best fit with p-value 0.748. In multivariable logistic regression analysis three variables were significantly associated with obstructed labour when other variables lost their significance association.

Among socio-demographic characteristics of study participants, maternal age was found to be statistically significantly associated with obstructed labor. Those women with age group <20 years old were 8 times more likely to be diagnosed with obstructed labour than those above 30 years old AOR; 8, 95% CI (2.98, 22.12). Those women with age group 20-30 years old were 5.2 times more likely to be diagnosed with obstructed labour than those above 30 years old; AOR:5.2,95% CI (1.72,16.10).

Those women who had duration of labour >24 hours were 4.4 times more likely to be diagnosed for obstructed labour than women whose labour took 12-24 hours of duration AOR:4.4, 95% CI (2.56,7.67).Those women who experienced any complications following their labour and delivery were 4.2 times more likely to had obstructed labour than their counter parts AOR;4.2,95% CI (2.63,6.98).

Table 5. Bivariate and Multivariable logistic regression analysis for factors associated with obstructed labor in western part of SNNPR, Ethiopia 2020(n=704)

Variable	Category	Obstructed labor		COR (95%CI)	P-value	AOR (95%CI)	P-value
		No# (%)	Yes# (%)				
Age	<20	14(58.3)	10(41.6%)	8.7(3.73,20.6)	<0.001*	8(2.98,22.12)	<0.001*
	20-30	62(13.7)	389(86.2)	7.7(3.19,18.8)	<0.001*	5.2(1.72,16.10)	0.004*
	>30	35(15.2)	194(84.7)	1	1	1	1
Own income	Yes	36(12.2)	257(87.7)	1	1	1	1
	No	75(18.2)	336(81.7)	1.5(1.03,2.44)	0.03*	1.3(0.81,2.17)	0.2
Parity	0	7(29.1)	17(70.8)	1	1	1	1
	1-4	98(15.5)	532(84.4)	2.2(0.90,5.53)	0.08	1.8(0.60,5.63)	0.2
	>4	6(12)	44(88)	3(0.88, 10.28)	0.07	3.4(0.76,15.28)	0.1
ANC follow up	Yes	91(15.3)	504(84.7)	1.2(0.73,2.12)	0.42	1.6(0.78,3.39)	0.19
	No	20(18.3)	89(81.6)	1	1	1	1
Institutional delivery	Yes	58(13)	388(86.9)	1	1	1	1
	No	53(20.6)	204(79.3)	1.7(1.15,2.61)	0.008*	1.1(0.65,2.09)	0.59
Gestational age	<37 weeks	8(8.8)	82(91.1)	0.5(0.24,1.13)	0.10	0.4(0.20,1.12)	0.09
	37-42 weeks	79(15.5)	428(84.4)	0.33(0.14,0.79)	0.01*	0.4(0.15,1.10)	0.07
	>42weeks	24(22.4)	83(77.5)	1	1	1	1
Duration of labor	12-24 hour	70(11.5)	538(88.5)	1	1	1	1
	>24hour	41(42.7)	55(57.2)	5.7(3.56,9.21)	<0.001*	4.4(2.56,7.67)	<0.001*
Birth weight	<4000g	99(15)	557(84.9)	1	1	1	1
	>4000g	12(25)	36(75)	1.8(0.94,3.72)	0.07	1.0(0.46,2.16)	0.99
History of previous Complications	Yes	56(38.3)	90(61.6)	5.6(3.68,8.78)	<0.001*	4.2(2.63,6.98)	<0.001*
	No	55(9.8)	503(90.1)	1	1	1	1

COR&AOR=crude and adjusted odds ratios, P*=statistically significant at p-0.05 in multivariable logistic regression analysis

5. Discussion

The study found that among 704 completed record review, the prevalence of obstructed labour was found to be 111(15.8%),95%CI(13.1%,18.5%).Maternal factors such as age, duration of labor and Maternal complications were significantly associated with obstructed labor.

In this study the prevalence of obstructed labour among study participants found to behigh,111(15.8%),95%CI (13.1%,18.5%).This magnitude of obstructed labor in the study area implies the need to give special attention to health care given for women during pregnancy, labour and delivery more than ever. In doing so will assure the health and wellbeing of mothers. This finding is consistent with other facility based studies conducted in Ethiopia and abroad For instance prevalence of obstructed labour was 18.1% in a study conducted at Gimbi public hospital, Ethiopia 2019.15.6 % in a study done in Mizan-Tepi University Teaching Hospital, Bench-Maji Zone, SNNPR, Ethiopia 2017.

However prevalence of obstructed labor in this study is higher than prevalence of obstructed labor reported as 7.95% in a study conducted in Mizan Aman, southwest Ethiopia 2015, prevalence of 12.2% in a study conducted in Jimma University Specialized Hospital. prevalence of 4.1% in a study conducted in Ilu Ababora Zone(Ahmed Y, Solomon *et al.*,2017).The current finding also higher than the reported study findings 5.2% prevalence of obstructed labor in Pakistan 10.5% prevalence of obstructed labor in Uganda ,1.64% prevalence in India and 3.61% prevalence in Pakistan. The difference might be due to difference on study setting, sample size, socio-economic and difference on time durations of the studies. For instance a study conducted in 2015 in Mizan Aman hospital, Ethiopia had small sample size (only 151) and only being conducted in one hospital un like the current study which was conducted in all available hospitals in the study area and relatively large sample size. This might be the reason for the observed difference in terms of prevalence of obstructed labor

On the other hand the prevalence of obstructed labor reported in the current study is lower than prevalence of obstructed labor which was 34.3% reported in a study done at Public Hospitals of Western Harerghe Zone, Oromia, Ethiopia in 2018 and20.5% prevalence of obstructed labor reported in Nigeria, and 29% prevalence of obstructed labor in Ethiopia in 2014. The possible difference for this might be improved health care system, Proper care during pregnancy and delivery, and improved ANC follow up in the recent years than ever before might explain the gap.

In this study concerning factors associated with obstructed labour in multivariable logistic regression analysis, maternal factors such as maternal age below 20 years old, prolonged labor(>24 hours), and those women who experienced any complications following their labour and delivery were 4.2 times more likely to had obstructed labour than their counter parts.

Those mothers below age of 20 years old were 8 times more likely to be diagnosed for obstructed labor than women whose age was greater than 30 years old; AOR: 8, 95% CI (3.1, 21.96). This is consistent with study findings reported in other similar researches conducted in Ethiopia and different parts of the world. For example a hospital based cross-sectional study conducted in Halab Kulito Primary Hospital in 2015revealed that those mothers whose age less than 19 years were 6.9 times more likely to have obstructed labor than their counterparts; AOR:6.9, 95%CI (2.2, 21.6).Similarly another study in Ethiopia also showed that obstructed labour was significantly associated with age group 15 - 19 years (AOR 11.22, 95% CI: 4.43 - 28.42). A study in Uganda also showed that those mothers with age group 15-19 years were more likely for obstructed labor than their counter parts; AOR: 1.21, 95% CI: 1.02-1.45.

This implies that pregnancy and related labor and delivery in teenagers are very risky for both maternal as well as fetal wellbeing. In spite of the fact that the situation is a known fact proved a numerous literatures it is still a very serious problem which requires interventions targeting this age group to mitigate maternal morbidity and mortality secondary to obstructed labour.

Duration of labour was also significantly associated with diagnosis of obstructed labour in this study. Those women whose labour took >24 hours were 4.5 times more likely to be diagnosed for obstructed labour than women whose labour lasts 12-24 hours of duration. Similar findings also reported that prolonged labour was significantly associated with obstructed labour. This is in line with another study conducted in Adigrat Zonal Hospital, Tigray Region, Ethiopia reported that obstructed labour was highly prevalent among women who are in labour for a long time.

The finding also consistent with other study findings that found perinatal complications are much more common in women with prolonged labour (>24 hours) than normal duration of labour.

Similar finding also reported in another study. Therefore proper follow up of danger signs of obstructed labor to women in labour and delivery and appropriate interventions targeting the challenges during this time would reduce perinatal mortality and in doing so will make sure in achieving sustainable

development goal targeting reduction of maternal morbidity and mortality related with labor and delivery.

In this study any complications developed after labour and delivery were 4.2 times more likely had obstructed labour than women without complications AOR;4.2,95% CI (2.63,6.98).This finding is consistent with study finding done in south-western Uganda in 2011 which revealed that the proportion of women with obstructed labour who developed complications was 8 times that of those who did not have the condition. Obviously, obstructed labour, if not well managed in the early stages, leads to severe or debilitating complications and sometimes leads to death. There for special attention coupled with optimum and timely care by advancing ANC follow up, easily access of labour and delivery service for those pregnant women would minimize maternal complications so that it's possible to prevent morbidity and mortality secondary to obstructed labor.

6. STRENGTHS AND LIMITATIONS OF THE STUDY

6.1. Strengths

- Use of both primary and secondary data.
- Including all zonal public hospitals and relatively large sample size.

6.2. Limitations

- ❖ The study has considered only women who were attending there delivery at the public hospitals Despite these assumptions, other pregnant women may visit private hospitals for delivery.
- ❖ In the study health care factors are not included if the factors are include the association and prevalence could be more clear.
- ❖ Due to the nature of cross-sectional study design it is difficult to establish the cause effect relationship between the predictors and the outcome variable.

7. Conclusion and Recommendation

7.1 Conclusion

The study shows that prevalence of obstructed labour was 15.8%. The main causes were Cepalo-pelvic disproportion, malposition and malpresentation. Most obstructed labour was managed by caesarian section. Maternal age, duration of labour and any complications experienced following labour and delivery were significantly associated with obstructed labour.

7.2 Recommendations

Keeping in view of the present research study findings, the following recommendations have been made:

- The zonal health bureau should focusing on program and activities to improve maternal health and repeated capacity building workshops should be organized for delivery providers at all level to enhance their capabilities for improving the efficiency of delivery services.
- The health institutions should focus on providing improved maternal health services with special emphasis to teenage women with optimum and proper follow up throughout the pregnancy, proper labor and delivery services, in detecting early danger signs of pregnancy and managing complications.
- District health office collaborate with districts educational office encourage the students to actively participate in RH clubs and providing quality RH services for all students and improving women's education. And also they should work on collaboration with primary and secondary schools giving health education including family planning to teenagers.

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APPENDIX

Appendix A. Information Sheet and Informed Voluntary Consent Form for Heads of Hospitals of western part of SNNPR.

My name is _____.I am working as a data collector for the study being conducted in this institution by Yekatit Melesse who is studying for her Master's degree at Haramaya University, College of Health and Medical Sciences. I kindly request you to lend me your attention to explain you about the study and your institution being selected as the study setting.

1. Study title: Prevalence of Obstructed labour and associated factors among women delivered at Hospitals of western part of South Nation Nationalities Peoples' Region Ethiopia

2. Purpose of the study: The findings of this study can be important for the health care providers working in maternal health unit to identify the factors of obstructed labour and to take appropriate modification strategies to improve the effectiveness of health facility maternal health care. Besides this the aim is for partial fulfillment of master in MPH for the Principal Investigator

3. Procedure and duration: I will be interviewing mothers who give birth using a questionnaire to provide me with pertinent data that is helpful for the study. There are 27 questions to answer where I will fill the questionnaire by interviewing the mother. The interview will take about 35 minutes.

4. Risks and benefits: The risk of participating in this study is minimal, but only taking few minutes from mothers time. There would not be any direct payment for participating in this study. But the findings from this research may reveal important information for the local health planners.

5. Confidentiality: The information that we will be provided will be kept confidential. There will be no information that will identify the participants in particular. The findings of the study will be general for the study community and will not reflect anything particular of individual persons. The questionnaire will be coded to exclude showing names. No reference will be made in oral or written reports that could link participants to the research.

6. Rights: Participation for this study is fully voluntary. The participants have the right to declare to participate or not in this study. If they decide to participate, they have the right to withdraw from the study at any time and this will not label them for any loss of benefits which they otherwise are entitled. They do not have to answer any question that they do not want to answer.

7. Contact address: If there, are any questions or enquires any time about the study or the procedures, please contact: Mobile phone of investigator: +251913734844(Yekatit Melesse) Email address of investigator: Yekatitabitew2@gmail.com. Institutional research ethics review committee (IRERC) Haramaya University: Office phone: 0254662011: P.O.BOX: 235, Harar.

8. Declaration of informed voluntary consent: I have read the participant information sheet. I have clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality, the rights of participating and the contact address for any queries. I have been given the opportunity to ask questions for things that may have been unclear. I was informed that participants have the right to withdraw from the study at any time or not to answer any question that they do not want. I am also informed that the Hospital has the right to stop this study from being conducted in the Hospitals if any misdeeds and unethical procedures are observed during the data collection process in the Hospitals premises. Therefore, I declare my voluntary consent on behalf of _____ management to allow this study to be conducted in the Hospital with my initials (signature).

Name and Signature of Head of the Hospital: _____

Name and Signature of Data Collector: _____

Thank you for your cooperation!

Appendix B. Participant Information Sheet and Informed Voluntary Consent form for women who attend their delivery at western part of Hospitals.

My name is _____, I am working as data collectors for the study being conducted in this community by Yekatit Melesse who is studying her masters in Reproductive Health in Haramaya University, the college of health and Medical Sciences

I kindly request you to lend me your attention to explain you about the study and being selected as the study participant.

1. Study title: Prevalence Obstructed labour and associated factors among women delivered at Hospitals of western part of South Nation Nationalities Peoples' Region Ethiopia.

2. Purpose of the study: The findings of this study can be important for the health care providers working in maternal health unit to identify the factors of obstructed labour and to take appropriate modification strategies to improve the effectiveness of health facility maternal health care. Besides this the aim is for partial fulfillment of master in MPH for the Principal Investigator.

3. Procedure and duration: I will be interviewing by using questionnaires to provide me with require information. There are 27 questions to answer where I will fill the questionnaire by interviewing you. The interview will take about 35 minutes. So kindly request you to spare me this time for the interview.

4. Risk and benefit: there is very limited risk in this study .It only taking for few minutes from your time. There would not be any direct payment for participating in this study. But the finding from this research will reveal important information for zonal health bureau and other interested organization on thematic area of the study.

5. Confidentiality: The information that you provide for us will not be disclosed. The questionnaires have no any information which will disclose your personal identity in specific.

6. Right of participant: Participating for this study fully voluntary. You have the right to declare to participate or not in this study. If you decide to participate, you have the right to withdraw from the study at any time and this will not label you for any loss of benefit which you otherwise are entitled. You do not have to answer any question that you do not want to answer.

7. Contact address: If there, are any questions or enquires any time about the study or the procedures, please contact: Mobile phone of investigator: +251913734844(Yekatit Melesse) Email

address of investigator: Yekatitabitew2@gmail.com. Institutional research ethics review committee (IRERC) Haramaya University: Office phone: 0254662011: P.O.BOX: 235, Harar.

8. Declaration of informed voluntary consent

I have read/ was read to me the participant information sheet. I have clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality, the rights of participating and the contact address for any queries. I have been given the opportunity to ask questions for things that may have been unclear. I was informed that I have the right to with draw from the study at any time or not to answer any question that I do not want. Therefore; I declare my voluntary consent to participate in this study with my initials (signature) as indicated below.

Name of participant: _____Signature of participant: _____

Name of data collector: _____Signature of data collector_____

N.B: This is to be signed face to face in the presence of data collector and the copy is provided to the participant.

Appendix C. English Version Questionnaire.

This is the questionnaire to assess prevalence of obstructed labour and associated factors among women delivered at Hospitals of western part of South Nation Nationalities Peoples' Region Ethiopia 2020.

1. Date of interview (date/month/year):_____
2. Name of the health Institution's: _____
3. Code number of the questionnaire: _____
4. Name of Data Collector: _____ Signature_____ Date: _____
5. Name of Supervisor: _____ Signature_____ Date: _____

Part I : Socio-demographic variables				
S.no	Questions	Option/Response	Code	Remark
101	How old are you?	_____ (in Year)		
102	What is your marital status?	1. Married 2. Single 3. Widowed 4. Separated 5. Divorced		
103	What is your religion?	1. Orthodox 2. Protestant 3. Muslim 4.Others(specify)----------		
104	What is your ethnicity?	1. Bench 2. Sheko 3. Sheka 4. Menit 5. Keffa 6. Others(specify)----------		
105	What is your occupation?	1. Governmental Employee 2. Self-Employee 3. House wife 4. Student 5. Others[specify]----------		
106	What is your educational Status?	1. Unable to read and write 2. able to read and write 3. Attend primary school (Grade 1-8) 4. Attend secondary school (Grade 9-12) 5. College diploma and above		
107	What is your place of	1. Rural		

	residence?	2. Urban		
108	How much is the average monthly income of the family	_____ ETB		
109	Do you have your own income?	1.Yes 2.No		
Part II: Obstetrics History				
201	How many times have you been Pregnant? Including the current.	1. Number of Pregnancy :_____		
202	How many times did you give Birth?	1. Number of children alive:_____ 2. Number of children died:_____ 3. Number of still birth:__		
203	Have you ever attended ANC for Current pregnancies?	1. Yes 2. No		
204	If you attend ANC when did you start follow up?	1._____months 2.I don't know		
205	How money times did you attend ANC visits?	1. Once 2. Two 3. Three 4. Four 5. more than four		
206	Have you ever given birth in health institution?	1.Yes 2.No		
207	If yes for Q 206 where did you give birth for that Pregnancy?	1. Governmental hospital 2. Private hospital 3. Governmental health center 4. Private clinic 5. Others specify_____		
	Part III Questions to assess obstructed labour			
208	Is she diagnosed for obstructed labour?	1. Yes 2. No		

209	If yes for Q 208 what was the cause?	1. CPD 2. Malpostion 3. malpresentation 4. If other specify _____		
210	What was your gestational age of current pregnancy?	1. <37 weeks 2. 37-42 weeks 3. >42 weeks 4. I don't remember		
211	Did you experience a health problem during current pregnancy?	1. Yes 2. No		
212	If yes for Q211 what was the health problem?	1. Persistent vomiting 2. Leg swelling 3. Vaginal bleeding 4. Right upper quadrant pain 5. Headache 6. Blurring of vision 7. Other(Specify)_____		
213	What was duration of labour?	1. 12-24 hr 2. >24 hr		
214	What was the current mode of delivery?	1.Normal Delivery 2.Cesarean Section 3. Instrumental Delivery 4. Other specify_____		
215	Birth weight	1.<2500gm 2. 2500-4000gm 3.>4000		
216	Did you have any complications during current delivery ?	1.Yes 2.No		
217	If yes for Q211 what is the problem? More than one answer is possible.	1.Rapture of uterus 2. Infection 3. postpartum hemorrhage 4. If other specify_____		

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Appendix D. Amharic Version of the Participant Information Sheet and Voluntary Consent Form for women who attend their delivery at western part of Hospitals.

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Appendix E. Amharic Version of the Questionnaire

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208	Is she diagnosed for obstructed labour?	1. Yes 2. No		
2□9	If yes for Q 208 what was the cause?	1. CPD 2. Malpostion 3. malpresentation 4. If other specify _____		
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