



SALALE UNIVERSITY
COLLEGE OF HEALTH SCIENCES

**OBSTETRIC COMPLICATIONS AND ITS ASSOCIATED FACTORS
AMONG WOMEN WHO GIVE BIRTH IN MUKA TURI PRIMARY
HOSPITAL, NORTH SHOA ZONE, OROMIA, ETHIOPIA 2024 :
COMPARATIVE CROSS SECTIONAL STUDY**

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OBSTETRIC COMPLICATIONS AND ASSOCIATED FACTORS
AMONG WOMEN DELIVERIES IN MUKA TURI PRIMARY
HOSPITAL, NOTH SHOA ZONE , OROMIA REGIONAL STATE ,
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ABSTRACT

Background: Obstetric complications are health problems that occur during pregnancy and childbirth. Preventing obstetric complications is important to reduce maternal death. Obstetric complications have a significantly impact maternal, fetal, and neonatal health. In low-resource countries like Ethiopia, obstetric complications remain high.

Objective: To compare the magnitude of obstetric complications and associated factors among women who gave birth at Muka Turi Hospital during October 1, 2021, to December 30, 2023.

Method: A hospital-based comparative cross-sectional study was conducted at Muka Turi Hospital among 224 participants (112 twins and 112 singletons) who were selected using simple random sampling techniques. Descriptive analysis, binary, and multivariate logistic regression models were used.

Result: In this study, 45.5 % of having twin deliveries and 21.4 % of having singleton deliveries had at least one obstetric complication. The variables such as age [AOR=3.377, 95% CI (1.098-10.385)], history of obstetric complications [AOR=4.175, 95%CL (1.221-14.276)], and no ANC follow up [AOR=6.072, 95%CI (1.524-24.11)] were significantly associated with obstetric complications among mothers who gave twin birth. History of abortion [AOR=4.286, 95% CI (1.070-17.17)] and no ANC follow-up [AOR=8.4, 95%CI (1.8-3.888)] were significantly associated with obstetric complications of singleton give birth mother in the multivariate logistic regression model.

Conclusions and recommendations: Magnitude of obstetric complications among twin deliveries is higher than singleton deliveries. History of obstetric complications, age of mother, and ANC follow up were factors associated with obstetric complications of twin give birth mothers. History of abortion and ANC follow up were factors associated with obstetric complications of singleton give birth mothers. Therefore, providing appropriate information on potential obstetric complications, accessing maternal health services, and empowering women is very important.

Key word: singleton delivery, twin delivery and obstetric complication.

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ACRONYMS AND ABBREVIATIONS

AGA	Average gestational age
APH	Antepartum haemorrhage
CPD	Cephalic pelvic disproportion
DCDA	Dichorionic diamniotic
GDM	Gestational diabetic
HCG	Human chorionic gonadotropin
IUFD	Intrauterine foetal death
IUGR	Intrauterine growth restriction
LNMP	Last normal menstrual period
LBW	Low birth weight
MAMC	Monoamniotic monochorionic
MCH	Maternal and child health
MTPH	Muka Turi primary Hospital
NICU	Neonatal intensive care unit
PIH	Pregnancy induced hypertension
PPH	Postpartum haemorrhage
PROM	Premature rupture of membrane
SSI	Surgical site infection
SVD	Spontaneous vertex delivery
UTI	Urinary tract infection
WHO	World health organization

1. INTRODUCTION

1.1 Background

Obstetric complications are health problems that occur during pregnancy and childbirth(1). Obstetric complication is an acute ailment resulting from a direct or indirect cause of maternal mortality. Direct obstetric complications Maternal problems such as hemorrhage, obstructed labor, sepsis, abortion complications, pre-eclampsia or eclampsia, ectopic pregnancy, postpartum sepsis, and ruptured uterus(2) . Indirect obstetric complications are the exacerbation of pre-existing maternal health conditions or illnesses, including anemia, malaria, and other health conditions, that a woman acquires during pregnancy and childbirth and are not the result of the pregnancy directly (3).

Certain women experience health issues that develop during pregnancy, while other women have pre-existing health issues that may cause complications(1,4). The most commonly observed pathophysiologic developments in pregnancy in seemingly healthy women result from maladaptation of the maternal hemodynamic, renal, immune, and metabolic functions. The impact is usually a disruption of the pregnancy course and outcome, because of the development of placental syndrome, spontaneous preterm birth, or gestational diabetes(5). Due to inherent biological factors, a twin pregnancy is associated with various obstetric complications, such as preterm labor, preeclampsia, gestational diabetes, placental abruption, and cesarean delivery(6).

Each year, more than 295,000 women lose their lives around the world due to complications during pregnancy or childbirth. The vast majority of these deaths occur in low-resource settings, and most could be prevented. Sub-Saharan Africa and Southern Asia account for approximately 86% of the estimated global maternal deaths. Sub-Saharan Africa alone accounts for roughly 66% of maternal deaths(7). Obstetric complications have an impact on the woman's physical, social, psychological, and economic wellbeing. In developing countries, these complications are the most significant public health challenge because of the cultural norms, poverty, lack of access to basic education, and inaccessibility of essential health-care services(8).

1.2 Statement of problem

Globally, maternal mortality remains unacceptably high, with an estimated 287,000 maternal deaths in 2020, 70% of which occurred in Sub-Saharan Africa. Obstetric complications are a major contributor to this burden(9). In Ethiopia, despite efforts to improve maternal health services, maternal mortality remains high at 412 deaths per 100,000 live births, and neonatal mortality is also considerable(10).

Obstetric complications are generally the symptoms and problems that are related to pregnancy and childbirth. On the other hand, complications during pregnancy and childbirth are the leading cause of disability and death among women. Many women face some minor health problems, while some women, unfortunately, get faced with more serious complications during pregnancy and childbirth(11).

Every year, over half a million women worldwide pass away from pregnancy-related complications, or obstetric difficulties, which affect over eight million women worldwide(12). Research conducted in sub-Saharan Africa has repeatedly shown that twin deliveries had a higher prevalence of obstetric difficulties than singleton pregnancies. These complications include premature labor, preeclampsia, and postpartum hemorrhage(13).

Compared to a singleton pregnancy, a mother carrying twins experiences preterm labor, cord prolapse, anemia, UTI, preeclampsia-eclampsia, and hemorrhage twice, five times, two and a half times, three times, and five times, respectively. These events are linked to 25% of PROM and a higher risk of uterine tony and maternal death(2). Furthermore, it is responsible for at least 10% of perinatal deaths worldwide. On the other hand, the next most concerning things are delivery risks and misrepresentation(14).

The occurrence of obstetric complications is influenced by several factors, including maternal age, parity, antenatal care utilization, preexisting medical conditions, and the mode of delivery. For twin deliveries, additional factors such as chorionicity, gestational age at delivery, and

healthcare system constraints play a critical role(13). Socioeconomic factors, limited access to emergency obstetric care, and delays in seeking care further exacerbate the problem(15).

The consequences of obstetric complications are far-reaching, affecting not only maternal and neonatal health but also families and communities. Maternal complications can lead to long-term disabilities, psychological distress, or death. Neonatal complications often result in low birth weight, prematurity, or stillbirth. The economic burden on households due to healthcare costs and loss of productivity also perpetuates the cycle of poverty and poor health outcomes(16).

In developing nations, obstructed labor, dangerous abortion, sepsis, severe bleeding, and hypertension are the main causes of death (17). This burden has been steadily increasing in recent years, leading to higher health service utilization, increased direct medical costs, longer hospital stays, and the need for long-term rehabilitation (18).

Worldwide studies typically show that additional factors that can directly reduce maternal obstetric complications, such as early referral, literacy, income, and accessibility to health services, as well as ANC follow-up, are elevating the bar for obstetric care(19). Efforts to address obstetric complications have included scaling up skilled birth attendance, improving access to emergency obstetric and neonatal care (EmONC), and expanding antenatal care coverage. In Ethiopia, the government has implemented maternal health programs such as the Health Extension Program and introduced maternal waiting homes to improve access in rural areas(10).

Even if the obstetric complication results in considerable negative impacts in different aspects, there is scarcity in studies conducted on the question under study at this time. Thus, the current comparison cross sectional study aims to compare the obstetric complications among twin and singleton deliveries at Muka Turi Hospital. By doing so, the research intends to generate evidence-based recommendations for improving maternal and neonatal health outcomes in the face of obstetric complications.

1.3 Significance of study

- ✓ Guiding Clinical Practice and Enhancing Healthcare Provider Awareness

Understanding the specific risk factors for complications in twin versus singleton deliveries allows healthcare providers to adopt targeted clinical practices.

- ✓ Supporting Public Health Policy and Resource Allocation

By providing data on complication rates and associated factors, the study helps inform resource allocation, enabling more effective deployment of medical resources, such as blood transfusion services, maternal health education, and training for healthcare providers on high-risk pregnancies. The data also be generated to assist the local authority and Muka Turi Hospital administrators by being the source of information and evidence to take measures and making plan

- ✓ Contributing to the Achievement of National and Global Health Goals

The Ethiopian government has committed to reducing maternal and neonatal mortality as part of its Reproductive Health Strategic Plan (2021-2025) and Sustainable Development Goals (SDGs) by 2030. This research aligns with these objectives by providing evidence-based insights that can help address preventable obstetric complications. In doing so, it contributes to the broader goals of improving maternal health services, ultimately helping Ethiopia achieve its national and international health targets.

- ✓ Establishing a Foundation for Future Research

Future researchers can build upon this work to explore additional factors, develop intervention strategies, and validate findings across other regions , thereby expanding the knowledge base in maternal and child health.

2. LITERATURE REVIEW

2.1 Magnitude of obstetric complications of twin and singleton pregnancy

Over 300,000 women worldwide pass away and 9.5 million suffer from pregnancy-related problems each year (20) . Twin pregnancies have a higher prevalence of obstetric complications than singleton pregnancies, including preterm labor, PIH, PROM, anemia, nausea and vomiting, UTI, bleeding (pre-, during, and post-delivery), GDM, and uterine atrophy. (2,3). Multi-center retrospective study carried out by the Global Network for Women and Children's Health Research in six distinct low- and mid-income countries discovered that 18.1% of twin pregnancies had a higher likelihood of being delivered by caesarian section than 9.5% of singleton pregnancies (21).

Retrospective research conducted in Finland indicates that over the study period, there was an increase in the incidence of postpartum hemorrhage, gestational diabetes, intrahepatic cholestasis during pregnancy, and pre-eclampsia. Nearly half of twin births (44.9%) occurred preterm, nearly half underwent Caesarean section (47.1%), and 27.7% of twin labors were induced. (22).The most frequent maternal problems were preeclampsia (12.8 percent in twins vs. 9.8 percent in singletons), PROM (10.5 percent in twins vs. 4.8 percent in singletons), and oligohydramnios, according to a retrospective observational cohort research conducted in Vadodara, Gujarat (3.7 percent in twin vs. 3.9 percent in singleton). Less frequently occurred complications. When comparing twin deliveries to singleton deliveries, PROM was far more common (23).

Based on a prospective case control study carried out from February 2019 to August 2020 at the Department of Obstetrics and Gynecology, Amritsar The three most common obstetric problems in twin pregnancies were malpresentation (35 percent), anemia (59 percent), and preterm labor (62 percent), all of which were considerably greater than in singletons. Twin pregnancies were also associated with a higher incidence of other problems, such as PROM (23 percent), hypertensive disorders (17 percent), PPH (11 percent), and hyperemesis (5 percent). Compared to singleton pregnancies, twin pregnancies had significantly greater rates of LSCS (62% vs. 42%)(24).

A comparative prospective study conducted in India between April 1, 2015, and September 30, 2016 revealed that the most prevalent complications in twin pregnancies were preterm labor (74.7 percent), anemia (44%), hypertensive disorders (32%), and PPH (13.33%). Compared to singletons (18.67 percent), twin pregnancies had a significantly greater rate of LSCS (32.67 percent) (25).based on a prospective observational study conducted at the Department of Obstetrics and Gynecology at a hospital. Jaipur's S.M.S. Medical College Twin pregnancies raised the chance of preterm rupture of the membranes by 2.74 times. Twin pregnancies were associated with a 2.28-fold rise in hypertensive illness and a 3-fold increase in the chance of mal presentation (26).

To evaluate the outcomes of twin pregnancies, a retrospective analysis of maternal and neonatal data gathered at Thailand Prapokklao Hospital indicated that preterm delivery, anemia, and pregnancy-induced hypertension were the three most prevalent maternal complications linked to twin pregnancies, with prevalence rates of 62.9 percent, 23.8 percent, and 13.9 percent, respectively(27).Between September 1, 2021 and December 31, 2022, a comparative prospective study was carried out in the obstetrics and gynecology department of R. D. Gardi Medical College in Ujjain. The results indicate that the most common complications in twin pregnancies were preterm labor (40 percent), anemia (26.5 percent), hypertensive disorders (14.3 percent), and PPH (6 percent) (28).

The most common maternal complications observed at the Nigerian tertiary teaching hospital between January 2020 and December 2020 were hypertensive disorders of pregnancy, which affected 27 (40.90 percent) of the women, gestational diabetes mellitus (GDM) in 24 (36.36 percent), preterm rupture of membranes (PROM) or preterm premature rupture of membranes (PPROM) in 21 (31.18 percent), and antepartum hemorrhage (APH) in 4 of the women (6.06 percent). 18 out of 49 women (74.25 percent) who had atypical presentation underwent Caesarean section as a result (36.73 percent). 80.30 percent of women gave birth prematurely. (29).

According to Hospital-based prospective cohort study conducted in Jimma University Specialized Hospital on Maternal complications of twin deliveries ,the rate of preterm delivery, HTN, Anemia, PPH, puerperal fever, PROM, Cord prolapse, Hysterectomy and maternal death were 3.5%, 25%, 21.5%, 16%, 6.4%, 15.3%, 4.9%, 2.8% and 2.8% respectively(30).Hospital-

based unmatched Case-control study design in Nekemte Referral Hospital show that incidence maternal complications were PIH(23.1 in twins vs. 7.2 % in singletons), PROM (13.3 % in twins vs. 4.8% in singleton), and APH (6.7% in twin vs. 32.4 % in singleton),obstructed labor (1 % in twins vs. 3.8 % in singletons), cord prolapse (5.8% in twins vs. 1 % in singletons) and PPH (9.6 in twins vs. 6.7 % in singletons)(31).

Due to the rising trend in magnitude of twin pregnancies complication worldwide and their link to high rates of maternal and perinatal death and morbidity, there is no information available in MTPH about obstetric complication of twin and singleton pregnancy.

2.2 Factor associated with obstetric complications

2.2.1 Socio demographic factors

Study done in rural Bangladeshi result showed that age of pregnant mothers greater than 35 and less than 18 were had significant association with obstetric complications(32). A Matched Case-control Study conduct in Debre Behran Referral Hospital, Ethiopia show The odds of Pregnant women with age 35 and above to have obstetric complications were 1.8 times higher compared to their counter parts of women less than 35 years(33).

A community based retrospective cross-sectional study conduct in Northwest Ethiopia show that urban resident mothers were 1.4 more likely to face pregnancy-related complications as compared to rural residents(34).The odds of Pregnant women with rural resident to have adverse birth outcome were 3 time higher compared to their counter parts of women with urban residents(35).

2.2.2 Medical factors

According to Study done in Gebretsadik Shewa general hospital show that the mother who have medical disorder were 4.28 times more likely to develop maternal complications than the mother who have no medical disorder (36).A community based retrospective cross-sectional study conduct in Northwest Ethiopia show that the mother who has history of heart problems were about two times more likely to be face pregnancy related complication than mother who has no history of heart disease(34).

2.2.3 Obstetric factors

Study done in rural Bangladeshi result showed that women who have null parity were 1.16 times more likely to develop maternal complications than women who multi parity(32). According to A cross-sectional study conduct in specialized maternal and child health national referral hospital, in Uganda Respondents who had a gravidity between 4-6 pregnancies had a 32% lower likelihood of having pregnancy-related complications as compared to those who had gravidity between 1-3 pregnancies(37).

Study conduct in Gamo Gofa Zone, Southern Ethiopia shows that those pregnant women with multigravida were 7 times more likely to have adverse birth outcome as compared to their counter parts of women with primigravida mothers(35).A health facility based cross-sectional study conduct in Mizan-Tepi University Teaching Hospital, Tepi General Hospital and Gebretsadik Shawo Hospital, Southwest, Ethiopia show that Having family history of pregnancy induced hypertension had about five times greater odds of developing pregnancy induced hypertension(38).

A Matched Case-control Study conduct in Debre Behran Referral Hospital, Ethiopia show that mothers who had birth interval less and equal 1 year were 2.83 times more likely to be a case of obstetric complication than those who had 2-4 years birth interval(33).

2.2.4 Health service-related factors

According to hospital based cross sectional study conduct in Yaoundé show that mother who lack of obstetric ultrasound assessment were 2.65 times more likely to be a case obstetric complication than those who had access to ultrasound access(39) .

Study conduct in slum and non-slum in Bangladeshi showed that women who received at least 4 ANC visits during pregnancy had 19% higher odds of having pregnancy related complications than women not taking at least 4 ANC visits(40). According to study conduct in Debre Behran Referral Hospital, With regard to FP utilization mothers who didn't use FP methods had 9.5 more likely develop obstetric complications(33).Study conduct in jimma university medical college show that women who have no ANC follow up were 1.66 time more likely to develop maternal complication than mother who have ANC follow up (41) .

2.5 Conceptual framework of obstetric complication

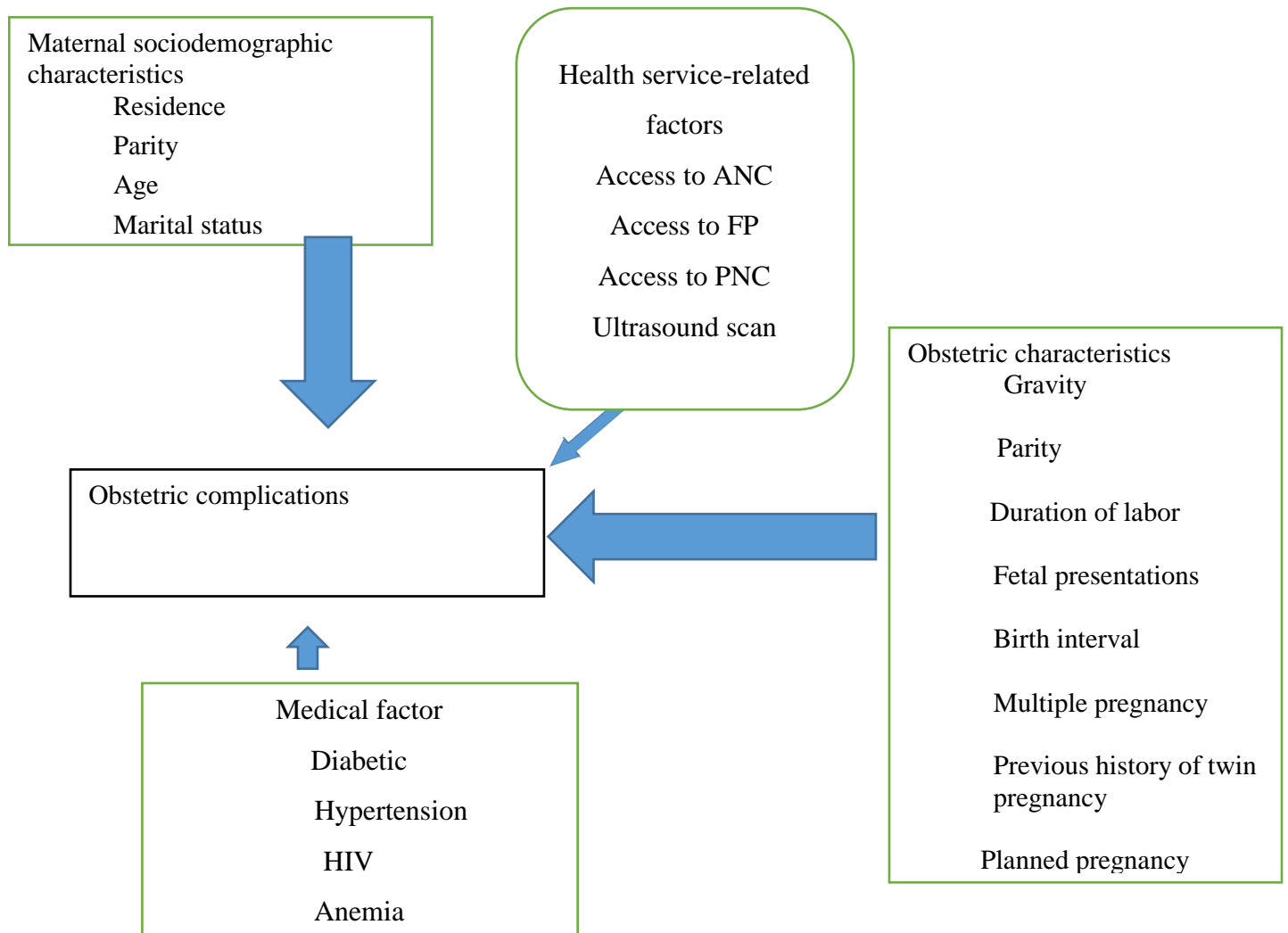


Figure 1 Conceptual framework factor association with obstetric complication constructed after reviewing pertinent literatures(33,36,41,42)

3. OBJECTIVES

3.1 General objective

To compare magnitude obstetric complications and their associated factor among twin and singleton deliveries at Muka Turi Hospital from October 1, 2021 to December 30, 2023.

3.2 Specific objectives

- To determine magnitude of obstetric complication among twin deliveries at Muka Turi Hospital, from October 1, 2021 to December 30, 2023.
- To determine magnitude of obstetric complication among singleton deliveries at Muka Turi Hospital, from October 1, 2021 to December 30, 2023.
- To compare magnitude of obstetric complication among twin and singleton deliveries at Muka Turi Hospital, from October 1, 2021 to December 30, 2023.
- To identify factor associated with obstetric complications among mother give singleton deliveries at Muka Turi Hospital, from October 1, 2021 to December 30, 2023.
- To identify factor associated with obstetric complications among mother give twin deliveries at Muka Turi Hospital, from October 1, 2021 to December 30, 2023.

4. METHODS AND MATERIALS

4.1 Study area and period

The study was conducted at Muka Turi Hospital. Which is located in Wuchale woreda. Wuchale is located in the North Showa zone, Oromia regional state, and 78 KM far from the capital city, Addis Ababa. MTPH was established in 2010 and is currently the only public hospital in Wuchale woreda and provides services for three woreda (Wuchale, Jidda, and Darba libanos) accessible for about 301,334 people, male 49,160 female 52,174. It is also serving as attachment site for Bsc Midwifery, Bsc Nurse, Bsc in pharmacy and Bsc laboratory. Currently it has 78 beds for the inpatient services and 103 health professionals (including 1 Gynaecologist, 1 IEOS, and 17 midwife) and 78 administrative staffs. The Hospital provides Medical treatment, dental treatment, Psychiatric treatment, major and minor operation, inpatient services, MCH, control of HIV and TB, laboratory pharmacy, X-ray and ultrasound. This study was conducted from November 2023 to June, 2024 in Muka Turi Hospital.

4.2 Study design

Comparative cross sectional study was conducted.

4.3 Source and study population

4.3.1 Source population

All women who gave birth in Muka Turi Hospital.

4.3.2 Study population

All Women who gave birth at Muka Turi Hospital from October 1, 2021 to December 30, 2023 with complete log book recorded.

4.4 Inclusion and exclusion criteria

4.4.1 Inclusion criteria

Group 1:- women who deliver twin in Muka Turi Hospital with complete information.

Group 2:- women who delivery singleton in Muka Turi Hospital with complete information.

4.4.2 Exclusion criteria

Group 1:- women who deliver twin in the Muka Turi Hospital with lack complete information and lost card.

Group 2: - women who delivery singleton in the Muka Turi Hospital with lack complete information and lost card.

4.5 Sample size determination

The sample size was calculated using Comparison of two proportions with equal sample size formula. Pregnancy induced hypertension (PIH) was taken as one of outcome variables (maternal complications). From the previous study the proportions of mothers who developed PIH among twin deliveries was 23.1% and 7.2% in singleton deliveries (31). A level of confidence of 95% and power of 80 is used.

$$n_1 = n_2 = \frac{\left(z_{\alpha/2} \sqrt{2pq} + z_{\beta} \sqrt{p_1q_1 + p_2q_2} \right)^2}{\Delta^2}$$

Where;

Z_{α} =Standard normal variate for 95% level of significance= 1.96

Z_{β} =Standard normal variate for power of 80% or type 2 error = 0.84

p_1 = the proportions of PIH in twin delivery mothers $q_1 = 1-p_1 = 1-0.231=0.769$

p_2 = the proportions of PIH in singleton delivery mothers $q_2 = 1-p_2 = 1-0.072=0.928$

n_1 =sample for mothers with twin delivery

n_2 =sample for mothers with singleton delivery

$\Delta = p_1-p_2 = 0.231-0.072=0.159$

$$n_1=n_2 = \frac{\left((1.96\sqrt{(2(0.3)(0.7))}) + 0.84\sqrt{(0.231(0.769)+0.072(0.928))} \right)^2}{0.159^2}$$

$n_1=n_2=112$

Total sample size = $n_1+n_2 = 112+112 = 224$

For the second objective, sample size was calculated by using Epi info as illustrated in the following table.

Table 1: Sample size determination for second objective using Epi info version 7.2.5.0.

S no	Factor	Power	Ration	%of unexposed	% exposed	Calculate sample size	Refere nce
1	No any access to ANC	80	1	1.1	32.6	56	(33)
2	Multiple pregnancy	80	1	91.8	32.4	26	(35)
3	No history of FP	80	1	6.3	39.1	62	(33)
4	Rural resident	80	1	51.9	93.7	44	(35)

4.6 Sampling tool and procedure

The sample was selected by using simple random sampling technique. First go through the delivery registration logbook and label each entry as either twin or singleton deliveries. This way clear record of all singleton and twin deliveries within study period then divide the entries into two lists one for singleton and one for twin deliveries. Apply simple random sampling technique (Computer generated number) within each group to select required sample size for each group.

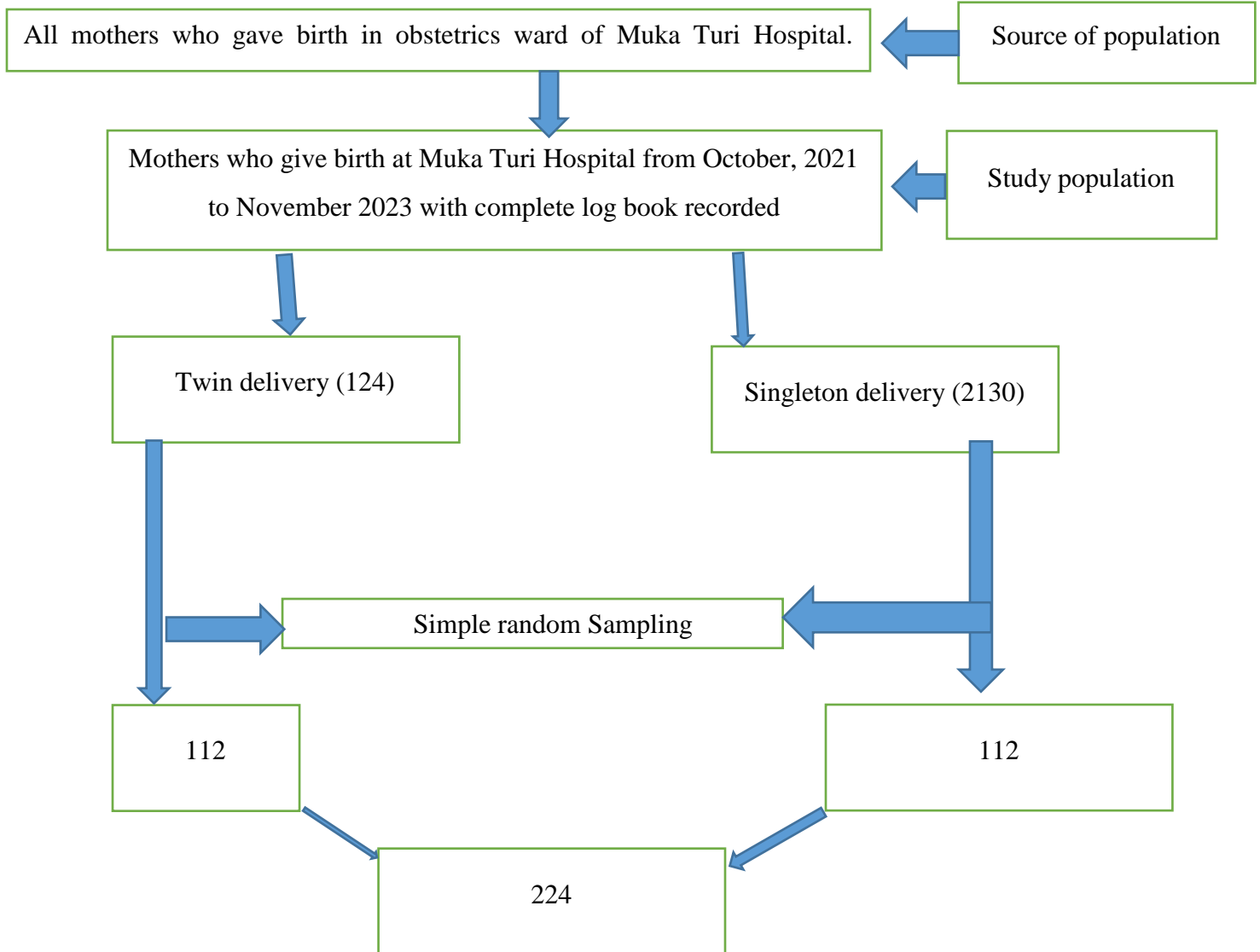


Figure 2: Schematic presentation of sampling procedures among mothers who delivered twin Muka Turi Hospital Oromia Regional State, Ethiopia, 2023/2024

4.7 Data collection procedure

Data was collected using a checklist that was prepared and modified after reviewing different relevant kinds of literatures(24,30,31,33,34). Checklists was prepared in the English version. Clients' charts and labor ward logbooks were reviewed to collect the required data by using a checklist. Data were collected by three midwifery, and one BSc midwifery were recruited as supervisors. Data was collected from mother's cards and registration books using a check list, which has 5 parts: sociodemographic factors, obstetrics assessment, health-related factors, medical factors, and obstetric complications.

4.8 Study variables

4.8.1 Dependent variable

Obstetric complication

3.8.2 Independent variables

Maternal sociodemographic characteristics

Residence

Parity

Age

Marital status

Obstetric characteristics

Duration of labor

Fetal presentations

Mode of delivery

Multiple pregnancy

Previous history of twin pregnancy

Medical factor

DM

HIV

Anemia

Hypertension

Health related factor

ANC follow up

Ultrasound scan

4.9 Operational definition

Obstetric complications: if Presence of at least one of the following its say to be mother has complication : Ante partum hemorrhage (APH), PPH,PROM or chorioamnionities, PIH, obstructed labor , mal-presentation, Cord prolapse, Anemia, uterine rupture, and etc (11).

Bad obstetric history : if the mother has history of at least one of the following : intrauterine demise, Repeated abortions, Preterm labour, Anomalies in the foetus, Neonatal demise, Severe intrauterine growth restriction (IUGR) or foetal growth restriction(2) .

Complete information: Full information about women's obstetric history (gravity, parity, past obstetric history, present obstetric history and medical history).

4.10 Data quality control

Data quality was assured through the careful design of a pretested checklist and data collection procedure. One day training was given for the data collectors and supervisors by the principal investigator on data collection tools, data collection techniques, and maintaining the privacy and confidentiality. The checklist was pretested to ensure its clarity, completeness, and consistency, and was done in Canco Hospital by taking 5% ($n = 12$) of the total sample size. During data collection, all the collected data were reviewed frequently by the supervisors and principal investigator for its completeness and consistency. After data collection, it was cleaned and coded to minimize errors before proceeding to analysis.

4.11 Data processing and analysis

The collected data were checked manually, coded, and entered into Epi-Data version 3.1, then exported to SPSS-version 26 for data analysis. Descriptive analyses, including frequency distribution, and percentage were used to describe the characteristics of the study Group and to describe magnitude among twin and singleton. Binary logistic regression analysis was used to select candidate variables for multivariable analysis. Then all independent variables with a P-value ≤ 0.25 during the bivariable analysis were entered into the multivariable analysis. Finally, multivariable logistic regression analysis was carried out to control for the possible confounding effect variables. Adjusted odds ratio (OR) with 95% confidence intervals (CI) was used to estimate the presence and strength of association, statistical significance was declared at p value < 0.05 .

4.12 Ethical consideration

To conduct this research project, ethical approval letter ref/no SLU-ERERC-229/20216 date 12/10/2016 E.C was obtained from Salale University Research and Ethical review Committee. The procedure and purposes of the study was explain to the hospital manager and to the Hospital medical director. Permission was obtained from Muka Turi Hospital. The patient's name not included in the checklist, after finishing the data collection the patients' document returned to card room. Confidentiality was strictly observed and patient's names was not be used in this study except their file registration number and the study identification number. The information was used for study purpose only.

4.13 Dissemination of the finding

Findings will be presented to master's thesis defense of Salale University College of health science, and school of Graduate Study. The finding will be submitted to the coordinator of PH, None governmental organizations working on this area and Muka Turi Hospital. Also there will be an attempt to publish the result in standard journal.

5. Results

5.1. Socio-demographic characteristics

A total of 224 mother chart were reviewed from March 1, 2021-February 30, 2024 G.C. out of which 112 were twin deliveries and 112 were singleton deliveries. The majority of residences, 56.3% of twin deliveries and 64.3 % of singleton deliveries, were rural areas. The highest magnitude, 74(66.1%) of twin deliveries and 80 (71.4%) of singleton deliveries, were in the age category of 15-24 years. The majority, 70 (62.5%) of single deliveries and 71 (63.4%) of twin deliveries, were gravida II-IV. Nighty seven (86.6%) of singleton deliveries and 90 (80.4 %) of singleton deliveries had ANC follow. Ultrasound (U/S) was done at ANC, for about 82.1 % of twin deliveries and 88.4 % of singleton deliveries.

Table 2. Socio-demographic and obstetric characteristics of mothers delivered in Muka Turi Hospital, Muka Turi Town, Ethiopia, June 2024

Son	Socio-demographic and obstetric characteristics		Singleton delivery N (%)	Twin delivery N (%)	Total (n=224) N (%)
1	Residence	Urban	40(35.7)	49(43.8)	89(39.7%)
		Rural	72(64.3)	63(56.3)	135(60.3)
2	Age of mother	15-24	80(71.4)	74(66.1)	154(68.8)
		25-34	20(17.9)	12(10.7)	32(14.3)
		>=35	12(10.7)	26(23.2)	38(17)
3	Gravida	Gravity (I)	28(25)	27(24.1)	55(24.6)
		Gravity (II-IV)	70(62.5)	71(63.4)	141(62.9)
		Gravity(5 and above)	14(12.5)	14(12.5)	28(12.5)
4	ANC follow up	Yes	97(86.6)	90(80.4)	187(83.5)
		No	15(13.4)	22(19.6)	37(16.5)
5	LMNP	Known	91(81.3)	87(77.7)	178(79.5)

		Unknown	21(18.8)	25(22.3)	46(20.5)
6	Ultrasound during ANC	Yes	99(88.4)	92(82.1)	191(85.3)
		No	13(11.6)	20(17.9)	33(14.7)
7	Duration of labour	Known	96(85.7)	94(83.9)	190(84.8)
		Unknown	16(14.3)	18(16.1)	34(15.2)
8	Family history of twin pregnancy	Yes	4(3.6)	19(17)	23(10.3)
		No	108(96.4)	93(83)	201(89.7)
9	Bad obstetric history	Yes	11(9.8)	24(21.4)	35(15.6)
		No	101(90.2)	88(78.6)	189(84.4)

5.2 Magnitude of obstetric complication among twin deliveries at Muka Turi Hospital.

In this study, the magnitude of obstetric complications among mothers who give twin birth was 45.5% (95% CI = 36.5,54.9). The major ones were preterm labour (14.8%), premature rupture of membrane (11.6 %) postpartum hemorrhage (11.6 %), and Pregnancy induce hypertension (9.8 %) (Figure 3).

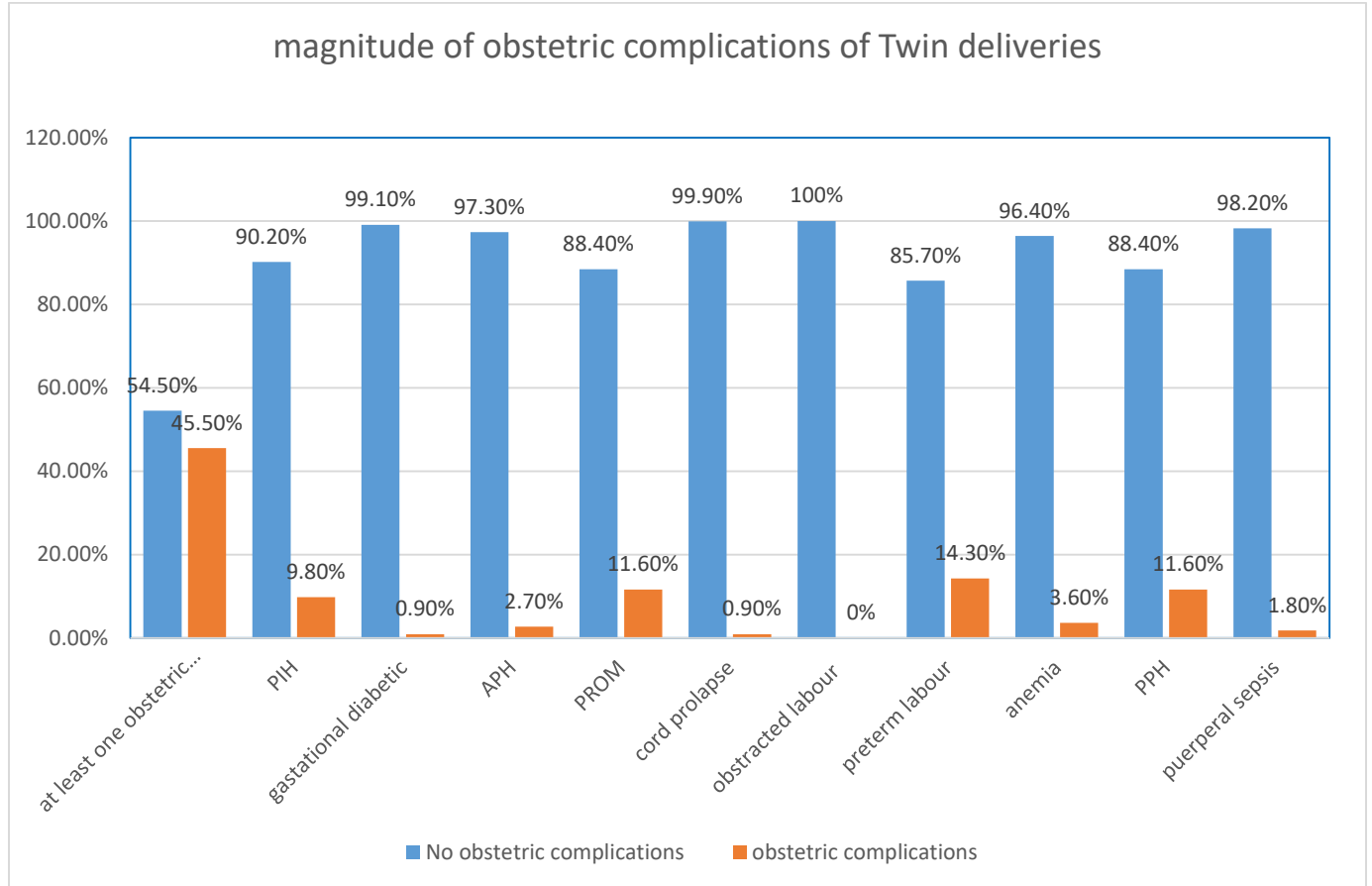


Figure 3: Magnitude of obstetric complications among twin deliveries in Muka Turi Hospital, Muka Turi, Ethiopia, June 2024

5.3 Magnitude of obstetric complication among singleton deliveries at Muka Turi Hospital

In this study, the magnitude of obstetric complications among mothers who give singleton and twin birth was 21.4% (95% CI = 14.7, 30). The major ones were premature rupture of membrane (6.25%) antepartum hemorrhage (4.46%), Pregnancy induce hypertension (3.5%) and preterm labor (3.5%) (Figure 4).

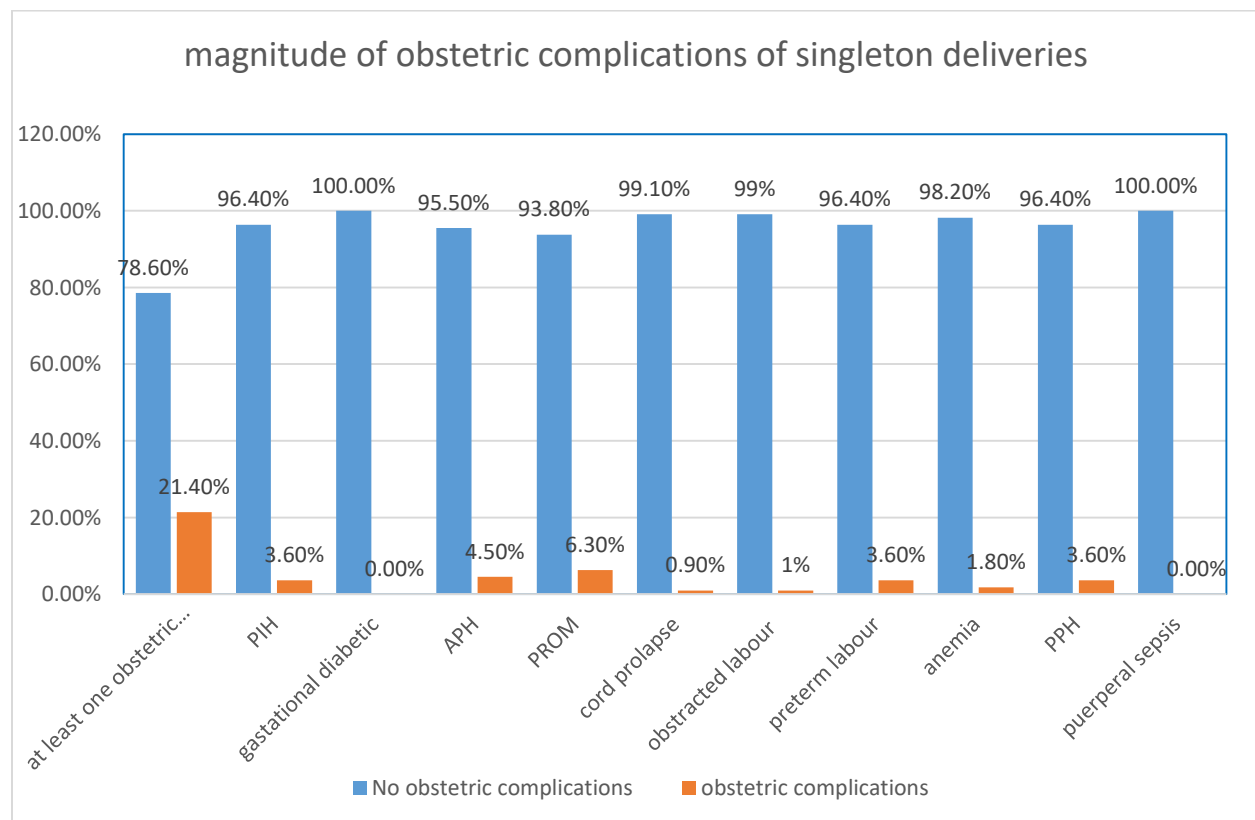


Figure 4: Magnitude of obstetric complications among singleton deliveries in Muka Turi Hospital, Muka Turi, Ethiopia, June 2024.

5.4 Magnitude of obstetric complication among twin and singleton deliveries at Muka Turi Hospital,

In this study the proportion of complications was significantly higher in twin deliveries (45.5%) compared to singleton deliveries (21.4%). The majority (14.3%) of the women who give birth to twin babies experience preterm labor, whereas premature rupture of the membrane contributes more (6.3%) to the obstetric complications women who give birth to singletons experience (Table 3).

Table 3: Comparison of Obstetric complication of mother give singleton and twin birth in MTPH, Muka Turi Town, Ethiopia, June 2024

Obstetric complication		number of fetas		Total N(%)
		Single n(%)	Twin n(%)	
At least one obstetric complication	No	88(78.6)	61(54.5)	149(66.5)
	Yes	24(21.4)	51 (4.5)	75(33.5)
Pregnancy induce hypertension	No	108(96.4)	101 (90.2)	209(93.3)
	Yes	4(3.6)	11 (9.8)	15(6.7)
antepartum hemorrhage	No	107(95.5)	109 (95.6)	216(96.4)
	Yes	5(4.5)	3 (4.4)	8(4.6)
premature rapture of membrane	No	105(93.6)	99 (88.4)	204(91)
	Yes	7(6.3)	13(11.6)	20(9)
cord prolapse	No	111(99.1)	111(99.1)	222(99.1)
	Yes	1(0.9)	1(0.9)	2(0.9)
obstructed labor	No	111(99.1)	112(100)	223(99.6)
	Yes	1(0.9)	0(0)	1(0.4)
preterm labor	No	108(96.4)	96(85.7)	204(91.1)
	Yes	4(3.6)	16(14.3)	20 (17.9)
anemia during pregnancy	No	110(98.2)	108(96.4)	218(97.3)
	Yes	2(1.8)	4(3.6)	6(5.7)

post-partum bleeding	No	108(96.4)	99(88.4)	207(92.4)
	Yes	4(3.6)	13(11.6)	17(7.6)
Blood transfusion	No	107(95.3)	105(93.6)	212(94.6)
	Yes	5(4.7)	7(6.4)	12(5.4)
puerperal sepsis	No	112(100)	110(98.2)	222(99.1)
	Yes	0(0)	2 (1.8)	2(0.9)
Maternal death	No	112(100)	112(100)	224(100)
	Yes	0(0)	0(0)	0(0)

5.5 Factor associated with obstetric complication

5.5.1 Factor associated with obstetric complication of singleton delivery

Based on the bivariable analysis, Residence, Age of mother, History obstetric complication, History of abortion, ANC follow up, FP Before pregnancy, and Number of pregnancy were associated with obstetric complication ($P < 0.25$). On multivariable logistic regression analysis, factors were assessed to have a statistically significant association with obstetric complications.

Mothers who had a history of abortion were 4.2 times more likely to face an obstetric complications than those mothers who had no history[AOR=4.286, 95% CI (1.070,17.17)]. Regarding ANC follow-up, mothers who had no ANC follow up service had 8.4 develop obstetric complications compared to those who have used ANC [AOR=8.4, 95%CI (1.8, 3.888)].

Table 4: Factor association with obstetric complication among singleton deliver mother in MTPH in bivariate and multivariate analysis, Muka Turi Town, Ethiopia, June 2024

Sno	Variable	category	Obstetric complication		COR(95%CI)	AOR(95%CI)	P-value
			n				
			Yes	No			
1	Residence	Urban	12	28	1	1	0.14
		Rural	12	60	0.47(0.85, 5.33)	0.76(0.24,2.41)	

2	Age of mother	15-24	17	66	1	1	
		25-34	2	15	0.67(0.13, 3.31)	0.97(0.165,5.77)	0.06
		>=35	5	7	2.89(0.82,10.26)	4.94(0.953,25.68)	0.65
3	History obstetric complication	No	17	78	1	1	
		Yes	7	10	3.21(1.07, 9.64)	2.53(0.62, 10.204)	0.19
4	History of abortion	No	16	77	1	1	
		Yes	8	11	3.50(1.22, 10.08)	4.29(1.07,17.17)*	0.04
5	ANC follow up	No	8	7	5.79(1.83,18.2)	8.40(1.8-3.89)*	0.006
		Yes	16	81	1	1	
6	FP Before pregnancy	No	18	40	3.6(1.3,9.9)	1.8(0.59,5.91)	0.309
		Yes	6	48	1	1	
7	Gravida	Gravity (I)	5	23	1	1	0.254
		Gravity (II-IV)	11	59	0.86(0.27,2.74)	0.49(0.08,2.92)	0.433
		Gravity(5 and above)	8	6	6.13(1.46,25.73)	0.28(0.06,1.33)	0.109

COR: Crude Odds Ratio, AOR: Adjusted Odds Ratio, 1: reference, *significant at p value < 0.05.

5.5.2 Factor associated with obstetric complication of twin delivery

Based on the bivariable analysis, Residence, Age of mother, Fetus presentation during pregnancy, History obstetric complication, History of abortion, ANC follow up, Ultrasound during ANC, FP Before pregnancy, and Number of pregnancy were associated with obstetric complication ($P < 0.25$). On multivariable logistic regression analysis, factors were assessed to have a statistically significant association with obstetric complications.

Accordingly, women with age 35 and above to have obstetric complications were 3.3 times higher compared to the counterpart [AOR=3.377, 95% CI (1.09, 10.38)]. Regarding history

of obstetric complications, mothers who had a history of obstetric complications were 4.1 times more likely to have obstetric complications than those mothers who had no history [AOR = 4.175, 95% CI (1.22,14.28)]. Regarding ANC follow-up, mothers who had no ANC follow up service had 6 times develop obstetric complications compared to those who have used ANC [AOR=6.07, 95%CI (1.53,24.11)].

Table 5: Factor association with obstetric complication among twin deliver mother in MTPH in bivariate and multivariate analysis, Muka Turi Town, Ethiopia, June 2024

Sno	Variable	category	Obstetric complication		COR(95%CI)	AOR(95%CI)	p-value
			Yes	No			
1	Residence	Urban	27	22	1	1	0.401
		Rural	24	39	0.50(0.23,1.07)	0.67(0.26, 1.71)	
2	Age of mother	15-24	27	47			0.668
		25-34	5	7	1.24(0.34, 4.30)	1.38(0.32, 6.06)	
		>=35	19	7	4.73(1.76, 12.68)	3.38(1.09, 10.38)*	
3	Fetes presentation during pregnancy	Ma-present	25	31	0.9(0.51, 2.26)	0.87(0.43, 2.64)	0.884
		tation	26	30	1	1	
		Normal					
4	History obstetric complication	No	36	56	1	1	0.023
		Yes	15	5	4.67(1.56, 13.95)	4.18(1.22, 14.27)*	
5	History of abortion	No	40	58	1	1	0.108
		Yes	11	3	5.32(1.39, 20.27)	3.43(0.76, 15.41)	

6	ANC follow up	No	18	4	7.77(2.42, 24.9)	6.07(1.53, 24.1)*	0.01
		Yes	33	57	1	1	
7	Ultrasound during ANC	No	13	7	2.63(0.96, 7.2)	0.87(0.21, 3.51)	0.847
		Yes	38	54	1	1	
8	FP Before pregnancy	No	25	27	0.61(0.29, 1.3)	0.72(0.29, 1.78)	0.482
		Yes	36	24	1	1	
9	Gravida	Gravity (I)	14	13	1	1	
		Gravity (II-IV)	31	40	0.72(0.29, 1.75)	0.75(0.25, 2.24)	
			6	8	0.69(0.19, 2.55)	0.45(0.08, 2.40)	
		Gravity(5 and above)					

COR: Crude Odds Ratio, AOR: Adjusted Odds Ratio, 1: reference, *significant at p value < 0.05.

6. Discussion

This study has attempted to assess the magnitude of obstetric complication and its associated factor among mother gave birth to singleton and twin deliveries. Accordingly, the study found that 21.4 % of having singleton deliveries and 45.5% of having twin deliveries had at least one obstetric complication. It was also found that age, history of obstetric complications, and no ANC were significantly associated with obstetric complications among mothers who gave twin birth. History of abortion and no ANC follow-up were significantly associated with obstetric complications of singleton give birth mother.

In this study 21.4% having singleton deliveries had at least any one of obstetric complications. This finding is higher than studies conduct in Neqemte referral hospital 14.4% (31) and studies done at Azare Nigeria 20% (43). But its lower than previous studies conducted at Jimma university specialized hospital 28.1%(30). The reasons for this difference in the prevalence of obstetric complication among singleton deliveries may be due to variations in methods between studies, availability and utilization of healthcare services, maternal health status, geographical factor, and cultural and socioeconomic status of the women which may also contribute to the differences in reported prevalence among studies.

In this study 45.5% having twin deliveries had at least any one of obstetric complications. This finding is lower than studies conduct in Nekemte referral hospital 48.1%(31). But its higher than study conduct in Jimma university 41.7%(30). The reasons for this difference in the prevalence of obstetric complication among twin deliveries may be due to variations in prevalence of risk factor, availability and utilization of healthcare services, maternal health status, geographical and environmental factor, and cultural and socioeconomic status of the women which may also contribute to the differences in reported prevalence among studies.

According to this study, the proportion of complications was significantly higher in twin deliveries (45.5%) compared to singleton deliveries (21.4%). This may do to overloaded maternal physiology, uterine over distention, higher risk of pre term birth, placenta challenge, and maternal health risk. These findings were comparable with study conducted at Nekemte Referral Hospital ,Jimma Hospital(30,31) .

The most common obstetric complications were preterm labor (14.3% among twins and 3.6% among singletons), hypertensive disorder of pregnancy (9.8% among twins and 3.6% among singletons), premature rupture of membrane (11.6% among twins and 6.3% among singletons), and postpartum bleeding (11.6% among twins and 3.6 among singletons). These findings were almost comparable with studies done at Jimma University(30).

The risks of developing premature rupture of membranes (11.6% among twins and 6.3% among singletons) and preterm delivery (14.3% among twins and 3.6% in singleton delivery) were higher when compared to singleton delivery. This could be explained by the increased intrauterine pressure in twin pregnancy. The current finding is consistent with similar studies in Ethiopia(30,31) and other Africa countries(43,44).

In this study, 24.1% of mothers having twin deliveries and 9.8% of having singleton deliveries had cesarean deliveries. These findings were significantly higher than studies done at Azare, Nigeria, which was 18.5% in twin(43) and Global Network for women's children's health research in 6 different low and mid income countries, which was 18.1% in twin pregnancies and 9.5% in singleton pregnancies(21).The increase in the use of cesarean sections to deliver twin pregnancies may be due to the increased occurrence of obstetric complications such as hypertensive disorders, malpresentation, and premature rupture of membranes.

Among twin delivery women with age 35 and above to have obstetric complications were 3.3 times higher compared to their counterparts of women 15 This is in line with a previous finding, a case-control study findings conducted in Debre Tabor town, Northwest Ethiopia, factors associated with obstetric complications, which shows that advanced maternal age was found to be significantly associated with higher odds of obstetric complications (45). This in line might be due to the physiological aging process in the reproductive organs.

Among twin delivery mothers who had history of obstetric complications, they were 4.1 times more likely to have obstetric complications than those mothers who had no history. This finding

also consistent with study conducted in in maternity centre of District Hospital Ujjain, Madhya which shows that history of previous obstetric complications was 2.28 times more develop obstetric complications (46). This finding is consistent with findings in Jimma University Specialized Hospital, which show that women who had a history of obstetric complications 18 times more develop obstetric complications(47) This consistency also might be due to that mothers who had previous obstetric complications might vulnerable to physiological and pathological change of reproductive systems.

Among singleton deliver mothers who had a history of abortion, they were 4.2 times more likely to be a case of obstetric complications than those mothers who had no history, [AOR = 4.286, 95% CI (1.070-17.17)]. This finding is consistent with the findings of a study conducted in Addis Ababa, Ethiopia, in 2017 which show that a history of abortion was statistically significantly associated with obstetric complications(48). This might be due to hormonal and pathological change of reproductive systems.

Among singleton delivery mothers who had no ANC follow up service had 8.4 develop obstetric complications compared to those who have used ANC [AOR=8.4, 95%CI (1.8-3.888)]. and in twin delivery, mothers who had no ANC follow up service had 6 times develop obstetric complications compared to those who have used ANC [AOR=6.072, 95%CI (1.529-24.11)]. This is consistent with the findings in a case-control study on factors associated with obstetric complications in the UK in 2015, which shows that the odds ratio of inadequate use of antenatal care was 15 times higher among women who had severe obstetric complications compared with women who survived (49). This finding is also consistent with a study conducted in Addis Ababa (45), and in Jimma University Specialized Hospital in 2016, mothers who attend antenatal care (ANC) were 83% less likely to have an obstetric complication(47). This might be due to that ANC attendance makes the women to prepare for birth and for complication readiness.

Limitation of study

Since it was a hospital based study conducted in a primary hospital, it may not be representative of the general population. It was difficult to get full information from records such as occupation, income, educational status and etc.

7. Conclusion and recommendation

7.1 Conclusion

The magnitude of obstetric complications among twin deliveries is higher than singleton deliveries in Muka Turi Primary Hospital. The major ones were preterm labor, hypertensive disorder of pregnancy, premature rupture of membrane, postpartum bleeding, and antepartum hemorrhage. History of abortion and ANC follow up were factors associated with obstetric complications of singleton delivery. History of obstetric complications, age of mother, and ANC follow up were factors associated with obstetric complications of twin delivery.

7.2 Recommendations

1. For Muka Turi Hospital:

Facilitate regular training sessions for healthcare professionals on ANC a, emphasizing the management of high-risk pregnancies.

Develop and distribute educational materials that guide healthcare providers in recognizing and managing obstetric complications, especially in twin pregnancies.

Prioritize comprehensive obstetric care for twin pregnancies, including sufficient blood supply and treatment protocols for complications like postpartum haemorrhage.

Ensure adequate resources for managing premature rupture of membranes to prevent severe maternal and neonatal outcomes.

2. For Health Professionals:

Be proactive in identifying and managing risk factors such as previous obstetric complications and histories of abortion.

Encourage and educate pregnant women on the importance of ANC visits to monitor and address complications early.

3. Future Research:

I recommend more prospective cohort studies to identify obstetric complications significantly associated with twin versus singleton deliveries.

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Salale University
College of Medicine and Health Science
Department of public health

Annex 1 checklist Information sheet

1. The study title : comparison of magnitude of obstetric complication and factor associated among twin and singleton delivery in MTPH , Oromia, Ethiopia, 2023/2024
2. Purpose of the study: the aim of this study is to asses magnitude of obstetric complication and its associated factor among twin delivery and singleton in MTPH , Oromia, Ethiopia, 2023/2024
3. Procedure : data will be collect from delivery registration
4. Risks and benefits: There are no anticipated risks associated with participating in this study. However, there may be benefits such as contributing to academic research, gaining insights into the research topic
5. Confidentiality: All collected data will be treated with strict confidentiality. The response will be anonymized and aggregated, meaning that the individual identity will not be linked to your specific responses. The data will be stored securely and only accessible to the research team. Any published results or findings will be presented in a manner that ensures individual participants cannot be identified.

ANNEX II questionnaires' checklist

This checklist was designed to conduct a hospital-based comparative cross section to study on Comparison of obstetric complications Among twin and singleton deliveries in Muka Turi hospital, North Shoa zone , Oromia regional state , Ethiopia 2023/2024 those recorded on delivery log book and has mothers' charts. Data will be extracted from March 1-30, 2024. Please encircle the letter corresponding to the correct respond.

Phone number of PI : +21922835228 email : darearega21@gmail.com

Part-I: Socio-demographic factors			
NO	Characters	Value	Go to
101	Hospital card No.	1. No _____	
102	Place of residence	0. Rural 1. Urban	
103	Age in year	1. Year _____	
104	Gestational age during delivery	1. _____ week	
Part-II: Obstetrics assessment			
201	Total number of pregnancies (gravidity)	1. Number _____	
202	Total number of delivery (parity)	Number -----	
203	Foetal presentation	0. Mal presentation 1. Normal	
204	History of previous obstetrics complication	0. No 1. Yes	
205	Has the mother had any previous cesarean deliveries?	0. No 1. Yes	
206	Bad obstetric history	0. No 1. Yes	If no „q208

207	If yes,	1. Spontaneous abortions 2. Early neonatal deaths 3. Stillbirths 4. Preterm delivery 5. Others_____	
208	Self history of twin pregnancy	0. No 1.Yes	
209	Family history of twin pregnancy	0. No 1.Yes	
210	LMNP	-----	
Part III Health service related factor			
301	ANC follow UP during this pregnancy	0. No 1.Yes	If no- Q 303
302	Number of ANC contact	
303	Was U/S done during pregnancy	0. No 1.Yes	
304	If U/S done what was pregnancy	1. Single 2. Twin 3. Triplet 4. Quadruplet	
305	Access to FP before pregnancy	0. No 1.Yes	
306	PNC utilization	0. No 1.Yes	
Part IV : medical factor			
401	Was any history medical illness	0. No 1.Yes	
402	If yes which medical illness	1. DM 2. HTN 3. HIV 4. Anaemia 5 other	
Part-V: obstetric outcome			
501	was duration of labour know	0. No 1.Yes	
502	If yes what is duration	-----hr	
502	Mode of delivery	0. VD 1. C/S delivery 2 . instrumental	
503	If c/s delivery indication	1 foetal distress 2 mal presentation 3 other -----	

504	What number of foetus deliver	1. Single 2. Twin 3. Triplet	
505	What is outcome of foetus	0 .died 1. live	
506	Any obstetric complication	0. No 1.Yes	
507	If yes which complication face the mother	1. PIH 2. GDM 3. APH 4. PROM 5. Cord Prolapse 6. Obstructed/prolonged labour 8. Preterm delivery 9. Anaemia (Hgb _____g/dl) 10. PPH (11. uterine rapture 12 other	

508	Maternal blood transfusion	0. No 1.Yes
509	Maternal Hospital stay	1. <3days 2. 3-7days 3. >7days
510	Maternal death	0. No 1.Yes
511	If mother died, cause of death	1. PPH 2. Sepsis 3. PIH 4. Other_____

Ethical approval letter



Salale University
Institutional Research Ethics Review Committee (SIU-IRERC)

Date: 12/10/2016

Ref. No: SIU-IRERC-223/2016

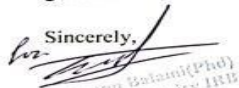
To: Dereje Arega

Subject: Research Ethics Approval Letter

This is to kindly notify you that your project protocol entitled “Obstetric complications and associated factors among women who gave birth in Muketuri primary Hospital, North Shewa zone Oromia-Ethiopia. Comparative cross sectional study” has been approved for the intended one-year period of implementation. The review process of the Research protocol has been carefully conducted by Salale University institutional research ethics review committee (SIU-IRERC). The protocol is ethically sound to be implemented through adhering to the research ethics principles during the implementation. Thus, the committee is pleased to inform you that your study protocol has been approved.

The committee would like to remind you that the research principal is expected to submit a progress report of the research at least once before the end of its implementation. The committee also looks forward to receiving the final technical report and recommendations that will be generated from the study.

Sincerely,


Solomon Salami(Phd)
Salale University IRB
Chairperson



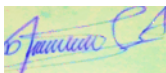
CC:



- Salale University Institutional Research Ethics Review Committee
- Salale University Collage of health sciences CARD

DECLARATION

By my signature below, I declare and affirm that this thesis is my own work, that all the source materials used for this thesis have been duly acknowledged. I have followed all ethical principles of scholarship in doing the preparation of this thesis. All scholarly matter that is included in the thesis was given recognition through citation. I affirm that I have cited and referenced all sources used in this document.

Place of submission: Salale University Collage of health Science, department of public health

Name of the student:	Signature	submission date
Dereje Arega		06/12/2024

Name of advisors'	signature	date
1. Habtamu Tadesa (Lecturer, MPH)		06/12/2024
2. Addisu Walelign (BSc, MPH)		06/12/2024