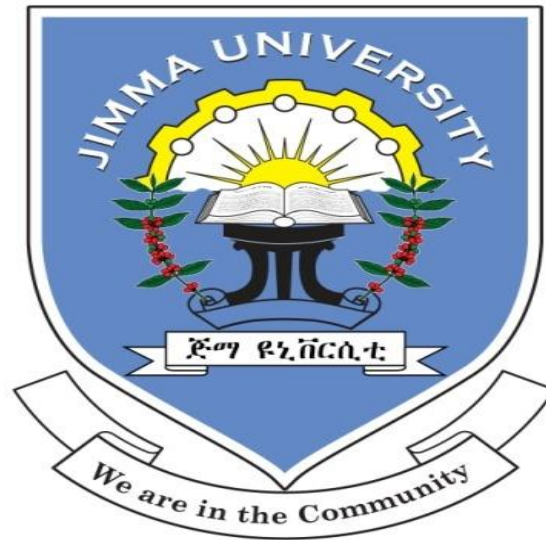


MAGNITUDE AND OBSTETRIC COMPLICATION OF TWIN DELIVERIES IN  
NEKEMTE REFERRAL HOSPITAL, EAST WOLLEGA ZONE, ETHIOPIA, 2017 G. C



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## Abstract

**Background:** Twin pregnancy is a high risk pregnancy with increased risk of obstetric complications which have important implications on the Perinatal outcome. This situation is worse in Sub-Saharan Africa due to lack of well-equipped facilities. However, studies on twin pregnancy and its maternal and fetal outcomes are limited in Ethiopia. Thus, this study aimed to fill this gap.

**Objectives:** The objective of the study was to determine the prevalence, and compare obstetric complications of twin and singleton deliveries in Nekemte referral hospital from March 1/2016 - February 30/2017 G.C.

**Method:** Hospital-based unmatched Case-control study design was carried-out on all mothers delivered in obstetrics ward of Nekemte Referral Hospital from March 1, 2016 to February 30, 2017 after 28 completed weeks with their corresponding records and charts. The data was collected through pretested structured check list and analyzed using SPSS version 20.0. First descriptive statistics done then odds ratio along with their 95% confidence intervals were determined to measure the existence of significant associations between twin delivery and each maternal and fetal complication by using chi-squared ( $\chi^2$ ) test, Fisher- Exact test was used when the assumption of the  $\chi^2$ - test was not fulfilled.

**Results:** The incidence of twin deliveries were 28.6 in 1000 deliveries. Hypertensive disorder of pregnancy(OR=2.1;95% CI=1.54,2.86), preterm labor(OR=2.76;95% CI=2.12,3.40), premature rupture of membrane(OR=1.87;95% CI=1.28,2.73), antepartum hemorrhage(OR=1.80;95% CI=1.09,2.99), cesarean delivery(OR=2.50;95% CI=1.88,3.34), anemia(OR=1.77;95% CI=1.24,2.52), postpartum hemorrhage(OR=1.27;95% CI=0.77,2.11), sepsis(OR=2.18;95% CI=1.46,3.25), cord prolapse(OR=2.33;95% CI=1.51,3.84), and blood transfusion(OR=1.74;95% CI=0.90,3.38) were ante partum, intrapartum and postpartum maternal complications of twin deliveries. Low APGAR score at 1st minute(OR=1.75;95% CI=1.29,2.37), low birth weight(OR=3.36;95% CI=2.61,4.31), neonatal intensive care unit admission(OR=2.95;95% CI=2.25,3.89), and early neonatal death(OR=2.46;95% CI=1.81,3.34) were the major perinatal complications.

**Conclusion:** The prevalence of twin pregnancies in this study was high. The likelihood of developing hypertensive disorder of pregnancy, preterm labor, premature rupture of membrane, ante partum hemorrhage, cesarean delivery, cord prolapse, anemia, postpartum hemorrhage, puerperal sepsis, blood transfusion, low Apgar score at 1st minute, low birth weight, neonatal intensive care unit admission, and early neonatal death was significantly higher in twin deliveries when compared with singleton deliveries. Therefore, greater emphasis should be given on the area of adequate blood service, newborn resuscitation, and standard care for mothers with premature rupture of membrane, to prevent maternal and perinatal complication related to twin deliveries.

**Key words:** Twin delivery, singleton delivery, and obstetric complications.

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## Table of Contents

Abstract .....	i
Acknowledgment .....	ii
List of Table .....	v
List of Figure.....	vi
Acronyms .....	vii
1. Introduction.....	1
1.2 Background .....	1
1.2 Statement of the problem .....	2
1.3 Significance of study.....	3
2. Literature review .....	4
2.1 Overview of twin pregnancy .....	4
2.2 Magnitude of twin pregnancy .....	4
2.3 Maternal complication.....	4
2.4 Fetal and /or neonatal complication .....	8
2.5 Conceptual framework .....	13
3. Objective.....	14
3.1 General objective.....	14
3.2 Specific objective .....	14
4. Methods.....	15
4.1 Study area and period.....	15
4.2 Study design .....	15
4.3 Source population.....	15
4.4 Study population .....	15
4.5 Sample size and sampling techniques .....	15
4.6 Inclusion and exclusion criteria.....	16
4.6.1 Inclusion criteria .....	16
4.6.2 Exclusion criteria .....	16
4.7 Study variables .....	16
4.8 Operational definition .....	16
4.8 Data collection instruments and measurement.....	17
4.8.1 Data collection Instrument.....	17
4.8.2 Data collection procedures and personnel .....	17
4.8.3 Data quality control.....	17

4.8.4	Data processing and analysis .....	18
4.9	Ethical consideration .....	18
4.10	Plan of dissemination.....	18
5.	Results.....	19
5.1	Socio-demographic and obstetric characteristics .....	19
5.2	Ante partum medical and obstetric complication.....	20
5.3	Intra partum and postpartum obstetric complication.....	21
5.4	Other obstetric maternal complication .....	22
5.5	Perinatal obstetric characteristics .....	23
5.6	Perinatal complications .....	26
6.	Discussion .....	29
7.	Conclusion and recommendation.....	32
7.1	Conclusion .....	32
7.2	Recommendations.....	32
8.	Reference .....	33
9.	Annexes-Checklist .....	37

## List of Table

<b>Table 1.</b> The socio-demographic and obstetric characteristics of mothers delivered in NRH .....	19
<b>Table 2.</b> Ante partum complication of mothers delivered in NRH .....	21
Table 3. Intra partum and postpartum complication of mothers delivered in NRH .....	22
Table 4. Obstetric characteristics of mothers delivered in NRH .....	23
<b>Table 6.</b> Fetal presentations delivered in NRH.....	23
<b>Table 7.</b> Distribution by mode of delivery among neonates delivered in NRH .....	24
<b>Table 8.</b> Distribution of birth weight among deliveries in NRH .....	25
<b>Table 9.</b> Sex distribution at birth among neonates delivered in NRH.....	25
<b>Table 10.</b> Causes of NICU admission in NRH.....	26
<b>Table 11.</b> Neonatal hospital stay at NRH .....	26
<b>Table 12.</b> Fetal complications encountered in NRH.....	27

## List of Figure

Figure 1. Conceptual framework.....	13
Figure 2. Fetal presentation combinations among twin delivered in NRH .....	24
Figure 3. Shows combinations of sex among twins delivered in NRH .....	25
Figure 4. Shows unique complication of twins delivered in NRH.....	28



## Acronyms

AGA	Average gestational age
ANC	Antenatal care
APGAR	Appearance, Pulse, Grimace, Activity, and Respiration
APH	Antepartum haemorrhage
C/S	Cesarean section
CPD	Cephalopelvic disproportion
DCDA	Dichorionic diamniotic
DCMA	Dichorionic monoamniotic
EDD	Expected date of delivery
EFW	Estimated fetal weight
ENND	Early neonatal death
EONS	Early onset of neonatal sepsis
GDM	Gestational diabetes mellitus
GA	Gestational age
hCG	Human chorionic gonadotropin
Hct	Hematocrit
IESO	Integrated Emergency surgery (Obstetrics, Gynecology and General Surgery)
IUFD	Intrauterine fetal death
IUGR	Intrauterine growth restriction
JU	Jimma University
LNMP	Last normal menstrual period
LBW	Low birth weight
MAMC	Monoamniotic monochorionic
MCH	Maternal and child health
NRH	Nekemete Referral Hospital
NICU	Neonatal intensive care unit
NRFHRS	None reassuring fetal heart rate status
OPD	Outpatient department

OL	Obstructed labor
PIH	Pregnancy induced hypertension
PND	Perinatal death
PPH	Postpartum hemorrhage
PROM	Premature rupture of membrane
RR	Relative risk
SSI	Surgical site infection
SVD	Spontaneous vertex delivery
TP	Twin pregnancy
TTTS	Twin- to-twin transfusion syndrome
U/S	Ultrasound
UTI	Urinary tract infection
VLBW	Very low birth weight
WHO	World health organization

# 1. Introduction

## 1.2 Background

In the human species, twin is a type of multiple birth in which the mother gives birth to two offspring from the same pregnancy. They are usually result from fertilization of two separate ova–dizygotic or fraternal twins. Less often, twins arise from a single fertilized ovum that divides–monozygotic or identical twins which has similar distribution throughout the world (1,2).

The occurrence and frequency of twinning varies across human populations. Slightly more than 30% of twins are monozygotic; nearly 70% are dizygotic. Monozygotic twins have a uniform incidence of about 3-5 per 1000 across the world. Dizygotic twinning shows regional variations and the highest incidence of 49 per 1000 occurs in Nigeria. There has been an increasing trend in the incidence of twin pregnancies globally. This is attributable to increasing practice of assisted reproduction and delayed age of marriage as older women are at greater risk of having twin pregnancy(3 - 5).

Twin pregnancy is associated with increased risk of maternal and fetal complications both in the developed and developing countries, which in turn increase financial, emotional, personal and social costs to the twins themselves and their families. This is probably worse in sub-Saharan Africa, where lack of facilities to manage twin delivery and poverty and harmful cultural beliefs and practices are still frequent (6 - 11).

Women with twin pregnancy are at a higher risk of medical and obstetrics complications like; Preterm labor, Hypertensive disorder in pregnancy, Nausea and vomiting during pregnancy, UTI, DM, Anemia, PROM, Cord prolapse, Uterine a tony and PPH during antepartum, intra partum, and postpartum periods(7). They are nearly six times more likely to be hospitalized due to complications during pregnancy (12).

Twin gestations have an elevated risk of prematurity, low birth weight, TTTS, Conjoined twin, Death of one or both twin and IUGR. These factors significantly mediated other adverse perinatal outcomes, such as low five-minute APGAR scores, neonatal sepsis, admission to the ICU, and hyperbilirubinaemia(5,13-16). In previous studies preterm delivery is the most

common complication of twin pregnancies of which its consequence prematurity being the leading cause of perinatal mortality which is 3-5 times higher in twin babies than in singletons (3, 8, 11, 17, 18).

Operative intervention is more likely in twin pregnancy because of increased risk of obstetric problems such as mal presentation, prolapsed cord, and fetal distress. All mother carrying a twin pregnancy should deliver in a well-equipped hospital by an experienced physician who has adequate assistance (pediatrician or neonatologist, pediatric nurse team, and anesthesiologist) where immediate caesarean section can be performed if required. In the absence of other obstetrics complication requiring cesarean delivery, the route of delivery depends on intra partum presentation of twin which could be (1)twin A and twin B cephalic, (2)twin A vertex and twin B non-cephalic , and (3)twin A non-cephalic and twin B cephalic, breech, or transverse. Category 1 and 2 with each >32 weeks and weighing >1500–2000 g, can usually be managed successfully by vaginal delivery with either total breech extraction of twin B immediately after the delivery of twin A or External cephalic version of twin B after mother has been consented. When either twin A or both twins are non-cephalic (category 3), primary caesarean section should be performed (2, 3). Because of difference in anatomic and physiologic changes, many aspects of the obstetric management of the twin pregnancy cannot be extrapolated from that of a singleton pregnancy (9).

## 1.2 Statement of the problem

Twin pregnancy occurs one in 80 pregnancies(1, 3). The incidence is 1.3 in 1,000 births in Japan,12 in 1,000 births in the United States, and the highest in Africa where an incidence of up to 49-53 per 1,000 births have been reported among the Yoruba's in South-West Nigeria (19). But the information in Ethiopia about twin pregnancy is limited to few old studies showing the rates range from 1.37% at Mekele referral hospital in Tigray to 2.43% at St. Paul's Hospital, Addis Ababa with only single recent study done in Jimma showing incidence of 3.77% (6, 20, 21). In NRH and East Wollega Zone in general there is no information on its magnitude.

Twin pregnancy is associated with increased risk of maternal and neonatal complications both in developed and developing countries (20). It continues to be a focus of interest worldwide due to its increasing incidence and also the high maternal and perinatal mortality and morbidity associated with it. This is probably worse in sub-Saharan Africa where there may be lack of

facilities to manage twin pregnancy and delivery and where poverty, ignorance, and harmful cultural beliefs and practices are still rife. Available evidence also indicates that twin pregnancies are also associated with a number of financial, emotional, personal and social costs for their families and twins themselves(22). A mother with a twin pregnancy has having preterm labor, cord prolapse, anemia, UTI, preeclampsia-eclampsia and hemorrhage is (2times, 5times, 2-3times, 2times, 3times and 5times) respectively as compared to singleton pregnancy and associated with 25% of PROM and higher risk of uterine a tony and maternal death (2, 3). And it accounts for at least 10% of perinatal mortality globally .Whereas mal-presentation and the hazards of delivery are next in order of concern (9).

So except some old studies on twin pregnancy in Ethiopia, there is no base line study in NRH on twin pregnancy and the incidence and maternal and fetal outcome from these pregnancies. These may have its own share in increased maternal and perinatal mortality in the country. Therefore, this study is aimed to determine the twinning rate, and maternal and fetal complications of twin pregnancies managed at obstetrics ward of NRH. This might make proper allocation of scarce resources and prevent death of mothers of twin pregnancy and their babies due to complications.

### **1.3 Significance of study**

Twin pregnancies is classified as high risk because of the increased incidence of maternal anemia, UTI, preeclampsia–eclampsia, hemorrhage (before, during, and after delivery), mal presentation, increased risk of C/S, and complications after delivery including puerperal sepsis, SSI and postpartum depression. It is also associated with increased neonatal morbidity and mortality mainly due to preterm labor and preterm delivery with their complications, and complications unique to twin pregnancy. Compressive obstetric care and intensive neonatal care play a crucial role to decrease complications related to this pregnancy.

Even though the above is the known about twin pregnancy globally, in Ethiopia much is not known about the prevalence, maternal and fetal complications related with twin pregnancy. In NRH, there is no baseline study on twin pregnancy. Findings of this study will be used to plan and implement standard obstetric and neonatal care so as to decrease maternal and fetal complications from twin pregnancies; which in turn helps the country to achieve sustainable development goals.

## 2. Literature review

### 2.1 Overview of twin pregnancy

Twins in animal biology is a form of multiple births in which the mother gives birth to two offspring from the same pregnancy. Giving birth to twins is a relatively rare event in humans, where occurrences vary considerably across populations.

### 2.2 Magnitude of twin pregnancy

Twin pregnancy occurs one in 80 pregnancies(1, 3, 28 ).Monozygotic twinning occurs in about 4–5 of 1000 pregnancies in all races, when the incidence is influenced by race, heredity, maternal age, parity, and, especially, fertility treatment for Dizygotic. The incidence is 1.3 in 1,000 births in Japan,12 in 1,000 births in the United States, and the highest in Africa where an incidence of up to 49-53 per 1,000 births have been reported among the Yoruba's in South-West Nigeria(2, 19).In some African countries national twinning rates is higher, with 38 twins per 1000 births in Democratic Republic of Congo, 36 twins per 1000 births in Niger and 17.7 twins per 1000 births in Egypt and 27.9 twins per 1000 births in Benin(15, 29).With increasing trend in the incidence of twin pregnancies globally and its association with high maternal and perinatal mortality and morbidity, Information in Ethiopia about twin pregnancy is limited to few old studies showing the rates range from 13.7/1000 at Mekele referral hospital in Tigray to 24.3/1000 at St. Paul's Hospital, Addis Ababa with only single recent study done in Jimma showing incidence of 37.7/1000(6, 20, 21).

### 2.3 Maternal complication

Twin pregnancies, in comparison with singletons, are associated with increased incidence of maternal complications such as preterm labor, PIH, PROM, anemia, Nausea & Vomiting, UTI, hemorrhage (before, during, and after delivery), GDM and uterine a tony.(2, 3, 14).According to multi-centered retrospective study done by Global Network for Women and Children's Health Research in 6 different low- and mid-income countries, 18.1% of twin pregnancies were more likely to be delivered by caesarian section compared to 9.5% of singleton pregnancies(23). Retrospective review done on maternal and neonatal data in Thailand Prapokklao Hospital between 1st January 2004 and 31st December 2009to evaluate the outcomes of twin pregnancies shows the three leading maternal complication associated with twin pregnancy as preterm

delivery, anemia and pregnancy-induced hypertension, with a prevalence of 62.9%, 23.8% and 13.9%, respectively(24).In study done in Azare Nigeria on outcome of twin pregnancies in federal medical center from January 2010 to December 2012, the rate of preterm delivery, HTN, Anemia, PPH and C/S were 69.4%, 9.2%, 17.2%, 6.1% and 18.5 respectively(25).According to Hospital-based prospective cohort study conducted in Jimma University Specialized Hospital on Maternal complications of twin deliveries from December 01, 2012 to November 30, 2013, 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(7).

More than five of every 10 twins born in the United States in 2010 were delivered preterm. Delivery before term is a major reason for increased neonatal Morbidity and mortality rates in twin pregnancy. Prematurity is increased six fold and tenfold in twins and triplets, respectively(2). In a retrospective study done at Thailand Prapokklao Hospital between 1st January 2004 and 31st December 2009 preterm labor was the leading twin pregnancy complications with rate of 62.9%(17). In India, retrospective study done on Maternal and Perinatal Outcome of Twin Pregnancy from Jul 2012 to Jun 2014 shows preterm labor was 30%(30). Similarly a retrospective study done in AZARE Nigeria from January 210 to December 2012 on outcome of twin pregnancies shows also preterm labor as a leading maternal complication of twin pregnancy with rate of around 69.4%(25). When we come to Ethiopia single a Hospital-based prospective cohort study conducted in Jimma University Specialized Hospital on Maternal complications of twin deliveries from December 01, 2012 to November 30, 2013 G.C. And according to this study the rate of preterm labor for women with twin and singleton pregnancy was 3.5% and 0.3% respectively and mother with twin pregnancy has around 6.61 times risk of having preterm labor as compared to mother with singleton (7).

In WHO Global multi-country cross-sectional Survey conducted over 2004–2005 (Africa and Latin America) and 2007–2008 (Asia) on Maternal and Perinatal Outcomes of Twin Pregnancy in 23 Low- and Middle-Income Countries, shows rate of PIH and preeclampsia- eclampsia was 5.2% and 6.7% respectively(29). According to retrospective study done on Maternal and Perinatal Outcome of Twin Pregnancy in India from Jul 2012 to Jun 2014 the rate of HDP was 16.6%(30). A retrospective study done in AZARE Nigeria from January 210 to December 2012 on outcome of twin pregnancies shows also the rate of HDP as 9.2% (25).In hospital-based

prospective cohort study conducted from December 01, 2012 to November 30, 2013 in Jimma University Specialized Hospital 25% of Mother with twin pregnancy has HDP and mother with twin pregnancy has 5.54 times risk of having HDP as compared to mother with singleton(7).

Anemia is 2–3 times more common in multiple pregnancies than in singleton pregnancy(3). According to retrospective study done on Maternal and Perinatal Outcome of Twin Pregnancy in India between Jul 2012 to Jun 2014 16.6% of mothers with twin pregnancy has anemia(30). A retrospective study done in AZARE Nigeria from January 210 to December 2012 on outcome of twin pregnancies shows 17.3% of mothers with twin pregnancy has Anemia(25). In Ethiopia according to hospital-based prospective cohort study conducted from December 01, 2012 to November 30, 2013 in Jimma University Specialized Hospital 21.5% of mothers with twin pregnancy has anemia with relative risk of 1.15 as compared to singleton pregnancy(7).

According to WHO Global multi-country cross-sectional Survey conducted over 2004–2005 (Africa and Latin America) and 2007–2008 (Asia) on Maternal and Perinatal Outcomes of Twin Pregnancy in 23 Low- and Middle-Income Countries 12.4% of mothers with twin pregnancies have APH(29). A retrospective study done in AZARE Nigeria from January 210 to December 2012 on outcome of twin pregnancies shows 5.1% of mothers with twin pregnancy has APH(25). Similarly, hospital-based prospective cohort study conducted from December 01, 2012 to November 30, 2013 in Ethiopia Jimma University Specialized Hospital the rate of APH for mothers with twin pregnancy was 4.7%. The mother with twin pregnancy has 1.08 times risk of having APH as compared to singleton pregnancy(7).

Postpartum hemorrhage is common in twin pregnancy (3). According to 2 years observational study done in Pakistan at Department of Obstetrics and Gynecology, Liaquat University Hospital, Jamshoro. From July 2007 to July 2009, from mother with twin pregnancies 12.5% has PPH (31). A retrospective study done in AZARE Nigeria from January 210 to December 2012 on outcome of twin pregnancies shows 6.1% of mothers with twin pregnancy has PPH(25). In hospital-based prospective cohort study conducted from December 01, 2012 to November 30, 2013 in Ethiopia Jimma University Specialized Hospital the rate of PPH for mothers with twin pregnancy was 16%. The mother with twin pregnancy has 3.24 times risk of having PPH as compared to singleton pregnancy(7).

According to WHO Global multi-country cross-sectional Survey conducted over 2004–2005



(Africa and Latin America) and 2007–2008 (Asia) on Maternal and Perinatal Outcomes of Twin Pregnancy in 23 Low- and Middle-Income Countries 8.4% of mothers with twin pregnancies have PROM(29). In India, retrospective study done on Maternal and Perinatal Outcome of Twin Pregnancy from Jul 2012 to Jun 2014 indicated rate of PROM as 1.6% for mothers with twin pregnancy(30). Descriptive study done on patients with twin pregnancy that delivered at Aminu Kano Teaching hospital, Nigeria from 1st January, 2005 to 31st December 2009 shows 7.7% mother with twin pregnancy has PROM(32). As to hospital-based prospective cohort study conducted from December 01, 2012 to November 30, 2013 in Ethiopia Jimma University Specialized Hospital 15.3 % of mothers with twin pregnancy has PROM and as compared to singleton they have 3.82 times risk of having PROM(7).

As a result of placental origin of human placental lactogen, which causes insulin resistance, both gestational diabetes mellitus and gestational hypoglycemia are much higher in twin gestation compared with findings in singleton pregnancy(3). In a retrospective study done at Thailand Prapokklao Hospital between 1st January 2004 and 31st December 2009, 6.6% of mothers with twin pregnancy has GDM(17). Observational study done on twin pregnancies delivered at the University of Nigeria Teaching Hospital between 2002 and 2008 shows 2.7% of mothers with twin pregnancy has GDM(33). When we come to Ethiopia, hospital-based prospective cohort study conducted from December 01, 2012 to November 30, 2013 in Ethiopia Jimma University Specialized 0.7 % of mothers with twin pregnancy has GDM and as compared to singleton they have 2 times risk of having GDM(7).

Prolapse of the cord occurs 5 times more often in Twin than in singleton pregnancy(3). Descriptive study done on patients with twin pregnancy that delivered at Aminu Kano Teaching hospital, Nigeria from 1st January, 2005 to 31st December 2009 shows 3.1% mother with twin pregnancy has cord prolapse (32). According to hospital-based prospective cohort study conducted from December 01, 2012 to November 30, 2013 in Ethiopia Jimma University Specialized 4.9 % of mothers with twin pregnancy was complicated with cord prolapse and as compared to singleton they have 2.23 times risk of having cord prolapse(7).

Still mothers with twin pregnancies are at higher risk of some other complications like Nausea and vomiting, UTI, operative deliveries, uterine atony and Hysterectomy(2, 7, 25, 32).

## 2.4 Fetal and /or neonatal complication

Perinatal mortality and morbidity rates are increased in twin pregnancy, mainly because of preterm delivery and its complications (ie, trauma or asphyxia). The perinatal mortality rate of twins is 3–4 times higher and stillbirth is 2 times higher than in singleton pregnancies as a result of chromosomal abnormalities, prematurity, structural anomalies, hypoxia, and trauma(3). According to retrospective study conducted in Croatia at split university hospital Center on difference in perinatal outcome of singleton and twin pregnancies after assisted conception from January 1, 2007 until December 31, 2008, low birth weight and preterm delivery was the major perinatal complication of twin pregnancy being 64.4% and 37.5% respectively(26). Retrospective case–control study carried out at NAUTH, Nnewi, South-East Nigeria from 1st February 2005 to 31st January, 2010 on: the incidence, pregnancy complications, and obstetric outcomes of twin versus singleton pregnancies shows preterm labor, low birth weight, low APGAR score and perinatal death as 36%, 56%, 40% and 22% respectively with relative risk of 6.5, 9, 6 and 2.5 respectively(27). When we come to Ethiopia data's are limited with only single recent Hospital-based prospective cohort study conducted in Jimma University Specialized Hospital from December 2012 to November 2013 showing preterm labor, low birth weight, need for NICU admission and perinatal death 37.8%, 55.9%, 75% and 17.7% respectively(8). In many studies low birth weight is the major cause of admission to NICU where prematurity is the commonest cause of perinatal mortality(8, 10, 24, 25).

Delivery before the 36th week is twice as frequent in twin pregnancies as in singleton pregnancies. Intracranial injury is more common in premature infants, even those delivered spontaneously(3). In WHO Global multi-country cross-sectional Survey conducted over 2004–2005 (Africa and Latin America) and 2007–2008 (Asia) on Maternal and Perinatal Outcomes of Twin Pregnancy in 23 Low- and Middle-Income Countries preterm birth (<37 weeks) of 35.2% among twin babies was indicated to be significantly higher which persisted regardless of region(29). Retrospective study done In India on Maternal and Perinatal Outcome of Twin Pregnancy from Jul 2012 to Jun 2014 showed 60% of babies born from twin pregnancy was preterm birth(30). Retrospective case–control study carried out at NAUTH, Nnewi, South-East Nigeria on Twin versus singleton pregnancies: the incidence, pregnancy complications, and obstetric outcomes from 1st February 2005 to 31st January 2010 twin babies delivered 6.5 times

being preterm as compared to singleton and preterm birth was 36% from twin deliveries(27). In Ethiopia Hospital-based prospective cohort study conducted in Jimma University Specialized Hospital on Perinatal complications of twin deliveries from December 2012 to November 2013 from twin deliveries 37.8% delivered being preterm with RR of 3.73 as compared to singletons(8).

Twin gestations are more likely to be low birth weight than singleton pregnancies due to restricted fetal growth and preterm delivery(2). In a retrospective study done at Thailand Prapokklao Hospital between 1st January 2004 and 31st December 2009, 73.2% of babies delivered from twin pregnancy was low birth weight(17). Retrospective case–control study carried out at NAUTH, Nnewi, South-East Nigeria on Twin versus singleton pregnancies: the incidence, pregnancy complications, and obstetric outcomes from 1st February 2005 to 31st January 2010 twin babies delivered 9 times being low birth weight as compared to singleton and low birth weight was 56% from twin deliveries(27). In Ethiopia Hospital-based prospective cohort study conducted in Jimma University Specialized Hospital on perinatal complications of twin deliveries from (December 2012 to November 2013) the rate of low birth weight and risk of being low birth weight as compared to singleton was 55.9% and 1.74 respectively(8).

In a retrospective study done at Thailand Prapokklao Hospital between 1st January 2004 and 31st December 2009, 13.9% and 2.6% of babies from twin deliveries has low APGAR score (<7) at 1<sup>st</sup> and 5<sup>th</sup> minutes respectively(17). Retrospective study done In India on Maternal and Perinatal Outcome of Twin Pregnancy between Jul 2012 to Jun 2014 showed the rate of low APGAR score (<7) for babies born from twin pregnancy to be 41.6% and 16.6% in the 1<sup>st</sup> and 5<sup>th</sup> minutes respectively(30). Hospital-based prospective cohort study conducted in Jimma University Specialized Hospital on perinatal complications of twin deliveries from (December 2012 to November 2013) also shows the rate of low APGAR score(<7) at 1<sup>st</sup> and 5<sup>th</sup> minutes for twin babies as 54% and 6.3% respectively(8).

According to retrospective study conducted in Korea Yonsei University Health System from January 1995 to December 2008 on Obstetric and Perinatal Outcomes of twin pregnancy 64.7% spontaneously conceived twin babies was admitted to NICU(34). Retrospective study done In India on Maternal and Perinatal Outcome of Twin Pregnancy from Jul 2012 to Jun 2014 also shows 36.6% of twin babies admitted to NICU and prematurity was the leading cause of NICU

admission with 36.6% (30). This data was relatively higher at Jimma, according to Hospital-based prospective cohort study conducted (from December 2012 to November 2013). This study shows 75% of twin babies are admitted to NICU with low birth weight and prematurity being the leading cause of NICU admission 76.7% and 55.6% respectively. As compared to singleton twin babies has 3.91 times risk of NICU admission(8).

Twin-twin transfusion syndrome is local shunting of blood, which is most serious problem of monochorionic placentas occurs because of vascular anastomoses to each twin that are established early in embryonic life with possible communications of artery to artery, vein to vein, and combinations of these. Artery-to-vein communication is by far the most serious and is most likely to cause twin-twin transfusion. It is exclusively a complication of diamnioticmonochorionic pregnancies occurs in about 15% of monochorionic gestations and is thus the most common severe complication specific to this type of twinning(3,5). Prospective cohort study done on outcome of monochorionicdiamniotic twin gestations in (Leuven and Hamburg) from (January 2002-January 2007) shows the rate of TTTS to be 9% (35). In a retrospective study done at Thailand Prapokklao Hospital between 1st January 2004 and 31st December 2009 1.3% of twin babies has TTTS(17). In Ethiopia there is no data concerning this issue.

Growth discordance in utero is the difference in sonographic estimated fetal weights expressed as a percentage of the larger twin's estimated fetal weight. The American College of Obstetricians and Gynecologists defines abnormal growth in two ways: an estimated fetal weight below the 10th percentile using singleton growth curves or a 20 percent discordance in estimated fetal weight between the lighter and heavier twin. Approximately 15% of twins are diagnosed with this condition (36 - 38). Generally, as the weight difference within a twin pair increases, the perinatal mortality rate increases proportionately(2). Retrospective study done In India on Maternal and Perinatal Outcome of Twin Pregnancy from Jul 2012 to Jun 2014 also shows the rate of discordant twin to be 3.33% (30).Hospital-based prospective cohort study conducted in Jimma University Specialized Hospital on perinatal complications of twin deliveries from (December 2012 to November 2013) also shows the rate of discordant twin to be 5.6%(8).

Overall, none cephalic presentation occurs 10 times more often in multiple pregnancy than in

singleton pregnancy(3). Observational study done on twin pregnancies delivered at the University of Nigeria Teaching Hospital between 2002 and 2008 shows none cephalic presentation was 37.6% from twin pregnancy(33). According to Hospital-based prospective cohort study conducted in Jimma University Specialized Hospital on perinatal complications of twin deliveries from (December 2012 to November 2013) the overall mal-presentation rate was 37.4% in twin deliveries when compared with 9.7% of singleton deliveries (8).

The higher the number of fetuses, the greater is the risk of fetal growth restriction(3). In a retrospective study done at Thailand Prapokklo Hospital between 1st January 2004 and 31st December 2009, 9.3% of babies delivered from twin pregnancy was IUGR(17). Retrospective study done In India on Maternal and Perinatal Outcome of Twin Pregnancy from Jul 2012 to Jun 2014 also shows the rate of IUGR among twin to be 7.6%(30). Retrospective review of twin deliveries at the University of Abuja Teaching Hospital over a period of 10 years between 1 January 1998 and 31 December 2007 shows, out of twin deliveries 0.7% were IUGR(11). There is no data in literatures from Ethiopia.

Major fetal structural malformations are present in approximately 2% of twin infants, compared with 1% of singletons, whereas minor malformations are found in 4% of twins compared with about 2.5% of singletons(3). It is approximately twofold increased risk for congenital anomalies in twins versus singletons, with most of this risk occurring in MZ twins(5). A 2009 population-based study from England found that rates of congenital anomalies were 1.7 times more frequent in twins compared with singletons (95% CI, 1.5 to 2.0) and that the relative risk for monozygotic twins was nearly twice that of dizygotic twins (RR, 1.8; 95% CI, 1.3 to 2.5) (39). According to retrospective study conducted in Korea Yonsei University Health System from January 1995 to December 2008 on Obstetric and Perinatal Outcomes of twin pregnancy 8% spontaneously conceived twin babies were congenitally malformed(34). In Cross-sectional study conducted at the Island Maternity Hospital (IMH) in Lagos, southwest Nigeria, from May 2005 to December 2007, out of 17 infants with congenital abnormalities 3(17.6%) were twins ( $p=0.091$ ) (13). In Ethiopia, Hospital-based prospective cohort study conducted in Jimma University Specialized Hospital on perinatal complications of twin deliveries from (December 2012 to November 2013) shows similar 0.7% of congenital malformation between twin and singleton which was spinal bifida and anencephaly(8).

Conjoined twins result from incomplete segmentation of a single fertilized ovum between the 13th and 14th days; which may be incomplete twinning (ie, 2 heads, 1 body) if cleavage is further postponed(3). It is a rare complication of monochorionictwinning. This event occurs with a frequency of about 1 per 50,000 deliveries. Most conjoined twins are female, with a reported female-to-male ratio of 2:1 or 3:1(5). Retrospective study done in Brazil in University of São Paulo from (January 1982 to January 2007) shows 1/90 pairs of twin live births was conjoined twin(40). There is no data on prevalence of conjoined in Ethiopia.

From the above literature review, we have seen that the magnitude of twin pregnancy varies with geographical location and different factors. It is also associated with a number of antepartum, intra-partum and postpartum maternal and fetal complications. But in Ethiopian context, there is only limited information; particularly at NRH there is no even baseline study on the issue. Lack of this baseline information might contribute its share to high maternal and perinatal mortality in the country. Therefore this study will help us know the incidence, maternal, fetal and neonatal complications in our set up, which in turn create awareness about situation of twin pregnancy in the area for the health sector in the region and the country as the whole.

## 2.5 Conceptual framework

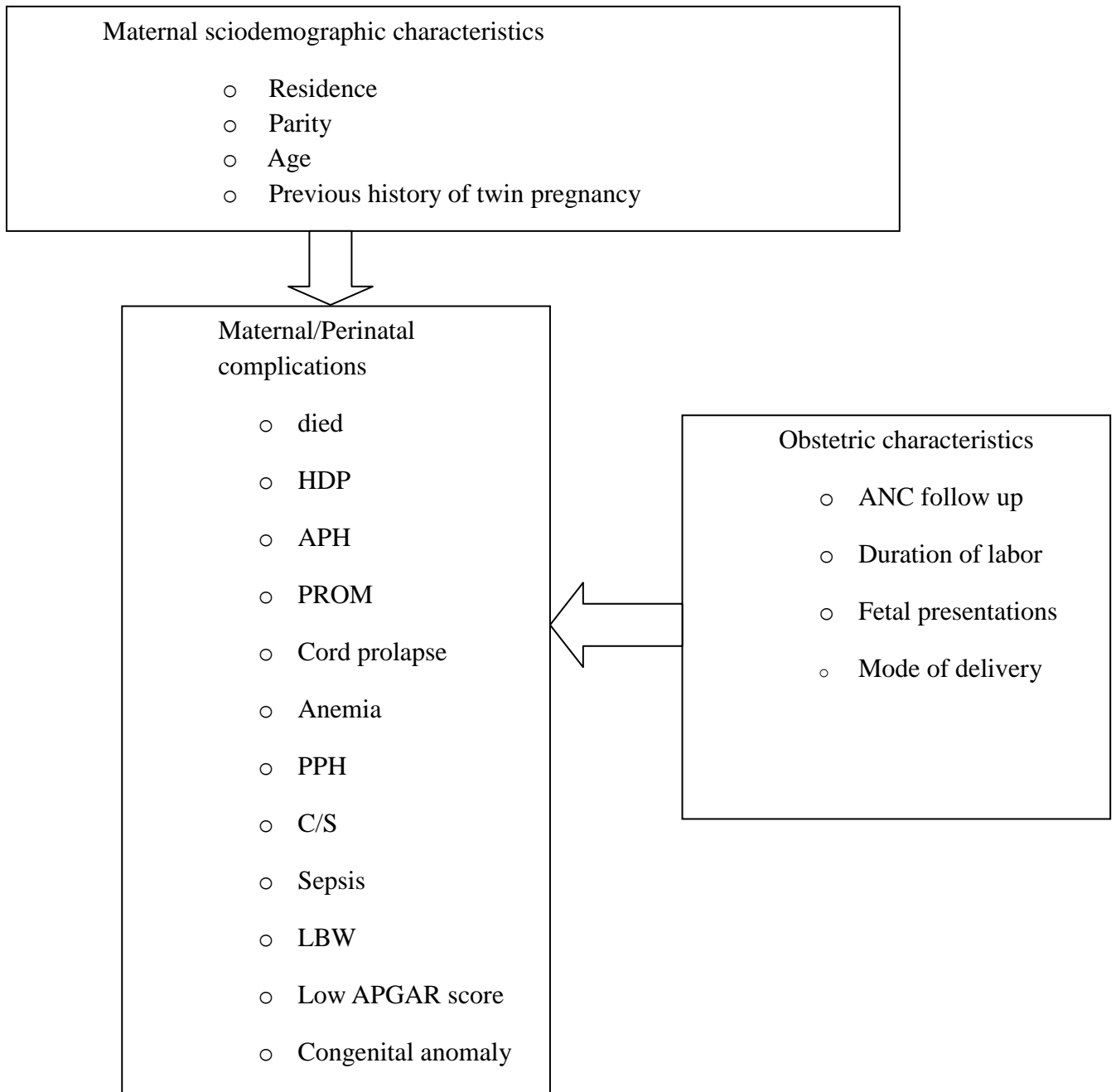


Figure 1. Conceptual framework

### **3. Objective**

#### **3.1 General objective**

The general objective of this study was to determine the incidence, and compare obstetric complications of twin and singleton deliveries in Nekemte Referral Hospital from March 1, 2016 to February 30, 2017 G.C.

#### **3.2 Specific objectives**

- To determine the incidence of twin deliveries among all deliveries from March 1, 2016 to February 30, 2017 G.C in Nekemte referral hospital.
- To identify and compare maternal complications of twin and singleton deliveries.
- To identify and compare fetal complications of twin and singleton deliveries.



## **4. Methods**

### **4.1 Study area and period**

The study was conducted in NRH from March 1, 2016 to February 30, 2017 G.C which is found in Nekemte town 331 km, west of capital Addis Ababa .NRH is established in 1923 and currently it is one of the referral hospitals in the country giving services to about 2.1 million peoples of Nekemte town, East wollega zone, parts of west wollega zone, Horoguduru zone and west shoa zone. It is also serving as a clinical post graduate attachment site for MSc in Integrated Emergency Obstetrics, Gynecology and General Surgery, General Practitioner, Bsc in Public Health, Bsc Nurse and Bsc Midwifery. Currently it has 178 beds for the inpatient services and 113 health professionals( including 2 Gynecologist, 2 IEOS, and 20 midwife) - and 78 administrative staffs. The Hospital provides Medical treatment, ophthalmic treatment Psychiatric treatment, major and minor operation, inpatient services, MCH, control of HIV, laboratory, X-ray and ultrasound, pharmacy, training services and physiotherapy.

### **4.2 Study design**

A hospital- based retrospective case-control study design was conducted.

### **4.3 Source population**

All mothers who gave birth in obstetrics ward of NRH and recorded on delivery log book from March 1, 2016 to February 30, 2017 G.C and their new born.

### **4.4 Study population**

All pregnant mothers who delivered at NRH from March 1, 2016 to February 30, 2017 G.C and recorded in delivery log book and has card.

### **4.5 Sample size and sampling techniques**

Sample size was calculated by using Epi info version 7.2.0.1 by considering two-population comparisons of proportions based on the following assumptions. Premature rupture of membrane(PROM) is -taken as one of outcome variable\_(maternal complications). The proportion of mothers developing PROM among exposed\_(twin deliveries) is assumed to be 15.3%\_( $p_1=0.153$ ) and among non-exposed\_(singleton deliveries) is assumed to be

3.1%\_( $p=0.03$ ). A level of confidence of 95%, power of 90%, ratio of exposed to non-exposed 1:2 and 10% non-responses are considered. This gives sample size, 104 exposed\_(twin deliveries) -and 208 non-exposed\_(singleton deliveries), a total of 312 deliveries. Each (singleton and twin) deliveries was taken by using simple random sampling technique.

## **4.6 Inclusion and exclusion criteria**

### **4.6.1 Inclusion criteria**

All pregnant mothers who delivered twin and singleton at NRH or outside the hospital and come with complication in study period and has records and patient cards.

### **4.6.2 Exclusion criteria**

All mothers who delivered outside and not visited the hospital or in the NRH during study period but no records and cards.

## **4.7 Study variables**

### **Independent variables**

- Residence
- Age
- Parity
- ANC follow up
- U/S during ANC & labor
- Family history of twin pregnancy
- Fetal presentation
- Mode of delivery

### **Dependent variables**

- **Maternal outcome**
- **Perinatal outcome**

## **4.8 Operational definition**

**Residence**:-Kebeles putted in whole number on mothers card (eg, 01, 02,..) were taken as Urban

and Kebeles putted in specific name on mother's card were taken as Rural.

**Maternal outcome:-** A mother delivered with and/or developed at least any one of complication like APH, HDP, GDM, PROM, Preterm labor, Anemia, Cord prolapse, PPH, Hysterectomy, Puerperal sepsis, Death.

**Standard care:-** Treatment and/or clinical care like avoidance of multiple per vaginal examination that required to mothers with premature rupture of membrane.

**Perinatal outcome:-** A neonate delivered with and /or developed at least any one of complication like low Apgar score, low birth weight, NICU admission, congenital anomaly, still birth, Conjoined twin, weight discordance and ENND

**Newborn resuscitation:-** Assistance of neonate in making physiological transition from intra uterine life to extra uterine life.

## 4.8 Data collection instruments and measurement

### 4.8.1 Data collection Instrument

The study data was collected from mothers cards and registration books using check list which have 4 parts;

- Socio demographic factors.
- Obstetrics Assessment
- Maternal complications and
- Fetal complications

### 4.8.2 Data collection procedures and personnel

Two midwives, and three Bsc. nurses were trained for 1 day for data collection. Maternal and neonatal data obtained from delivery log books and mothers cards and neonatal admission and discharge registration books. After the data was collected, it was revised by the investigator for completeness.

### 4.8.3 Data quality control

The questionnaire was pre-tested on few cases before the actual data collection.

**During data collection:** Intensive training was given for the data collectors on the questionnaires and methods of data collection. The principal investigator was checked the

completeness and consistency of the questionnaire after each document information. The data collection process was closely monitored by the principal investigator. The principal investigator was checked every questionnaire meticulously so that all incomplete forms was identified before the mothers data return to card room.

**After data collection:** The data was edited and cleaned to ensure accuracy, consistency and completeness.

#### **4.8.4 Data processing and analysis**

The collected data were entered to, cleaned and analyzed by using SPSS for windows version 20.0. Descriptive statistics such as proportions, means and standard deviations were determined to describe the study participants by cross-tabulating according to their exposure status. Odds ratio(OR) along with their 95% confidence intervals (CI) were determined to measure the existence of significant associations between twin delivery and each maternal and fetal complications by using chi-squared ( $\chi^2$ ) test, Fisher- Exact test was used when the assumption of the  $\chi^2$ - test was not fulfilled. Results of the study were presented by using tables, and graphs. Final interpretation, discussion and recommendation were made based on the findings of this research.

#### **4.9 Ethical consideration**

The procedure and purposes of the study was explained to the hospital manager and to the hospital medical director. Permission was obtained from NRH. The patient's name was not included in the Check list, after finishing the data collection the patients' document returned to card room. Confidentiality was strictly observed and patient's names were not used in this study except their file registration number and the study identification number. The information was used for study purpose only.

#### **4.10 Plan of dissemination**

Findings was presented to master's thesis defense of JU, institute of health science, and school of Graduate Study. The results will be submitted to the coordinator of IEOS, Regional Health Bureau, Zonal Health Offices and None governmental organizations working on this area and NRH to use as input to improve obstetric care for twin deliveries. Also there will be an attempt to publish the result in standard journal.

## 5. Results

### 5.1 Socio-demographic and obstetric characteristics

A total of 4328 deliveries were conducted at Nekemte Referral Hospital (NRH) from March 1, 2016- February 30, 2017 G.C, out of which 124 were twin deliveries, constituting 2.86% or 1 in 35 deliveries. Majority of residence, 64.4% of twin deliveries and 51.4% of singleton deliveries, were rural areas. The highest prevalence, 42(40.4%) of twin deliveries and 88(42.3%) of singleton deliveries, were at age category of 25-29 years followed by age category of 20-24 years which was 28.8% and 35.1% respectively. Majority, 62(59.6%) of twin deliveries and 129(62 %) of singleton deliveries, were **Para II-IV**. Ninety two(88.5%) of twin deliveries and 185(88.9%)of singleton deliveries had ANC follow up but only 23(22.1%) of twin deliveries and 48(23.1%) of singleton deliveries know their LNMP. Ultrasound (U/S) was done at ANC, for about **37.5%** of twin deliveries and 38% of singleton deliveries, and during labor, for about 74%and 17.8% respectively. Majority of mothers, 48(46.2%) of twin deliveries and 162(77.9%) of singleton deliveries, come complaining pushing down pain followed by referred from health institution which was 34(32.7%)and29(13.9%) respectively. Only 2.9% and 4.3% of twin deliveries had self and family history of twin deliveries\_(Table 1).

**Table 1.** The socio-demographic and obstetric characteristics of mothers delivered in NRH

S No	Socio-demographic and obstetric factors		Exposed (Twin)N(%)	Non-exposed (Singleton)N(%)	Total (n=312)N(%)
1	Place of residence	Urban	37(35.6)	101(48.6)	138(44.2)
		Rural	67(64.4)	107(51.4)	174(55.8)
2	Age in years	15-19	3(2.9)	14(6.7)	17(5.4)
		20-24	30(28.8)	73(35.1)	103(33)
		25-29	42(40.4)	88(42.3)	130(41.7)
		30-34	18(17.3)	24(11.5)	42(13.5)
		35-39	10(9.6)	9(4.3)	19(6.1)
		40-44	1(1)	0(0)	19(0.3)
3	Parity	Para (I)	10(9.6)	50(24)	60(19.2)
		Para (II-IV)	62(59.6)	129(62)	191(61.2)
		Para (V & above)	32(30.8)	29(13.9)	61(19.6)
4	ANC follow up	Yes	92(88.5)	185(88.9)	277(88.8)
		No	12(11.5)	23(11.1)	35(11.2)
5	LNMP	Known	24(23.1)	48(23.1)	72(23.1)
		Unknown	80(76.9)	160(76.9)	240(76.9)
6	US during	Done	39(37.5)	79(38)	118(37.8)

	ANC	Not done	65(62.5)	129(62)	194(62.2)
7	US during labor	Done	77(74)	35(17.8)	112(35.9)
		Not done	27(26)	173(83.2)	200(64.1)
8	Compliant of the mother	Pushing down pain	48(46.2)	162(77.9)	210(67.3)
		Passage of fluid per vagina	12(11.5)	7(3.4)	19(6.1)
		Vaginal bleeding	6(5.8)	5(2.4)	11(3.5)
		Come for ANC	3(2.9)	5(2.4)	8(2.6)
		Referred from health institution	34(32.7)	29(13.9)	63(20.2)
		Other	1(0.9)	0(0)	1(0.3)
9	Duration of labor	Known	79(76)	185(88.9)	264(84.6)
		Unknown	25(24)	23(11.1)	48(15.4)
10	Duration of labor in hours	Mean $\pm$ SD	9.9 $\pm$ 4.0	14.5 $\pm$ 7.1	13 $\pm$ 6.6
		Range	23(2-25)	30(2-32)	30(2-32)
11	Self history of twin pregnancy	Yes	3(2.9)	4(1.9)	7(2.2)
		No	47(45.2)	95(45.7)	142(45.5)
		Unknown	54(51.9)	109(52.4)	163(52.3)
12	Family history of twin pregnancy	Yes	9(4.3)	4(1.9)	13(4.2)
		No	69(33.2)	139(66.8)	208(66.7)
		Unknown	26(12.5)	65(31.3)	91(29.1)

## 5.2 Ante partum medical and obstetric complication

In this study, 48.1% of exposed\_(having twin deliveries) and 14.4% of non-exposed\_(having singleton deliveries) had at least any one of ante partum complication which was statistically significant\_(p=0.001). The major ones were hypertensive disorder of pregnancy\_(23.1% among twin Vs 7.2% among singleton), premature rupture of membrane\_(13.5% among twin Vs 4.8% among singleton), preterm labor\_(17.3% among twin Vs 1.9% among singleton), and ante partum hemorrhage\_(6.7% among twin Vs 2.4% among singleton)\_(Table 2).

**Table 2.** Ante partum complication of mothers delivered in NRH

S No	Ante partum maternal complications		Exposed (twin)(%)	Non-exposed (singleton)(%)	Total (n=312)N(%)	OR* (95% CI)	P-value
1	At least one complication	Yes	50(48.1)	30(14.4)	80(25.6)	2.69(2.01,3.58)	0.001
		No	54(51.9)	178(85.6)	232(74.4)		
2	Hypertensive disorder of pregnancy	Yes	24(23.1)	15(7.2)	39(12.5)	2.1(1.54,2.86)	0.001
		No	80(76.9)	193(92.8)	273(87.5)		
3	Gestational diabetes Mellitus	Yes	2(1.9)	0(0)	2(0.6)	3.03(2.59,3.56)	0.045
		No	102(98.1)	208(100)	310(99.4)		
4	Ante partum hemorrhage	Yes	7(6.7)	5(2.4)	12(3.8)	1.80(1.09,2.99)	0.061
		No	97(93.3)	203(97.6)	300(96.2)		
5	Premature rupture of membrane	Yes	14(13.5)	10(4.8)	24(7.7)	1.87(1.28,2.73)	0.007
		No	89(85.5)	198(95.2)	288(92.3)		
6	Preterm labor	Yes	18(17.3)	4(1.9)	22(7.1)	2.76(2.12,3.40)	0.001
		No	86(82.7)	204(98.1)	290(92.9)		

\*Reference group is singleton delivery.

### 5.3 Intra partum and postpartum obstetric complication

Fifty three(51%) of exposed\_(having twin deliveries) and forty (19.2%) of non-exposed\_(having singleton deliveries) had at least any one of intra partum and post partum obstetric complication which was statistically significant( $p=0.001$ ). The likelihood of developing major complication were significantly higher among twin deliveries as compared to singleton deliveries; Cesarean delivery(44.2% Vs 13.9% )(OR=2.50; 95% CI=1.88,3.34), anemia(18.3% Vs 7.7% )(OR=1.77; 95% CI=1.24,2.52), post partum hemorrhage(9.6% Vs 6.7%)(OR=1.27; 95% CI=0.77,2.11), maternal sepsis(8.7% Vs 1.9%)(OR= 2.18 95% CI= 1.46,3.25), cord prolapse(5.8% Vs 1%)(OR=2.33; 95% CI= 1.51, 3.84) and blood transfusion(3.8% Vs 1.5%)(OR=1.74; 95%CI=0.90,3.38). There was no maternal death in both groups\_(Table 3).

**Table 3.** Intra partum and postpartum complication of mothers delivered in NRH

S No	Intra partum and postpartum complications		Exposed (n=104) N(%)	Non-exposed (n=208) N(%)	Total (n=312) N(%)	OR** (95% CI)	P-value
1	At least one complication	Yes	53(51)	40(19.2)	93(29.8)	2.45(1.82,3.30)	0.001
		No	51(49)	168(80.8)	219(70.2)		
2	Cord prolapse	Yes	6(5.8)	2(1)	8(2.5)	2.33(1.51,3.84)	0.011
		No	98(94.2)	206(99)	304(97.5)		
3	Obstructed labor	Yes	1(1)	8(3.8)	9(2.9)	0.327(0.05,2.09)	0.152
		No	103(99)	200(96.2)	303(97.1)		
4	Cesarean delivery	Yes	46(44.2)	29(13.9)	75(24)	2.50(1.88,3.34)	0.001
		No	58(55.8)	179(86.1)	237(76)		
5	Post partum hemorrhage	Yes	10(9.6)	14(6.7)	24(7.7)	1.27(0.77,2.11)	0.369
		No	94(90.4)	194(93.3)	288(92.3)		
6	Anemia	Yes	19(18.3)	16(7.7)	35(11.2)	1.77(1.24,2.52)	0.005
		No	85(81.7)	192(92.3)	277(88.8)		
7	Hysterec tomy	Yes	1(0.9)	2(1)	3(0.9)	1.00(0.20,4.99)	1.000
		No	103(99.1)	206(99)	309(99)		
8	Blood transfusion	Yes	4(3.8)	3(1.5)	7(2.2)	1.74(0.90,3.38)	0.178
		No	100(96.2)	205(98.5)	305(97.8)		
9	Maternal sepsis	Yes	9(8.7)	4(1.9)	13(4.2)	2.18(1.46,3.25)	0.005
		No	95(91.3)	204(98.1)	299(95.8)		
10	Other complications *	Yes	4(3.8)	8(3.8)	12(3.8)	1.00(0.44,2.26)	1.000
		No	100(96.2)	200(96.2)	300(96.2)		
11	Maternal death	Yes	0(0)	0(0)	0(0)		
		No	104(100)	208(100)	312(100)		

\*Other complications( SSI, genital tear, polyhydramnios,...)

\*\*Reference group is singleton delivery.

#### 5.4 Other obstetric maternal complication

Majority, 58(55.8%) of mothers delivered twin and 179(86.1%) of mothers delivered singleton, gave birth vaginally while the remaining 46(44.2) of twin deliveries and 29(13.9%) of singleton deliveries gave birth by C/S. The most common indication for C/S, in twin and singleton deliveries was mal- presentation and others(CPD,APH,OL,HDP,...) which accounts 17(37%) and 12(41.4%) respectively. Nearly half( 49%) of mothers delivered twin and 160(76.2%) of mothers delivered singleton were stayed in hospital for less than 3 days\_(Table 4).



**Table 4.** Obstetric characteristics of mothers delivered in NRH

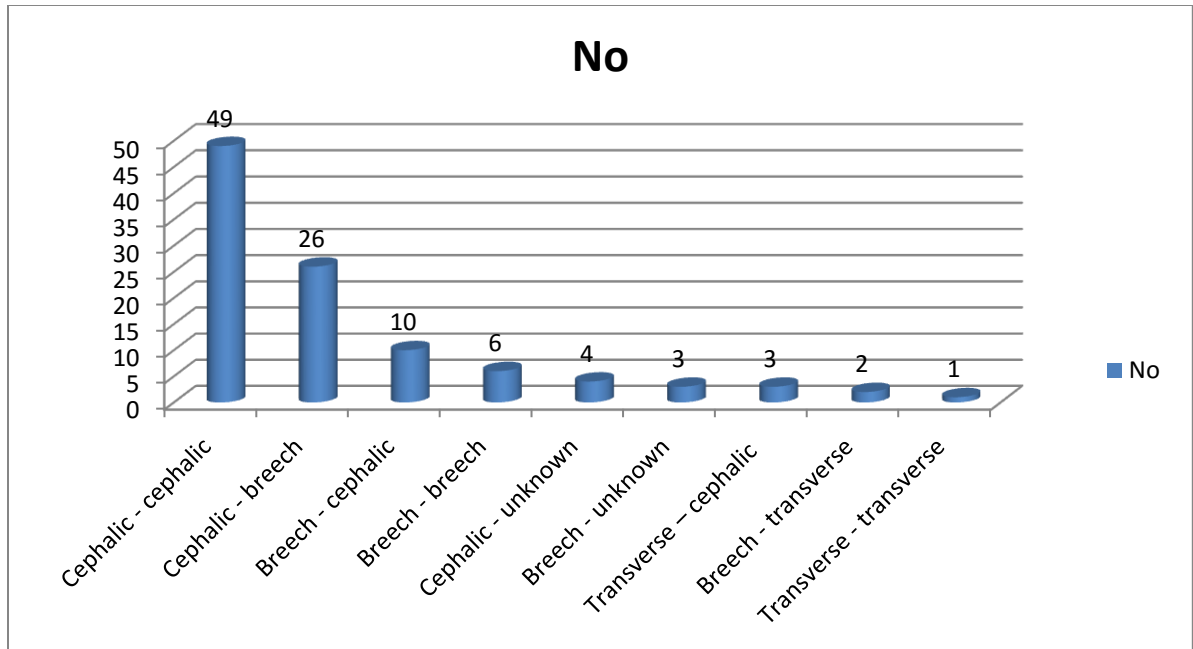
S No	Variables		Exposed (twin) (n=104)N(%)	Non exposed (singleton) (n=208)N(%)	Total (n=312)N(%)
1	Mode of delivery	Vaginal	58(55.8)	179(86.1)	237(76)
		C/S	46(44.2)	29(13.9)	75(24)
2	Indications for operative delivery	Mal-presentations	17(37)	2(6.9)	20(26.7)
		Others (APH, HDP, PROM, CPD,OL,...)	13(28.3)	12(41.4)	24(32)
		Poor progress of labor	6(13)	5(17.2)	11(14.7)
		Cord prolapse	6(13)	2(6.9)	8(10.7)
		Previous C/S scar	3(6.5)	4(13.8)	7(9.3)
		NRFHRS	1(2.2)	4(13.8)	5(6.7)
3	Maternal hospital stay	< 3 days	51(49)	160(76.9)	211(67.6)
		3-7 days	47(45.2)	42(20.2)	89(28.5)
		> 7 days	6(5.8)	6(2.9)	12(3.8)

### 5.5 Perinatal obstetric characteristics

Table 6 and figure 2 demonstrates fetal presentations and presentation combination at delivery time. Majority, 142(68.3%) of twin and 192(92.3%) of singleton pregnancies, were cephalic in presentation. The most common presentation combination were cephalic - cephalic which accounts 49(47.1%) followed by cephalic - breech which was 26(25%). The overall mal presentation rate 31.7% in twin when compared with 7.7% in singleton deliveries.

**Table 5.** Fetal presentations delivered in NRH

S No	Fetal presentations	Twin A (n=104)N(%)	Twin B (n=104)N(%)	Total (n=208)N(%)	Singleton (n=208)N(%)
1	Cephalic	80(76.9)	62(59.6)	142(68.3)	192(92.3)
2	Breech	20(19.2)	32(30.8)	52(25)	14(6.7)
3	Transverse	4(3.8)	3(2.9)	7(3.4)	2(1)
4	Unknown	0(0)	7(6.7)	7(3.4)	0(0)



**Figure 2.** Fetal presentation combinations among twin delivered in NRH

Distribution of twins by mode of deliveries showed majority of neonates, 56 (53.9%) of 1<sup>st</sup> twin and 147(70.7%) of singleton, were delivered by Spontaneous vertex delivery (SVD) but majority, 44(42.3%) of 2nd twin delivered by Cesarean section. Nearly 362( 87%) of total mothers delivered by Spontaneous vertex delivery (SVD) and Cesarean section(Table 7).

**Table 6.** Distribution by mode of delivery among neonates delivered in NRH

S No	Mode of delivery	Twin A (n=104)N(%)	Twin B (n=104)N(%)	Singleton (n=208) N(%)	Total (n=416) N(%)
1	Spontaneous vertex delivery	56(53.9)	41(39.4)	147(70.7)	244(58.7)
2	Cesarean delivery	44(42.3)	45(43.3)	29(13.9)	118(28.4)
3	Assisted /Complete breech extraction	0(0)	16(15.4)	10(4.8)	26(6.3)
4	Vacuum/Forceps delivery	4(3.8)	2(1.9)	20(9.6)	26(6.3)
5	Destructive delivery	0(0)	0(0)	2(1)	2(0.5)

Seven(3.4%) of twins were Very low birth weight and fifty five(26.4%) of twins were low birth weight making the total low birth weight of 62(29.8%). The remaining 146(70.2%) were normal birth weight while there was no macrosomia in twins. From the singleton deliveries, 1(0.5%) were very low birth weight and 8(3.8%) were low birth weight making total low birth weight 9(4.3%). The remaining 178(85.6%) and 21(10.1%) were normal birth weight and macrosomic

respectively. Majority, 324(77.9%) from total deliveries were normal birth weight while seventy one(17%) were low birth weight and twenty one(5.1%) were macrosomic\_(Table 8).

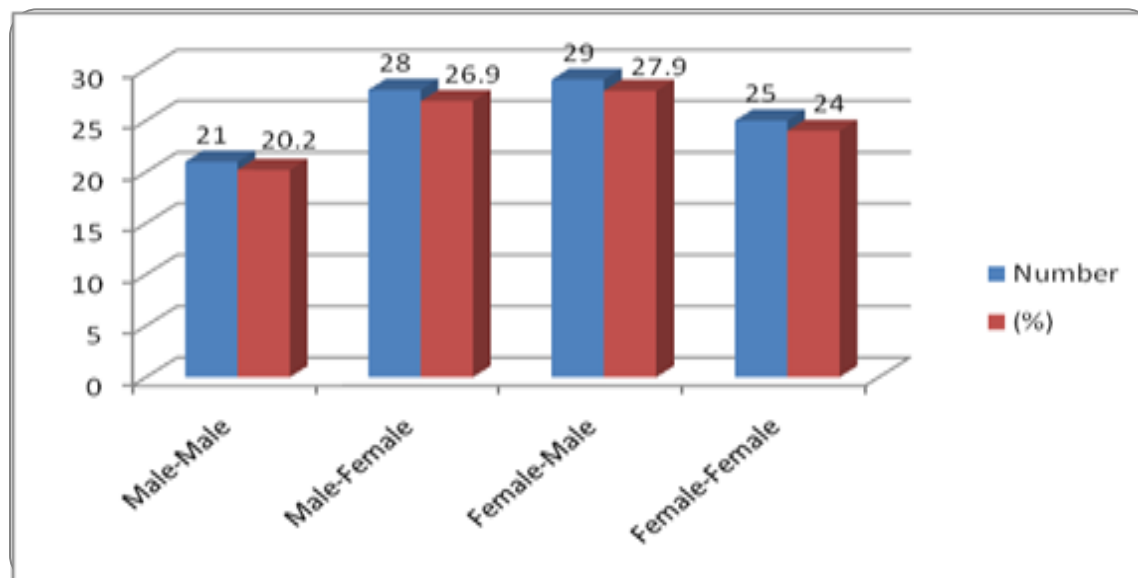
**Table 7.** Distribution of birth weight among deliveries in NRH

S No	Fetal weight category	Twin A (n=104)N(%)	Twin B (n=104)N(%)	Total (n=208)N(%)	Singleton (n=208)N(%)
1	VLBW (1000-1499gm)	2(1.9)	5(4.8)	7(3.4)	1(0.5)
2	LBW (1500-2499gm)	24(23.1)	31(29.8)	55(26.4)	8(3.8)
3	NBW (2500-3999gm)	78(75)	68(65.4)	146(70.2)	178(85.6)
4	Macrosomia ( $\geq 4000$ gm)	0(0)	0(0)	0(0)	21(10.1)
5	Range(gm)	2300	2300	2300	3500
6	Mean (gm)	2671.2	2527.9	2599.6	3283.7

**Table 8.** Sex distribution at birth among neonates delivered in NRH

Sex	Twin A (n=104)N(%)	Twin B (n=104)N(%)	Singleton (n=208)N(%)	Total (n=416)N(%)
Male	49(47.1)	50(48.1)	101(48.6)	200(48.1)
Female	55(52.9)	54(51.9)	107(51.4)	216(51.9)

Female sex were more common than male sex in this study accounting 216(51.9%) from all delivers , giving sex ratio of 1.08 girls to boys\_(Table 9).



**Figure 3.** Shows combinations of sex among twins delivered in NRH

Female-Male combination was the most common and accounted for 29(27.9%) from all pairs. The other were Male-Female, Female-Female, and Male-Male which accounts 28(26.9%), 25(24%), and 21(20.2%) respectively\_(Figure 3).

**Table 9.** Causes of NICU admission in NRH

Causes of NICU admission	Twin A No(%)	Twin B No(%)	Total (n=208)N(%)	Singleton No(%)
LBW	12(11.5)	18(17.3)	30(14.4)	5(2.4)
EONS	0(0)	0(0)	0(0)	6(2.9)
Preterm + LBW	18(17.3)	17(16.3)	35(16.8)	3(1.4)
Preterm + LBW + EONS	0(0)	0(0)	0(0)	1(0.5)
Others(hypoglycemia, hypothermia, MAS,...)	2(1.9)	2(1.9)	4(1.9)	6(2.9)
No admission	72(69.2)	67(64.4)	139(66.8)	187(89.9)

The major causes of NICU admission in twin were preterm +LBW, LBW, and others which accounts 16.8%, 14.4%, and 1.9% respectively when compared with that of singleton, in such case the major causes of NICU admission were others( MAS, hypoglycemia,...), EONS and LBW which was 2.9%, 2.9%, and 2.4% respectively. From total deliveries, 90(21.6%) were admitted to NICU and majority 38(9.1%) of them due to preterm + LBW followed by LBW, others, EONS, and preterm + LBW + EONS which accounts 35(8.4%), 10(2.4%), 6(1.4%), and 1(0.2%) respectively\_(Table 10).

Majority 66(63.5%) of twin stayed in hospital for less than 1 day and only 6(5.7%) of twin stayed for > 7 days. From singleton,187( 89.9%) stayed for < 1 day and only 2(1%) of singleton stayed for > 7 days. Majority, 253(81.1%) of total neonates stayed for < 1 day followed by 1-3 days, 4-7 days, and > 7days which accounts 27(8.7%), 24(7.7%), and 8(2.8%) respectively\_(Table 11).

**Table 10.** Neonatal hospital stay at NRH

Neonatal hospital stay	Twin No(%)	Singleton No(%)	Total No(%)
<1 day	66(63.5)	187(89.9)	253(81.1)
1-3 days	17(16.3)	10(4.8)	27(8.7)
4-7 days	15(14.4)	9(4.3)	24(7.7)
>7 days	6(5.7)	2(1)	8(2.6)

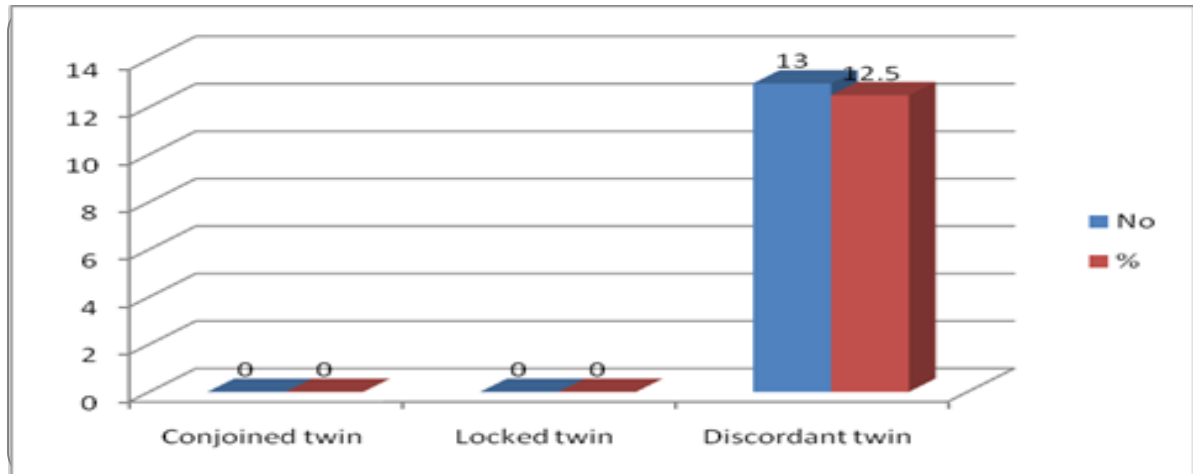
## 5.6 Perinatal complications

Generally , twin had 2.41 times more likelihood of developing at least any one of fetal complication when compared with singleton which was statistically significant( $p=0.001$ ). The likelihood of developing low APGAR score at 1st minute, low birth weight , the need for NICU

admission, and ENND in twin were 1.75 times, 3.36 times, 2.95 times, and 2.46 times respectively higher when compared with singleton\_(Table 12).

**Table 11.** Fetal complications encountered in NRH

S No	Fetal complications		Twin (n=104) N(%)	Singleton (n=208) N(%)	Total (n=312) N(%)	OR*(95% CI)	P-value
1	At least one fetal Complication	Yes	53(51)	41(19.7)	94(30.1)	2.41(1.79,3.25)	0.001
		No	51(49)	167(80.3)	218(69.9)		
2	Low APGAR score at 1st minute	Yes	37(35.6)	38(18.3)	75(24)	1.75(1.29,2.37)	0.001
		No	67(64.4)	170(81.7)	237(76)		
3	Low APGAR score at 5th minute	Yes	11(10.6)	14(6.7)	25(8)	1.36(0.85,2.18)	0.240
		No	93(89.4)	194(93.3)	287(92)		
4	Low birth weight	Yes	40(38.5)	9(4.3)	49(15.7)	3.36(2.61,4.31)	0.001
		No	64(61.5)	199(95.7)	263(84.3)		
5	Need for NICU admission	Yes	45(43.3)	19(9.1)	64(20.5)	2.95(2.25,3.89)	0.001
		No	59(56.7)	189(90.9)	248(79.5)		
6	Congenital anomaly	Yes	3(2.9)	2(1)	5(1.6)	1.82(0.88,3.89)	0.203
		No	101(97.1)	206(99)	307(98.4)		
7	Stillbirth	Yes	2(1.9)	6(2.9)	8(2.6)	0.75(0.22,2.50)	0.614
		No	102(98.1)	202(97.1)	304(97.4)		
8	ENND	Yes	15(14.4)	5(2.4)	20(6.4)	2.46(1.81,3.34)	0.001
		No	89(85.6)	203(97.6)	292(93.6)		



**Figure 4.** Shows unique complication of twins delivered in NRH

The above figure 4 shows unique complications of twins. The twin had weight discordance, which was 13(12.5%) but there was no conjoined twin and locked twin in this study.

## 6. Discussion

The incidence of twin delivery in this study was 28.6 per 1000 deliveries, which was higher than other previous studies in Ethiopia such as study in Addis Ababa (24.0 per 1000 deliveries) (21), study in Mekele (13.7 per 1000 deliveries) (20) and study in Gondar (14.4 per 1000 deliveries) (41). But lower than study in Jimma (37.7 per 1000 deliveries) (6). This finding is also higher than some African countries, like Egypt (17.7 per 1000 deliveries) (14), and Sudan (20.8 per 1000 deliveries)(15). And almost similar with study done in Benin (27.9 per 1000 deliveries) (15). In some African countries like Nigeria, Democratic Republic Congo, and Niger, the prevalence of twin is higher (19,29).

Increasing maternal age, parity, and family history of twin deliveries have been reported as risk factors for twin pregnancies in many studies (1, 15, 21, 27, 42). But in this study, the highest prevalence of twin deliveries occurs at age category of 24-29 years and Para 2-4 with rates of 40.4% and 59.6% respectively whereas the highest prevalence in singleton deliveries occurs at the same age category and parity, which was 42.3% and 62% respectively. The prevalence was lower at two extremes of age and parity, which is similar with study done in Jimma(6). And also, similar to study done in Kano and Nigeria (10, 18). This might be because of many women may be pregnant at this age.

Twin pregnancies, in comparison with singletons, are associated with increased incidence of maternal complications such as preterm labor, PIH, PROM, anemia, Nausea and Vomiting, UTI, hemorrhage (before, during, and after delivery), GDM and uterine a tony(2, 3, 14). According to this study, 48.1% of exposed\_(having twin deliveries) and 14.4% of non-exposed\_(having singleton deliveries) had at least any one of ante partum complications. The likelihood of developing hypertensive disorder of pregnancy, preterm labor, premature rupture of membrane, and ante partum hemorrhage was increased in twin deliveries by two times, three times, two times, and three times respectively as compared to singleton deliveries. The first, third and fourth findings were almost consistent with previous studies conducted at Jimma university specialized hospital(7) and the second finding were significantly higher than studies conducted at Jimma university specialized hospital(7). And this also higher than studies done at Azare Nigeria(25).

In my study, 53(51%) of exposed\_(having twin deliveries) and 40(19.2%) of non-exposed\_(having singleton deliveries) had at least any one of intra partum and post partum

complication like anemia, postpartum hemorrhage, puerperal sepsis, cord prolapse and blood transfusion. These complications were significantly higher among twin deliveries as compared with singleton deliveries. But these findings were slightly lower than study conducted at Jimma University specialized hospital(7) except maternal sepsis which was higher than this study.

In this study, 44.2% of exposed\_(having twin deliveries) and 13.9% of non-exposed\_(having singleton deliveries) mothers had Cesarean delivery( intra partum complication) which was three time more common in exposed groups as compared to non-exposed groups. These findings was significantly higher than studies done at Azare Nigeria which was 18.5% in twin(25) 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(23). The increase in the use of cesarean section to deliver twin pregnancies may be due to increased occurrence of obstetric complications such as hypertensive disorders, mal presentation, premature rupture of membranes, and cord prolapse in this study.

Obstructed labor, hysterectomy, other complications(SSI, genital tear,...)and maternal death was not higher in twin deliveries as compared to singleton deliveries. This findings were against study done at Jimma University specialized hospital(7).

In this study, 104 pairs(208) of twin and 208 singleton deliveries included making a total of 416. The mean birth weight of twin and singleton deliveries were  $2599.6 \pm 468.7$  grams and  $3283.7 \pm 546.1$  grams respectively. This findings were almost comparable with studies done at Jimma University(8).

Perinatal mortalities and morbidities are increased in twin pregnancies as compared to singleton pregnancies(3). According to this study, 53(51%) of twin and 41(19.7%) of singleton had at least any one of fetal complication. The likelihood of developing low APGAR score at 1st minute, low birth weight, the need for NICU admission, and ENND was increased in twin by two times, three times, three times and two times respectively when compared with that of singleton deliveries. This findings was almost comparable with studies done at Jimma University(8).

Overall, none cephalic presentation occurs 10 times more often in multiple pregnancy than in singleton pregnancy(3). According to this study, considering presentations of both twins, overall mal presentation rate 31.7% in twin when compared with 7.7% in singleton deliveries. This findings was slightly lower than studies done at Jimma University(8) and University of Nigeria



teaching hospital(33)

Growth discordance in utero is the difference in sonographic estimated fetal weights expressed as a percentage of the larger twin's estimated fetal weight (an estimated fetal weight below the 10th percentile using singleton growth curves or a 20 percent discordance in estimated fetal weight between the lighter and heavier twin). Approximately 15% of twins are diagnosed with this condition (36 - 38). In this study, there were 12.5% weight discordance and 2.9% of congenital anomaly in twin but no locked and conjoined twin. These findings was significantly higher than studies done at Jimma University(8) and India(30).

Limitations of the study

- Since it was hospital based study conducted in a referral hospital so it may not be a representative of the general population.
- It was difficult to get full information from records because it was retrospective data.

## **7. Conclusion and recommendation**

### **7.1 Conclusion**

The incidence of twin deliveries in this study was high. The likelihood of developing maternal and perinatal complication(s) like hypertensive disorder of pregnancy, preterm labor, premature rupture of membrane, ante partum hemorrhage, cesarean delivery, cord prolapse, anemia, postpartum hemorrhage, puerperal sepsis, blood transfusion, low APGAR score at 1st minute, low birth weight, the needs for NICU admission, and ENND was significantly higher in twin deliveries as compared with singleton deliveries.

### **7.2 Recommendations**

- NRH administrative should give greater emphasis for mothers delivering twin by preparing/providing adequate blood service to reduce/prevent maternal complication related to anemia/post partum hemorrhage.
- NRH administrative should give greater emphasis for mothers delivering twin by giving standard treatment for premature rupture of membrane to prevent maternal complication related to puerperal sepsis.
- NRH administrative should give greater emphasis for neonates with low Apgar score by giving newborn resuscitation to prevent perinatal complication related to ENND.
- I recommend more prospective cohort studies to identify obstetric complications significantly associated with twin deliveries.

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## 9. Annexes-Checklist

### Data collection format

This checklist was designed to conduct a hospital- based retrospective case control study on magnitude and obstetric complications of twin deliveries at NRH from March 1, 2016 to Feb 30, 2017 G.C after 28 completed weeks those recorded on delivery log book and has mothers' charts. Data will be extracted from June 1- 10, 2017. Please encircle the letter corresponding to the correct respond.

Part-I: Socio-demographic factors		
NO	Characters	Value
01	Hospital card No.	1. No_____
02	Place of residence	1. Urban      2. Rural
03	Age in year	1. Year_____
Part-II: Obstetrics assessment		
04	Parity	1. Number_____
05	ANC follow UP	1. Yes (Number of visit_____ )    2. No
06	LNMP	1. Known, date_____                  2. Unknown
07	By U/S during ANC fetes	1. Single    2. Twin    3. Triplet.    4. Quadruplet    5. Not done
08	Was U/S done during labor	1. Yes,      2. No
09	If U/S done what was pregnancy	1. Single    2. Twin      3. Triplet    4. Quadruplet
10	Self history of twin pregnancy	1.known    2.unknown
11	If known, is there history?	1.Yes    2.No
12	Family history of twin pregnancy	1.known    2.unknown
13	If known, is there family history?	1. Yes    2. No
Part-III: Maternal complications		
14	Compliant of mother when she come to labor ward	1. Pushing down pain    3. Vaginal bleeding    5. Referred from Health center 2. Passage of liquor    4. Come for ANC    6. other_____
15	Was duration of labor known	1. Yes, (_____hours)    2. No
16	Maternal complication(s)	1. PIH= 1.(PIH)    2.(Preclam./eclsmpsia)    3(superimposed)    4.(Chronic) 2. GDM 3. APH 4. PROM 5. Cord Prolapse 6. Obstructed/prolonged labor 7. C/S= 1.Singleton    2.(Twin A)    3..(Twin B)    4.(Both twins) 8. Preterm delivery (GA of _____ week if known/ amenorrhea of _____Months) 9. Anemia(Hgb_____g/dl)    1.<7)    2.(7.0-9.9)    3.(10-10.9)    4.(≥11) 10. PPH (cause: _____) 11. Hysterectomy( Indication_____) 12. Sepsis

		13. Others _____ 14. No complications
17	If there is C/S indication	1. Mal-presentation 3. Previous scar 4. Cord prolapse 5. Arrest/Protraction 2. NRFHRS 6. Others _____
18	Maternal blood transfusion	1. Yes (Units _____) 2. No
19	Maternal Hospital stay	1. <3days 2. 3-7days 3. >7days
20	Maternal death	1. Yes 2. No
21	If mother died, cause of death	1. PPH 2. Sepsis 3. PIH 4. Other _____
<b>Part-IV: Fetal complications</b>		
22	Was there fetal complication(s)	1. Yes 2. No
23	1 <sup>st</sup> & 5 <sup>th</sup> minute APGAR score	1. singleton (_____, _____) 2. Twin A (_____, _____) 3. Twin B (_____, _____)
24	GA at delivery in weeks	1. <37wks 2. 37-42wks 3. >42wks 4. Unknown
25	Birth weight in gram	1. Singleton 1. (<2500) 2. (2500-4000) 3. (>4000) 2. Twin A _____, 1. (<2500) 2. (2500-4000) 3. (>4000) 3. Twin B _____, 1. (<2500) 2. (2500-4000) 3. (>4000)
26	Fetal presentation	1. Singleton 1. (Cephalic) 2. (Breach) 3. (Transverse) 4. (Unknown) 2. Twin A, 1. (Cephalic) 2. (Breach) 3. (Transverse) 4. (Unknown) 3. Twin B, 1. (Cephalic) 2. (Breach) 3. (Transverse) 4. (Unknown)
27	Fetal sex	1. Singleton 1. M 2. F 2. Twin A = 1.(M) 2.(F) 3. Twin B = 1.(M) 2.(F)
28	mode of delivery	1. Singleton=1.(SVD) 2.(Assisted/Complete br.) 3.(C/S) 4.(Ininstru.) 5.(Destructive) 2. Twin A= 1.(SVD) 2.(Assisted/Complete br.) 3.(C/S) 4.(Ininstru.) 5.(Destructive) 3. Twin B= 1.(SVD) 2.(Assisted/Complete br.) 3.(C/S) 4.(Ininstru.) 5.(Destructive)
29	Need for referral to NICU	1. Singleton =1.(yes) 2.(no) 2. Twin A= 1.(yes) 2.(no) 3. Twin B= 1.(yes) 2.(no)
30	Indication for Referral to NICU	1. Preterm 2. Low birth weight 3. Sepsis 4. Hypothermia 5. Evaluation 6. Meconium aspiration syndrome 7. Other _____
31	Neonatal hospital stay	1. 0 day 2. 1-3 days 3. 4-7 days 4. >7days
32	Condition at discharge from NICU	1. Singleton=1.(Alive) 2.(died), cause of death _____ 2. Twin A= 1.(Alive) 2.(died), cause of death _____ 3. Twin B= 1.(Alive) 2.(died), cause of death _____
33	If it is twin, Was it conjoined	1. Yes, (type _____) 2. No
34	Was there Congenital anomaly(twin/singleton)	1. Yes, type _____) 2. No
35	Was there Locked twin	1. Yes 2. No
36	Stillbirth	1. Singleton (cause _____) 2. Twin A, (cause _____) 3. Twin B, (cause _____)
37	ENND	1. Singleton (cause _____) 2. Twin A, (cause _____) 3. Twin B, (cause _____)

Name of data collector: \_\_\_\_\_, date: \_\_\_\_\_, Sign: \_\_\_\_\_  
Name of investigator: Amaru Ayza Anebo, date: \_\_\_\_\_, Sign: \_\_\_\_\_



NAME AND SIGNATURE OF INTERNAL EXAMINERS

1. **Dr. Yesuf Ahmed** \_\_\_\_\_ Date \_\_\_\_\_

2. **Mr. Demeke Kifle** \_\_\_\_\_ Date \_\_\_\_\_