



COLLEGE OF HEALTH SCIENCES, SCHOOL OF MEDICINE,
DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

MATERNAL AND FETAL OUTCOME OF TWIN PREGNANCIES
AMONG WOMEN WHO DELIVERED AT THREE TEACHING
HOSPITALS, ADDIS ABABA, ETHIOPIA: INSTITUTIONAL-BASED
RETROSPECTIVE CROSS-SECTIONAL STUDY

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ADDIS ABABA, ETHIOPIA

DECLARATION

ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES,
SCHOOL OF MEDICINE, DEPARTMENT OF OBSTETRICS AND
GYNECOLOGY

POSTGRADUATE PROGRAM

I, Dr. Habtamu Gebeyehu, hereby declare that this research proposal entitled “**maternal and fetal outcome of twin pregnancies among women who delivered at three teaching hospitals, Addis Ababa, Ethiopia: institutional-based retrospective cross-sectional study**” in line with the requirement of graduate studies was fully undertaken by me under the guidance of my advisor and that I have, to the best of my knowledge and effort, avoided plagiarism or duplication of materials unless and otherwise cited and/or acknowledged and that it has not been so far submitted for any form of proposal application or consideration.

Dr. Habtamu Gebeyehu

Principal investigator

Signature

Date

I hereby certify that I have read and evaluated this research report relating to “maternal and fetal outcome of twin pregnancies among women who delivered at three teaching hospitals, Addis Ababa, Ethiopia: institutional-based retrospective cross-sectional study” under my guidance from its inception up to in its current format that it can be submitted to the DRPC for final approval in partial fulfillment to the Degree of Specialty in Obstetrics and Gynecology.

Dr. Dawit Desalegn

1. Advisor

Signature

Date

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ACRONYMS

AA	Addis Ababa
AAU	Addis Ababa University
ACOG	American college of obstetricians and gynecologists
AOR	Adjusted Odds Ratio
APGAR	Appearance, Pulse, Grimace, Activity and Respiration
APH	Antepartum haemorrhage
ART	Assisted reproductive technology
CI	Confidence Interval
COR	Crude Odds Ratio
DHS	Demographic and Health Survey
DM	Diabetes Mellitus
EDHS	Ethiopian Demographic and Health Survey
FIGO	International Federation of Gynecology and Obstetrics
GDM	Gestational diabetes mellitus
GMH	Ghandi memorial hospital
IUFD	Intrauterine fetal demise
IUGR	Intrauterine growth restriction
IVF	In vitro fertilization
LBW	Low birth weight
LMICs	Low- and middle-income countries
LSCS	Lower segment cesarean section
NICU	Neonatal intensive care unit
OBGYN	Obstetrics and gynecology
OL	Obstructed labor
OR	Odds Ratio

PIH	Pregnancy induced hypertension
PPH	Postpartum Hemorrhage
PPROM	Preterm premature rupture of membranes
PROM	Premature rupture of membranes
RDS	Respiratory distress syndrome
RR	Relative risk
sIUGR	Selective intrauterine growth restriction
SPSS	Statistical Package for Social Sciences
TASH	Tikur Anbessa Specialized Hospital
TRAP	Twin reversed arterial perfusion
TTTS	Twin to twin transfusion syndrome
UTI	Urinary Tract Infection
WHO	World Health Organization
ZMH	Zewuditu memorial hospital

ABSTRACT

Background: Complications for the mother and the newborn are more common in twin pregnancies. In developing nations, the results of twin pregnancies have not been thoroughly investigated.. Remarkably limited research on the frequency and effects of twin pregnancies have been conducted in Ethiopia.

Objectives: The main objective of this study is to assess the early neonatal outcomes and maternal problems associated with twin pregnancies in Addis Ababa. This will contribute to local evidence, enhance clinical care, and potentially lead to policy changes.

Methods: A hospital-based retrospective cross-sectional study was conducted at three teaching hospitals of Addis Abeba University in Addis Abeba, Ethiopia, between May 10 and June 13, 2023 GC, using a structured checklist. The study included all twin deliveries that were registered at three teaching hospitals between January 1 and December 31, 2022 GC. Data input and analysis were conducted using SPSS version 25.0 and Epi-data version 7.0. Bivariate regression is followed by multivariable logistic regression analysis for variables with a p-value of less than 0.20.

Results: Between January 1 and December 31, 2022, 433 (2.67%) twin deliveries were registered in the research area. This study comprised 407 maternal medical charts in total that met the inclusion criteria. Over one-third (n=156) of the study participants were between the ages of 25 and 29, with a mean $\pm$ SD of 27.7 ± 4.6 . Approximately two-thirds (n=257; 63.1%) were multiparous, and 49.4% of births occurred before term. Malpresentation of the leading twin (n = 246; 35.4%) was the most frequent indicator among moms who gave birth via caesarean section, which was used in 60% of cases. Of the 179 individuals (44%) who experienced antepartum complications, 51.9% (n = 93) had pregnancy-induced hypertension, and 42.4% (n = 76) had PROM. There were 58% of the patients who experienced either intrapartum or postpartum problems; the most common ones were preterm LSCS (38.4%), postpartum anemia (38.9%), and premature labor (57.3%). Of the twins, 54.3% of twin A and 63.6% of twin B were LBW. The gross rate of perinatal death is 115.47 per 1,000 live births. Two(3.3%) TTTS, 15(25.0%) co-twin fatalities, and 43(71.7%) sIUGR specific twin pregnancy problems were reported.

Conclusion: According to this study, twin pregnancies were related with significant rates of maternal illness and perinatal morbidity and mortality.

Keywords: Twin pregnancy, Addis Ababa , outcome

1. INTRODUCTION

1.1. Background

Multifetal pregnancies can result from two or more fertilization events, from a single fertilization event followed by zygote splitting, or from both[1]. Given the well-documented increase in numerous delivery over the past 30 years, multiple gestations are among the most common high-risk conditions that obstetricians faced[2].

Twin pregnancies are the most prevalent type of multiple gestation, accounting for 97% of multiple pregnancies and 1% of all pregnancies[3]. The twin birth rate increased by 76% between 1980 and 2009, from 18.9 per 1000 to 33.2 per 1000 births[2]. Due in part to infertility treatments, the United States had a 3.2% twin birth rate in 2019[1].

A mother who gives birth to two children during the same pregnancy is said to have a twin birth[4]. When two ova are fertilized, either one fertilized ovum divides into two, producing twin gestation, or two separate ova form, as in the case of dizygotic twins (fraternal twins) [5]. Thirty percent are monozygous and seventy percent are dizygotic[6]. Chorionicity, not zygosity, is the main factor that decides the outcome of a pregnancy. For example, monochorionic twins are more prone to suffer from intrauterine mortality, fetal abnormalities, and twin-to-twin transfusion syndrome (TTTS). Therefore, early detection of chorionicity may aid in risk assessment, deformity screening, and heightened monitoring for the emergence of discordant growth in monochorionic twins[6].

Twin pregnancies are linked to higher chances of issues for both the mother and the unborn child, including premature labor, hypertension throughout pregnancy, antepartum and postpartum hemorrhage, newborns with extremely low birth weights, congenital defects, and early mortality[1, 4, 7].

1.2. Statement of the Problem

In both industrialized and developing nations, there is a higher chance of challenges for the mother and the unborn child when a twin pregnancy occurs. Most likely, this is worse in Sub-Saharan Africa., where there are still a lot of harmful cultural practices and beliefs, extreme poverty, and inadequate facilities to handle twin deliveries. According to recent study, twin pregnancies are linked to higher costs for the twins and their families on a personal, financial, emotional, and social level. Additionally, it is to blame for at least 10% of perinatal deaths worldwide[8].

Research on twin pregnancies in developing countries is scarce. Twin birth registries are uncommon in low- and middle-income countries (LMICs), and most twin-specific research is conducted using hospital-based cohort studies, secondary analyses of interventional trials, or retrospective analyses of Demographic and Health Survey (DHS) data. All of these approaches have substantial biases and limitations[10, 11].

There are very few research on the occurrences and results of twin pregnancies in Ethiopia, therefore little is known about the current estimate of twin pregnancies and the related perinatal and maternal outcomes. Twin pregnancy rates vary from 28.6 per 1000 deliveries at Nekemte Referral Hospital to 37.7 per 1000 deliveries at Jimma University Specialized Hospital, according to the scant evidence that is currently available[4, 9, 12].

1.3. Significance of the Study

Twin pregnancies are associated with more pregnancy complications and a worse pregnancy outcome than singleton pregnancies. Therefore, it is essential to regularly evaluate the results of twin pregnancies in order to enhance program improvement and pregnancy outcomes.

It is crucial to continuously research this high-risk pregnancy given the rising occurrence of twin pregnancies around the world and the resulting problems for both the mother and the fetus. There hasn't been an assessment of twin birth outcomes at the study facilities recently. This study was conducted to ascertain the prevalence and maternal and fetal complications of twin pregnancies at these institutions in order to support the quality management and care of twin pregnancies and help improve obstetric outcomes. This will contribute to the corpus of knowledge on this crucial topic in addition to helping us manage the condition better.

2. LITERATURE REVIEW

Worldwide, twin pregnancies are regarded as high-risk pregnancies with varying frequencies. In contrast to African nations, where twin incidence is higher—up to 54 per 1000 births recorded in Nigeria—the lowest incidence is 4 per 1000 births in Japan [3, 8].

The prevalence of twin pregnancies has increased by more than 70% worldwide during the last three decades, mostly in high- and middle-income countries[14, 15]. A higher frequency of twinning has been linked to several things. These include the use of reproductive drugs for ovulation induction and in-vitro fertilization (IVF), as well as the advanced age of the mother[13, 15]. Additional variables include nutrition, height and weight of the mother, prior twin delivery experience, and family history of twinning[15]. Higher order multiple concepts that arise spontaneously are rare. Between 0.01% and 0.07% of pregnancies are known to have this incidence[15].

The incidence of twin pregnancies varies greatly among the races of the world, ranging from two to twenty pregnancies per 1000 births[13, 16]. The incidence differs greatly amongst ethnic groups, even within a single race[15].

Twin pregnancies increase the risk of disease and mortality for both the mother and the fetus. Twin pregnancies are often associated with maternal complications, including anemia, gestational diabetes mellitus (GDM), pre-eclampsia, pregnancy-induced hypertension, placental abruption, preterm labor, premature rupture of membrane (PROM), and polyhydramnios. Increased plasma volume, anemia, and hypertensive diseases all raise the risk of pulmonary edema during pregnancy, which increases the morbidity and fatality rate for mothers. As a result, these issues are responsible for several prenatal visits, extended hospital stays, and blood transfusions[17].

Twin gestation frequency was found to be 50.0% in grand multigravida, 34.4% in multigravida, and 15.6% in primigravida in a study conducted in Pakistan. The primary consequences for mothers were abruptio placentae (6.2%), pregnancy-induced hypertension (PIH) (31.2%), anemia (65.6%), postpartum hemorrhage (12.5%), and preterm labor and early rupture of membranes (84%)[18].

The primary maternal outcomes of a research conducted at Victoria Government Hospital, India, were preterm labor (57.1%), anemia (40%), pregnancy-induced hypertension (28.5%), and postpartum hemorrhage (PPH) (13.33%). Significantly, twin pregnancies had a greater rate of LSCS (57.14%)[6].

An additional study conducted at the JNU Medical College and Hospital, India, revealed that 16.5 out of 1000 deliveries had twin pregnancies. The most prevalent issues were hypertension (22.5%), anemia (26.7%), and preterm labor (25.4%). Fetal mal-presentation was the most frequent reason for a cesarean delivery (37.8%). The first twin weighed 2.12 ± 0.35 kg on average, while the second twin weighed 1.97 ± 0.30 kg on average[19].

A Turkish study revealed a 3% (130/4241) incidence of twin pregnancies. The most frequent maternal morbidities were selective intrauterine growth restriction (sIUGR) (9.2%), anemia (20.7%), preterm premature rupture of membrane (26.2%), and preterm labor (31.5%). Additionally, eight (6.2%), eight (6.2%), and seven (5.4%) instances had intrahepatic cholestasis of pregnancy, gestational diabetes, and preeclampsia, respectively. In three cases (2.3%), twin-to-twin transfusion was discovered.[20].

Anemia, hyperemesis gravidarum, hypertension (PIH/PE/Eclampsia), polyhydramnios, PROM, gestational diabetes mellitus, and antepartum hemorrhage (APH) were detected in 48.07%, 7.69%, 28.84%, 5.76%, 9.62%, 3.84%, and 1.92% of the total of the participants in a study that was carried out in Bangladesh. Among the intrapartum complications, preterm birth was the most common (59.61%; n = 31). There were 13.46% preterm vaginal births and 46.15% preterm lower segment cesarean sections (LSCS)[21].

According to a research conducted in Southern Nigeria, 1 in 51 deliveries, or 19.5 per 1000 live births, are twins. With a mean age of 31 SD 4.82 years (95% CI: 30.42, 31.59), the patients' ages ranged from 30 to 34. Ninety-nine (37.6%) of the parturients had term delivery, while 184 (62.4%) suffered preterm delivery. The mean gestational age at birth was 35.7 SD 2.9 weeks, 95% CI 35.3 to 36.0. Of the patients, 107 (67.3%) underwent cesarean sections, whereas 86 (32.7%) had vaginal births. 42 (23.7%) of the 177 patients who underwent cesarean sections were elective, while 135 (76.3%) had emergency cesarean sections[22].

According to research conducted at the Krishna Institute of Medical Sciences, India, 1.9% of pregnancies resulted in twins. The majority of women (56.48%) were between the ages of 21 and 30. Of them, 48.15% had completed 34–36 weeks of pregnancy, with an average gestational age of 34.97 ± 2.35 weeks. Malpresentations were the most common maternal complication (37.96%), followed by preterm labor (35.1%). Cesarean section (62.04%) was most frequent mode of deliver[17].

According to a study on maternal complications after twin deliveries at Jimma University Specialized Hospital in Southwest Ethiopia, 35.4% of women experienced at least one pregnancy-related medical complication. The main ones were anemia (21.5%), diabetes mellitus (DM) (0.7%), urinary tract infections (UTI) (1.4%), and hypertensive disorders of pregnancy (25%). Significantly more prevalent maternal antepartum and intrapartum obstetric problems were cord prolapse (4.9%), premature rupture of membrane (PROM) (15.3%), poor labor progress (8.3%), and polyhydramnios (1.4%). Twin pregnancies were associated with a non-significant risk of obstructed labor (OL) (RR = 1.00; 95%CI: 0.19, 5.30) and APH (RR = 1.08; 95%CI: 0.44, 2.64), as well as an inverse relationship with cephalo-pelvic disproportion (CPD) (RR = 0.29; 95%CI: 0.10, 0.92). There was at least one statistically significant complication that occurred right after birth in twenty-nine (20.1%) twin deliveries (RR= 3.57, 95%CI: 1.92, 6.62). The odds of PPH and uterine atony were approximately three times (RR=3.24, CI: 1.66, 6.33) and nine times (RR=9.43, 95% CI: 2.64, 33.33) higher in twin pregnancies than in singleton pregnancies, respectively. When twin pregnancies were compared to singleton pregnancies, the odds of maternal death (RR=8.2, CI: 1.91, 74.05) and puerperal sepsis (RR=3.13 CI: 1.09, 8.93) were about three and eight times higher, respectively. All maternal deaths were caused by PPH, and the case fatality rate for twin deliveries was 2.8%[8].

A study on the magnitude and obstetric complications of twin deliveries conducted at Nekemte Referral Hospital in Western Ethiopia revealed that there were 28.6 twin deliveries for every 1000 deliveries. Premature rupture of the membrane (OR=1.87; 95% CI: 1.28,2.73), gestational diabetes mellitus (OR=3.03; 95% CI: 2.59,3.56), antepartum hemorrhage (OR=1.80; 95% CI: 1.09,2.99), preterm delivery (OR=2.76; 95% CI: 2.12,3.40), and hypertensive disorder of pregnancy (OR=2.1; 95% CI: 1.54,2.86) were the most frequent antepartum complications. Intrapartum and postpartum problems that were most likely to occur included anemia (OR=1.77; 95% CI: 1.24, 2.52), postpartum hemorrhage (OR=1.27; 95% CI: 0.77, 2.11), puerperal sepsis (OR=2.18 95% CI: 1.46, 3.25), and cord prolapse (OR=2.33; 95% CI: 1.51, 1.84). However, there is a decreased chance of having obstructed labor with twin deliveries[11].

The primary causes of poor neonatal outcomes in multiple pregnancies are congenital abnormalities, low birth weight (LBW), twin transfusion syndrome (TTTS), intrauterine fetal death (IUFD), intrauterine growth restriction (IUGR), birth asphyxia, and neonatal death. Each of these elements has a part in the five to six times increased rate of perinatal problems seen in multifetal gestations when compared to singleton pregnancy[17].

Prematurity was a major issue for patients with twin pregnancies, according to a study conducted in Pakistan. Of the patients, 84.3% arrived between 28 and 35 weeks of pregnancy, 15.6% went into labor at 36 weeks or later, and 35.9% of twin A and 42.2% of twin B were born weighing between 1500 and 2500 grams. 9.4% of newborns were stillbirth[18].

A study conducted at the Victoria Government Hospital, India, revealed that low birth weight (87.1%), sepsis, respiratory distress syndrome (RDS), and admissions to the neonatal intensive care unit (NICU) (62.3%) were the most common neonatal problems. Thirteen monochorionic twin pregnancies had growth discordancy (20.07%) and twin to twin transfusion syndrome (7.6%). Neonatal mortality rate was 11.4% [6].

Another study conducted at JNU Medical College and Hospital, India, revealed that of the neonates with fetal problems, 21.4% had birth weight discordance and 11.4% had IUGR. In the early neonatal period, 12.9% of babies died, while 21.4% of neonates had a low APGAR score[19].

A study conducted in Bangladesh revealed that low birth weight, which affected 84.6% of newborns, was the most common neonatal problem. The initial twins weighed 1.6 ± 0.8 kg and the second twin weighed 1.8 ± 0.7 kg, on average ($\pm$ SD). The percentages of normal, sick, and dead neonates were 76.92%, 17.30%, and 5.76% for the first twins, respectively, whereas the percentages for the second twins were 67%, 26.92%, and 5.76%[21].

The first and second twins' mean birth weights were found to be 2.39 SD 0.67 and 2.30 SD 0.69, respectively, in a research conducted in Southern Nigeria. With 265 (50.4%) male and 261 (49.6%) female fetuses out of the 526 total, the male to female ratio was 1.02:1. Of the 526 fetuses, 41 experienced stillbirths and 485 babies were delivered alive. Per 1000 live births, the stillbirth and perinatal mortality rates were 4.2 and 7.8, respectively[22].

According to a study conducted at the Krishna Institute of Medical Sciences, India, the majority of newborns (92.34%) had LBW and 19.6% admitted to the NICU. The overall newborn death rate is 3.34 percent. Neonatal mortality was most frequently caused by birth asphyxia (42.85%)[17].

According to a study conducted on twin birth result evaluations and related factors among infants at Dessie referral hospital in Dessie, Ethiopia, twin birth prevalence was 23.4% (95% CI, 19.2-27.5). The following were recorded: low birth weight 9.1%, stillbirth 4.2%, Apgar score <7 9.1%, and neonatal death 1%. There was a significant correlation between adverse twin birth and ANC follow-up (95% CI, 13.47(2.49–72.85)), rural residence (95% CI, 2.46(1.39–4.37)), PROM (95% CI, 6.39(2.52–16.16)), and hypertension disorder (95% CI, 6.01(2.43–14.87)) [4].

3. OBJECTIVES OF THE STUDY

3.1. General Objective

- To evaluate twin pregnancies' perinatal and maternal outcomes for women who gave birth at three teaching hospitals in Addis Ababa, Ethiopia, between January and December of 2022 GC.

3.2. Specific Objectives

- To determine prevalence of twin delivery.
- To ascertain the twin pregnancy's maternal difficulties.
- To assess the perinatal consequences of a twin pregnancy.

4. METHODS AND MATERIALS

4.1. Study Design

Institutional-based retrospective cross-sectional study design was conducted among 407 maternal medical charts of women that delivered twins at three teaching hospitals of Addis Abeba University, from January 01 to December 31, 2022 GC.

4.2. Study Area and Period

Gandhi Memorial Hospital (GMH), Tikur Anbessa Specialized Hospital (TASH), and Zewditu Memorial Hospital (ZMH) are the three teaching hospitals of Addis Ababa University (AAU) that served as the study sites. Ethiopia is a country in the Horn of Africa, with Addis Ababa (AA) serving as its capital. At 2,355 meters above sea level, it has an area of 527 kilometers. According to United Nations World Urbanization Prospects, 5,227,794 people would live in Addis Abeba in 2022[23]. In addition to more than 500 clinics, the city currently contains more than 41 hospitals (12 public and more than 25 private), 28 health facilities, and 35 health posts. Convenience led to the selection of three public hospitals for the study. The largest teaching and referral hospital in the nation, Tikur Anbessa Specialized Hospital, is owned by Addis Abeba University, while the other two are under the jurisdiction of the Addis Ababa Health Bureau.

The research was carried out between May 10 and June 13, 2023 GC.

4.3. Source Population

The delivery records of three teaching hospitals between January 1 and December 31, 2022 GC, served as the study's population source.

4.4. Study Population

Twin deliveries reported in three teaching hospitals from January 1, 2022, to December 31, 2022 GC, comprised the study population for this study. A one-year record sheet before to the study period was reviewed using a maternal medical record chart.

4.5. Inclusion and Exclusion Criteria

Inclusion criteria:

- All registered twin births from January 1, 2022, to December 31, 2022 GC.

Exclusion criteria:

- Those who gave birth before 28 weeks of pregnancy.
- Those with a history of underlying medical illnesses, such as collagen vascular dysfunction, pre-gestational diabetes, heart illness, or renal disease.

4.6. Sample Size Determination

The single proportion formula was used to determine the sample size

$$n = \frac{\left(\frac{Z}{2}\right)^2 P(1-P)}{d^2}$$

Where: n = desired sample size

Z = Z value at 95% confidence interval (CI)

p = proportion rate

d = margin of error

The Z value at 95% CI is 1.96 (from significance level $\alpha = 5\%$). I would accept a p value of 48.07% because anemia was the most frequent maternal complication of twin pregnancy (48.07% of patients)[21]. Five percent is the allowed margin of error. Therefore,

$$p = 0.48 \quad 1 - p = 0.52 \quad d = 0.05$$

$$n = \frac{(1.96)^2 (0.48) (1-0.48)}{(0.05)^2} = 383$$

$$(0.05)^2$$

The total sample size was **383**

Table 1. Determining the sample size for various circumstances

No	Factor	Proportion rate	Sample size	Reference
1	Preterm labour/delivery	57.1%	375	6
2	Anemia	48.07%	383	21
3	PIH	28.84%	315	21
4	APH	6.2%	90	18
5	Primary PPH	13.33%	178	6
6	GDM	9.6%	134	21
7	PROM	26.2%	297	20
8	Hyperemesis Gravidarum	7.69%	109	21
9	Cesarean delivery	46.15%	381	21
10	TTTS	7.6%	108	6
11	Still birth	4.2%	62	22
12	Low birth weight	42.85%	375	17
13	Low APGAR score	21.4%	258	19
14	IUGR	23.07%	272	6
15	NICU Admission	62.3%	360	6
16	Birth asphyxia/hypoxia/RDS	42.85%	375	17
17	Early neonatal death	12.9%	173	19

4.7. Sampling Technique

At each institution, a systematic sample strategy combined with a stratified sampling technique was used to gather the maternity records. There were 483 twin births in three academic hospitals in 2021 GC. Based on the sampling fraction, the individuals are chosen at predetermined intervals (every kth).

The sampling fraction is $1/1.26$, calculated as 383 (sample size)/ 483 (study population). The sample interval is one as a result. Therefore, I have started from the first maternal record number that recorded as twin delivery in 2022 GC until I got the calculated sample size

A year before to the data collection period, each hospital's total annual delivery count was observed, and computed sample size was distributed proportionately among the hospitals using this data.

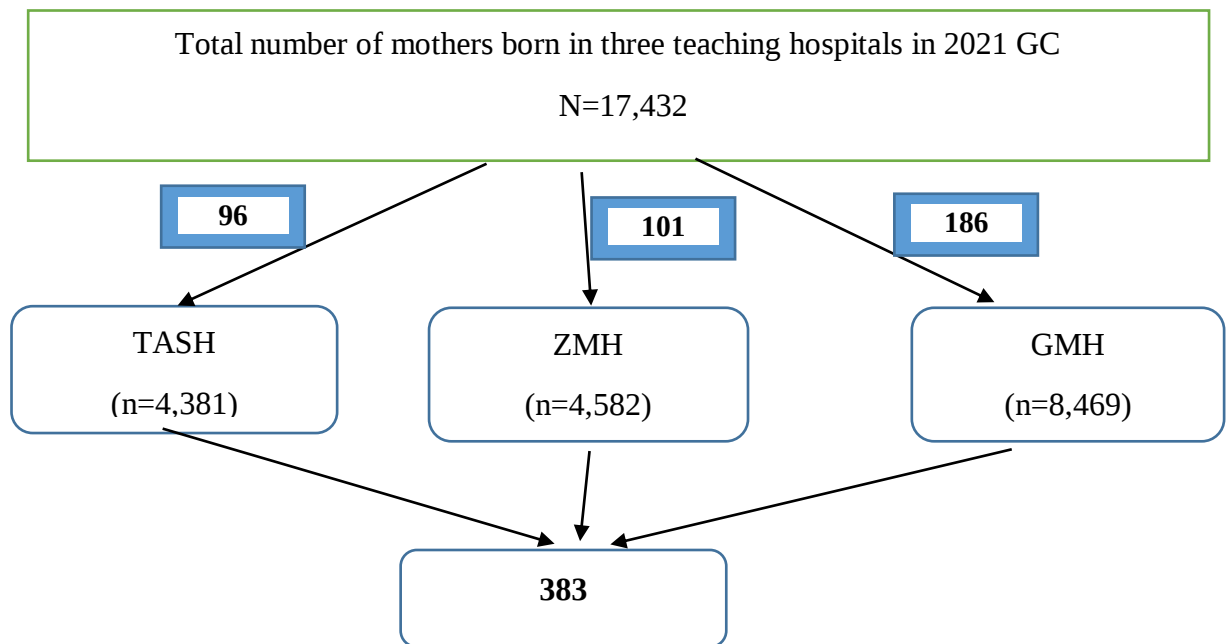


Figure 1. Diagrammatic representation of the study participants' sampling process

By considering the global prevalence and the yearly twin delivery of the study's area, which is not more than 500, the whole source of population were included study.

4.8. Study Variables

4.8.1. Dependent Variables

- PPH, preterm labor, fetal growth restriction, PROM/PPROM, GDM, and hypertensive disease of pregnancy are some of the specific maternal obstetric problems.
- Perinatal outcome includes birth outcome, weight at birth, gestational age at birth, APGAR score, need for NICU hospitalization, and death during the first week of life.
- Mode of delivery

4.8.2. Independent Variables

- Age is a sociodemographic factor.
- Obstetrical-related variables include parity and ANC history.
- Chorionicity
- Fetal presentation

4.9. Data Collection Method

A structured checklist was created following an assessment of pertinent literature. The purpose of the checklist was to gather pertinent data on the predictive variables, including perinatal outcomes, maternal problems, obstetric complications, and demographics.

Information was taken from patient files, NICU registration books, maternity operation theatre records, and labor ward delivery registration books. The hospital numbers of every patient registered as having twin births were gathered, and the records of every delivery that occurred during that time were examined. To conduct an in-depth analysis, the case records of individuals who had twin deliveries were taken out of the card room. The neonate's medical chart and NICU registration booklets provided supplementary information. We examined these case notes. The information gathered included the patient's age, booking status, parity, gestational age at delivery, fetus presentation, delivery method, gender distribution, birth weights, perinatal outcomes, and maternal issues.

Following consistent training prior to the research, six medical interns and three residents in obstetrics and gynecology (OBGYN) participated in data collection and supervision, respectively. All records were securitized for all variables in order to extract the maternal medical data and combine the mother's and newborn's medical cards.

4.10. Data Quality Control Measures

Data collectors and supervisors were trained on the data collection system for one and a half days. Every day, the primary investigator received daily reports from the supervisors who oversaw the data collectors. Prior to the actual data collection process, the checklist was pretested on 15 maternal medical records from Ghandi Memorial Hospital, or 5% of the sample size. Any questions that were confusing were then corrected, and an English version of the questioner was created.

Every day, supervisors and data collectors verified the completed questionnaires before returning the patient's chart. In order to maintain close supervision, open communication, and prompt decision-making during the data collection phase, the principal investigator supported the supervisors and data collectors.

4.11. Data Processing and Analysis

The completeness and consistency of each checklist were checked, and the data was double-entered using Epi Info 7 software. The cleaned and coded data was then imported into SPSS version 25 for further statistical analysis. Frequencies, proportions, tables, and summary statistics related to the relevant variable were used to describe the study population.

The variable with a P value less than 0.20 was determined to have a significant association with twin birth outcome by multivariable logistic regression following a bivariate investigation. Finally, the adjusted odds ratio and its 95% CI were used to measure the association variable and statistical associations with a P value less than 0.05.

4.12. Operational Definitions

Maternal outcomes: A selection of maternal complications that patients experienced before, during, and after giving birth, as determined by the attending physician.

Neonatal outcomes: Live births, stillbirths, neonatal deaths, and NICU admissions

Neonatal death: Any death that transpires before the mother or child is released from the hospital during the first week following birth

Adverse perinatal outcome: The presence of any of the following: low birth weight, premature birth, stillbirth, low Apgar Scores, neonatal intensive care unit admission, or early neonatal mortality

Prolonged pregnancy: Those delivered electively at $\geq 38^{+0}$ weeks for MCDA or twin A non-vertex presentation and at $\geq 40^{+0}$ weeks for DCDA twins without other indications.

Age of viability: GA > 28+0 Weeks from available evidences

Three teaching hospitals: Gandhi Memorial Hospital (GMH), Zewditu Memorial Hospital (ZMH), and Tikur Anbessa Specialized Hospital (TASH)

4.13. Ethical Considerations

The TASH research and community service ethical review committees provided their ethical approval prior to the project's start. The proposal was sent to my advisor for assessment and approval. The Addis Ababa University and the Addis Ababa City Health Bureau provided formal letters of consent and agreement, while Zewditu and Gandhi Memorial Hospitals received an official letter of collaboration from the aforementioned organizations. any of the data gathered from the registry was handled in confidence by removing any personally identifying information, and it was utilized only for this study.

4.14. Dissemination Plan and Use of Findings

The results of the study were given to the obstetrics and gynecology department at TASH. The Addis Ababa City Health Bureau, TASH, and the accountable hospitals will receive the final report. Additionally, attempts will be made to publicize the study's findings through other journals and scholarly publications.

5. RESULTS

5.1. The research participants' demographic and obstetric features

From January 1 to December 31, 2022 GC, 16,191 deliveries were registered in the study area. Of them, twins made up 433 (2.67%).

Using medical charts, 407 people who met the inclusion criteria for this study were involved. Approximately two thirds of the 255 study participants (62.6%) belonged to the 20-29 age group, with a mean and SD of 27.7 ± 4.6 , respectively. During the pregnancy under study, 99% (n = 403) received a prenatal visit, and nearly two-thirds (n = 257; 63.1%) were multiparous. Of these, half (n = 201; 49.4%) were born before their due date. A little over 36.7 percent (n = 149; 36.6%) of babies were born later than expected. 33:11:1 was the ratio of dichorionic diamniotic to dichorionic monoamniotic monochorionic monoamniotic. More than 37 percent (n = 146; 37.1%) presented twin A non-vertex.

Table 2. Demographic and obstetric features of study participants who had twin births at Addis Ababa University's three teaching hospitals between January 1 and December 31, 2022 GC (N = 407)

Variable	Frequency	Percent
Maternal age of the study of participants (Yrs.)		
≤19	5	1.2
20-24	99	24.3
25-29	156	38.3
30-34	112	27.5
≥35	35	8.6
Parity		
Primipara	146	35.9
Multipara	257	63.1
Grand multipara	4	1.0
ANC history		
Yes	403	99.0
No	4	1.0
Gestational age at delivery (Wks.)		
28+0-33⁺⁶	52	12.8
34-36⁺⁶	149	36.6
37-38⁺⁶	143	35.1
39-40⁺⁶	62	15.2
41-41⁺⁶	1	.2
Chorionicity		
Dichorionic diamniotic	299	73.5
Monochorionic diamniotic	99	24.3
Monochorionic monoamniotic	9	2.2
Fetal presentation		
Cephalic-cephalic	153	37.6
Cephalic-breech	103	25.3
Breech-breech	74	18.2
Breech-cephalic	65	16.0
Breech-transverse	7	1.7
Cephalic-transverse	5	1.2

5.2. Labor and delivery characteristics of the study participants

Majority (n = 246; 60.4%) were delivered by caesarean section and within fifteen minutes of the first twin's delivery, 79.4% (n = 323) of the second twins were born (see tables below).

Table 3. Mode of delivery of the study participants

Mode of delivery	Frequency	Percent
Vaginal delivery	106	26.0
ABD	43	10.6
Instrumental	12	2.9
CS	246	60.4

Table 4. Time between the first and second twins' deliveries

Delivery interval	Frequency by mode of delivery				Percent
	Vaginal delivery	ABD	Instrumental	CS	
<15min	52	19	6	246	79.4
15-30min	39	16	2	0	14.0
≥30min	15	8	4	0	6.66

5.3. Indication of cesarean section

According to figure 2 below, the primary reason for a cesarean delivery was the leading twin's malpresentation (n = 87; 35.4%), which was followed by pregnancy-induced hypertension (n = 53; 21.5%), a previous cesarean section (n = 36; 14.6%), and a prolonged pregnancy (n = 26; 10.6%).

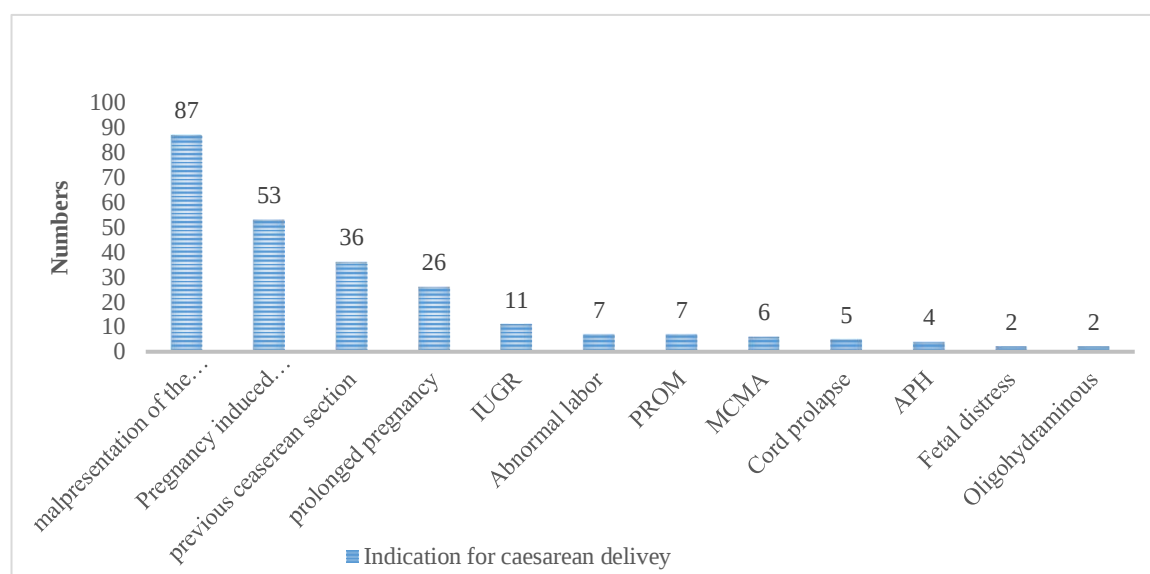


Figure 2. Indication of caesarean delivery of twin pregnancy

5.4. Maternal outcome of twin pregnancy

According to the study's findings, 68% of women experience at least one issue before, during, or after giving birth.

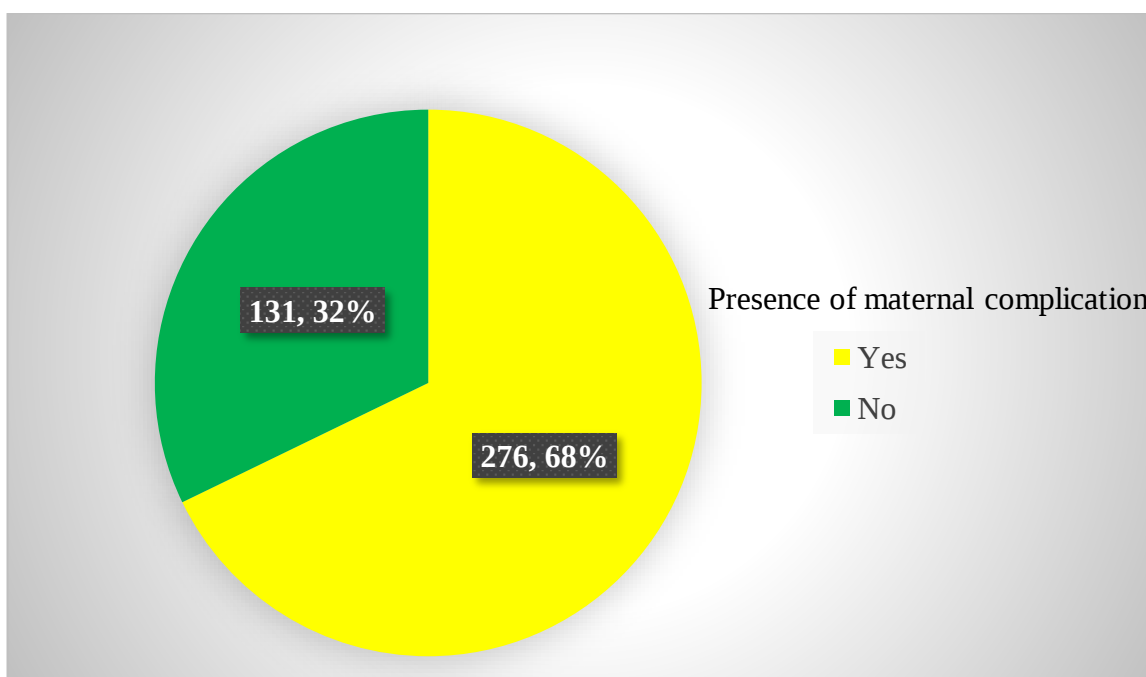


Figure 3. Magnitude of maternal complication during twin pregnancy.

Regarding the particular kinds of problems, antepartum complications accounted for 44% (n=179) of the total. Pregnancy-induced hypertension accounts for 52.0% (n = 93) of the antepartum problems, followed by PROM at 42.4% (n = 76), anemia at 5% (n = 9), and APH at 5% (n = 9). Among the subjects, intrapartum complications affected 58%. The most frequent intrapartum and postpartum problems were preterm lower uterine segment caesarean section (38.4%), anemia (38.9%), and preterm labor (57.3%).

Table 5. The characteristics of maternal complication.

Variable	frequency	Percent
Antepartum complication		
Yes	179	44.0
No	228	56.0
Specific antepartum complication		
PIH	93	46.0
PROM	76	42.4
Anemia	9	5.0
APH	9	5.0
GDM	7	3.9
Polyhydramnios	4	2.2
Congenital anomaly	3	1.7
HEG	1	0.6
Intrapartum and postpartum complication		
Yes	234	57.5
No	173	42.5

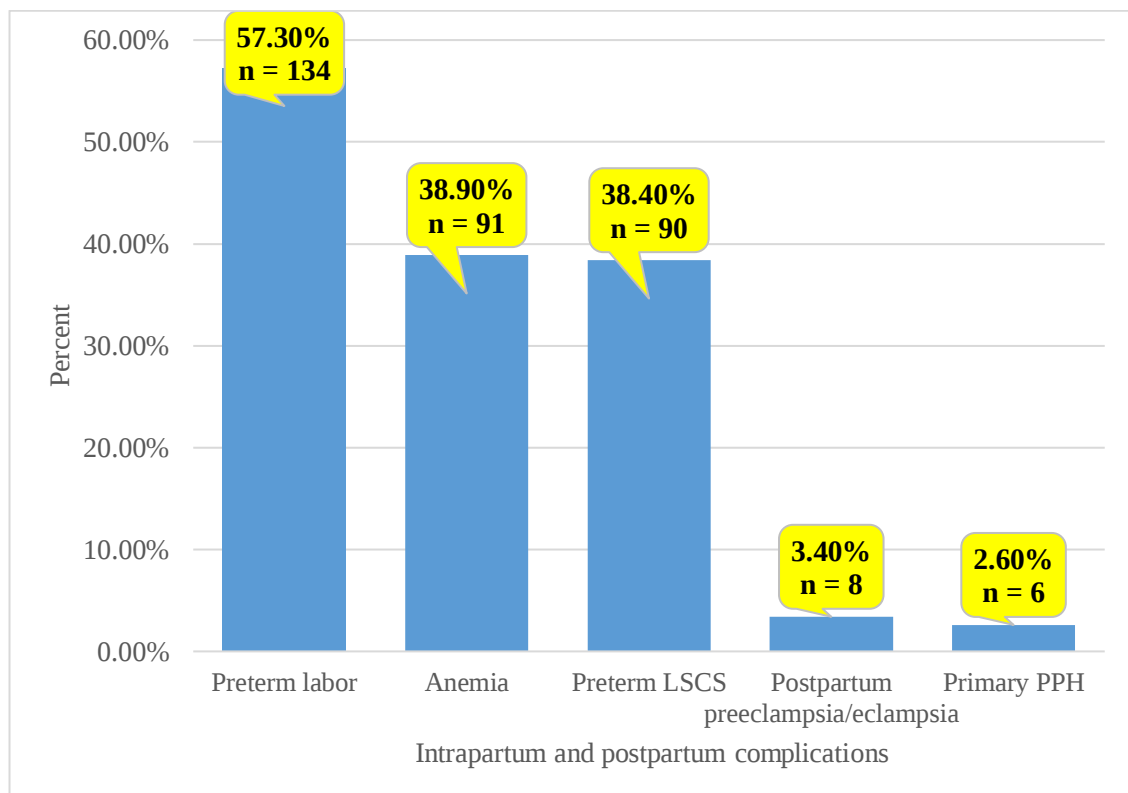


Figure 4. Intrapartum and postpartum complications of the participants

5.5. The determinants of maternal outcome of twin pregnancy

Using bivariate logistic regression, the mother's age, parity, and chronicity were related to the maternal outcome. According to the multivariate logistic regression, participants under the age of 19 had a 2.1-fold higher chance of experiencing a pregnancy-related problem than those over the age of 35 (AOR = 2.1, 95% CI: 1.19, 22.4). Table 6 shows multiparous and grand multiparous were, respectively, 36% and 89% less likely than primiparous participants to experience maternal complications (AOR = 0.64, 95% CI: 0.37, 0.71 & AOR = 0.11, 95% CI: 0.01, 0.43).

Table 6. The bivariate and multivariate logistic regression of association between maternal outcome and independent variables.

Variable	Maternal complication		P-value	COR with 95%CI	P-value	AOR with 95%CI
	Yes	No				
Age (Yrs)						
≤ 19	4	1	0.029	3.4(1.34, 33.26)	0.035	2.1(1.19, 22.44)
20-24	73	26	0.035	2.4(1.06, 5.27)	0.237	1.7(0.70, 4.15)
25-29	113	43	0.038	2.2(1.04, 4.69)	0.129	1.8(0.84, 3.97)
30-34	67	45	0.562	1.3(0.58, 2.69)	0.574	1.3(0.57, 2.75)
≥ 35	19	16	1		1	
Parity						
Primipara	111	35	1		1	
Multipara	164	93	0.012	0.56(0.35, 0.88)	0.013	0.64(0.37, 0.71)
Grand multipara	1	3	0.054	1.11(0.01, 1.04)	0.043	0.11(0.01, 0.43)
Chorionicity						
Dichromic diamniotic	195	104	1		1	
Monochorionic diamniotic	73	26	0.119	1.5(0.90, 2.49)	0.278	1.3(0.79, 2.29)
Monochorionic monoamniotic	8	1	0.045	3.2(1.38, 26.94)	0.024	3.2(1.37, 27.46)
Fetal presentation						
Cephalic-cephalic	95	58	1		1	
Cephalic-breech	75	28	0.076	1.6(0.95, 2.81)	.067	1.7(0.96, 3.0)
Cephalic-transverse	5	0	.999		.999	
Breech-cephalic	47	18	0.149	1.6(0.85, 3.01)	0.229	1.5(0.78, 2.86)
Breech-breech	50	24	0.421	1.3(0.71, 2.29)	0.708	1.1(0.61, 2.05)
Breech-transverse	4	3	0.792	0.81(0.18, 3.77)	0.743	0.77(0.16, 3.69)

5.6. Unique fetal complications of the study participants

There were specific fetal problems associated with twin pregnancies in over fifteen percent (15.5%; n=63). Of the twinning complications, selective intrauterine growth restriction accounts for 68.2% (n = 43), congenital abnormality accounts for 4.8% (n = 3), co-twin death for 23.8% (n = 15), and twin-twin transfusion syndrome for 3.2% (n = 2).

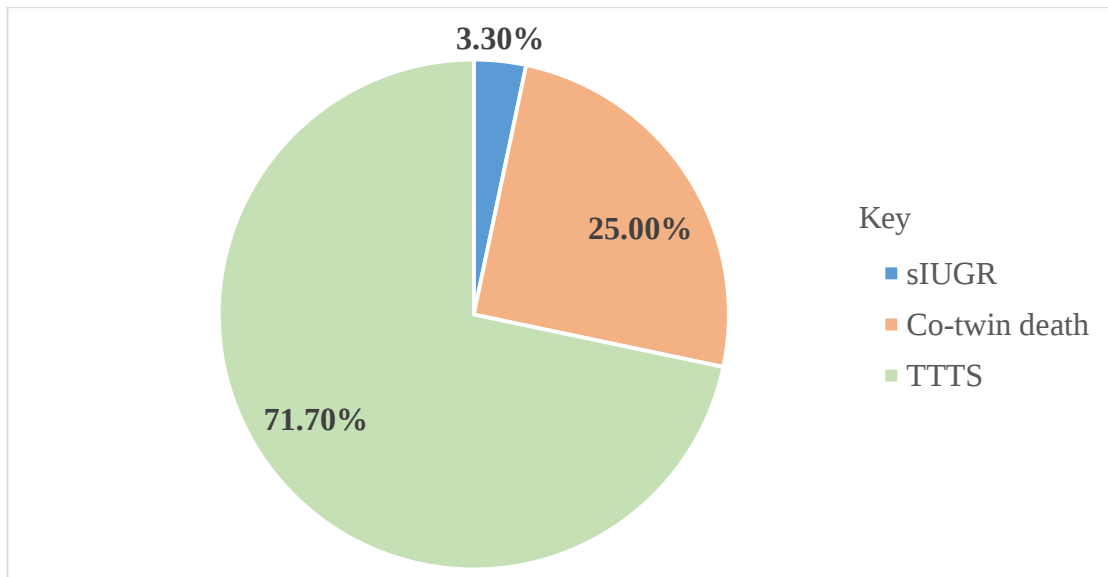


Figure 5. Unique fetal complications of twin pregnancies

5.7. The perinatal outcome of the study participants.

5.7.1. Outcome of twin A neonate

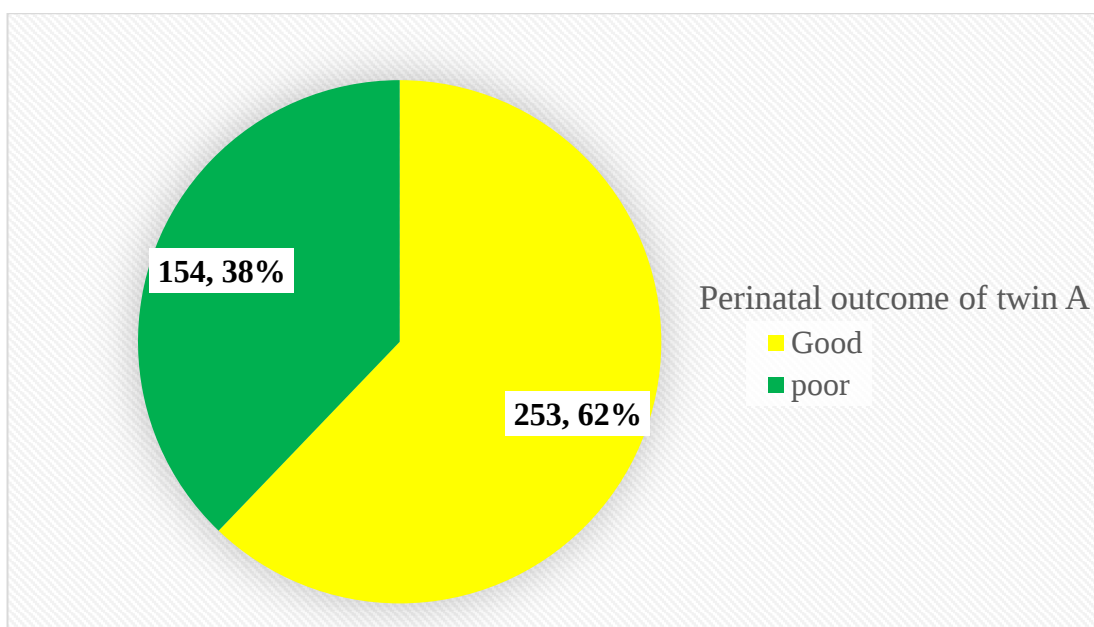


Figure 6. The perinatal outcome of twin A.

Of twin A, sixty-two percent (n = 253) were live births; 45.7% had normal birth weights, while 2% (n = 8) had very low birth weights. Fifty-eight percent (n = 237) were male and 96.1 % had a fifth-minute APGAR score of ≥ 7 ; nevertheless, 2% of the babies were stillborn. Within seven days of delivery, 3.7% (n = 15) of the newborns died, and nearly 32% (n = 132) were admitted to the NICU. According to the table below, septicemia, IUGR, and LBW were the leading causes of prenatal morbidity, followed by preterm.

Table 7. The perinatal outcome of twin A neonate

Variable	Twin A	
	Frequency	Percent
Weight in grams		
≥ 2500	186	45.7
1500-2499	194	47.7
1000-1499	19	4.7
≤ 1000	8	2.0
Sex		
Male	237	58.2
Female	170	41.8
APGAR first minute		
0	8	2.0
1-3	3	0.7
4-6	14	3.4
≥7	382	93.9
APGAR fifth minute		
0	8	2.0
1-3	1	0.2
4-6	7	1.7
≥7	391	96.1
Neonatal outcome (n = 407)		
Live birth	253	62.2
NICU admission	132	32.4
Neonatal death in the 1 st week	14	3.4
Still birth		
Fresh	6	1.5
Macerated	2	0.5
Causes of perinatal morbidity (n=146)		
Prematurity	64	43.8
Septicemia	23	15.8
IUGR	22	15.1
LBW	19	13.0
Asphyxia/hypoxia/RDS	12	8.2
Jaundice	4	2.7
Congenital malformation	2	1.4

5.7.2. Determinants of twin A Perinatal outcome

Bivariate regression analysis revealed a relationship between twin A outcome and parity, gestational age, birth weight, and maternal complications (antepartum, HTN, PROM, and intrapartum). The results of the multivariate regression showed that, compared to the 28–33+6 week gestational age at birth, gestational age of 34–36+6, 37–38+6, and 39–40+6 weeks had 92%, 98%, and 98% lower chances of a poor outcome, respectively. A neonate whose mother experienced a maternal intrapartum complication had a poorer outcome 1.6 times higher than that of a neonate whose mother experienced no complications (AOR = 1.6, 95% CI: 1.06, 3.37), and a neonate whose mother experienced a maternal antepartum complication had a worse outcome 2.3 times greater than that of its opposite compartment (AOR = 2.3, 95% CI: 1.61, 8.52). As indicated by table 6 below, neonates weighing 1500–2499, 1000–1499, and less than 1000 grams at delivery had 4.1, 22.6, and 9.8 times greater unfavorable outcomes, respectively, than those weighing ≥ 2500 grams..

Table 8. Bivariate and multivariate logistic regression evaluating the relationship between independent variables and twin A outcome.

Variable	Twin A outcome		p-value	COR	p-value	AOR
	Poor	Good				
Parity						
Primipara	69	77	1		1	
Multipara	84	173	0.004	0.54(0.36, 0.82)	0.433	0.79(0.45, 1.41)
Grand multipara	1	3	0.397	0.37(0.04, 3.66)	0.212	4.6(0.42, 50.45)
GA at delivery (Wks.)						
28+0-33 ⁺⁶	50	2	1		1	
34-36 ⁺⁶	81	68	0.000	0.048(0.01, 0.20)	0.001	0.08(0.02, 0.37)
37-38 ⁺⁶	17	126	0.000	0.005(0.001, 0.02)	0.000	0.02(0.004, 0.10)
39-40 ⁺⁶	6	56	0.000	0.004(0.001, 0.02)	0.000	0.02(0.004, 0.16)
41-41 ⁺⁶	0	1				
Mode of delivery						
Vaginal	45	61	1		1	
ABD	15	28	0.394	0.73(0.35, 1.52)	0.152	0.46(0.16, 1.33)
Instrumental	2	10	0.102	0.27(0.06, 1.29)	0.285	0.37(0.06, 2.29)
CS	92	154	0.373	0.81(0.51, 1.29)	0.438	1.3(0.67, 2.50)
Antepartum complication						
Yes	97	82	0.000	3.5(2.33, 5.40)	0.021	2.3(1.61, 8.52)
No	57	171	1			
Hypertension disorder						
Yes	45	48	0.018	1.8(1.10, 2.82)	0.517	0.65(0.18, 2.38)
No	109	205	1			
PROM						
Yes	48	28	0.000	3.6(2.16, 6.12)	0.774	0.82(0.22, 3.11)
No	106	225	1			
Intrapartum complication						
Yes	131	103	0.000	8.3(4.99, 13.80)	0.016	1.6(1.06, 3.37)
No	23	150	1			
Twin A birth weight (Grams)						
≥ 2500	20	166	1			
1500-2499	109	85	0.000	10.6(6.18, 18.3)	0.000	4.1(2.10, 8.21)
1000-1499	18	1	0.000	14.9(8.19, 117.7)	0.042	22.6(16.1, 46.8)
≤ 1000	7	1	0.000	58.1(6.79, 496.8)	0.010	9.8(1.59, 16.5)

5.7.3. Outcome of twin B neonate

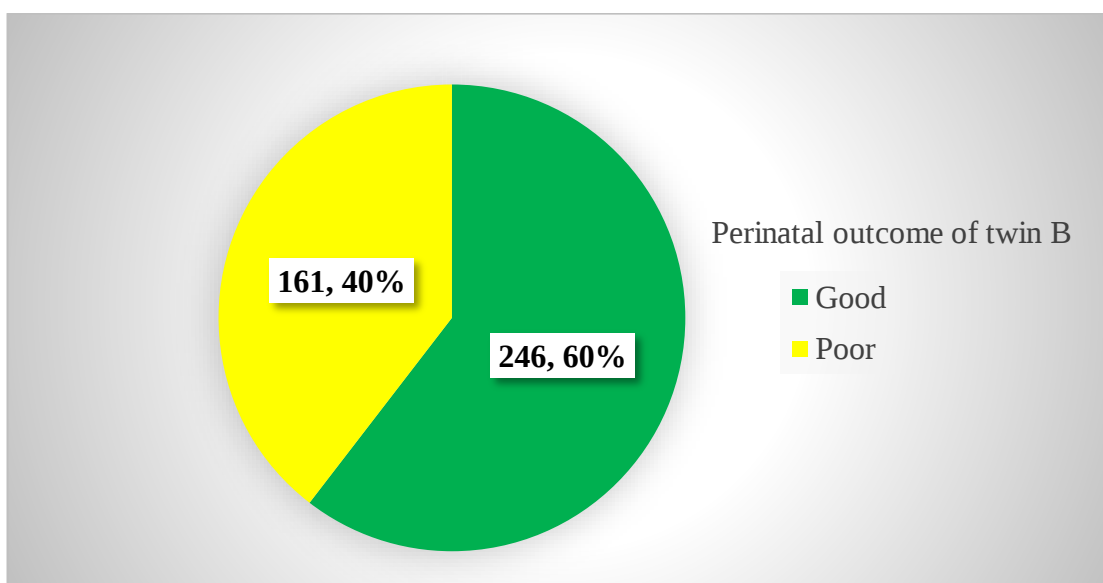


Figure 7. The twin B newborn's perinatal outcome.

Twin B's birth weight ranged from 1500 to 2499 grams for the majority ($n = 224$; 55%), while 1.7% ($n = 7$) had high LBW. While 1.7% ($n=7$) of stillbirths occurred, 60% ($n = 244$) of births were female and 95.8% ($n = 390$) had a score of ≥ 7 on the APGAR at the 5th minute. Of the newborns, 33% ($n = 156$) were hospitalized to the NICU, and 4.4% ($n = 18$) passed away within 7 days of the birth. According to the table below, preterm was the leading cause of prenatal morbidity, followed by septicemia, IUGR, LBW, and asphyxia/hypoxia/RDS.

Table 9. The twin B newborn's perinatal outcome

Variables	Frequency	Percent
Weight in grams		
≥ 2500	148	36.4
1500-2499	224	55.0
1000-1499	28	6.9
≤ 1000	7	1.7
Sex		
Male	163	40.0
Female	244	60.0
APGAR first minute		
0	7	1.7
1-3	2	.5
4-6	31	7.6
≥7	367	90.2
APGAR fifth minute		
0	7	1.7
4-6	10	2.5
≥7	390	95.8
Neonatal outcome		
Live birth	244	60.0
NICU admission	138	33.9
Neonatal death in the 1st week	18	4.4
Still birth fresh	2	.5
Still birth macerated	5	1.2
Causes of perinatal morbidity (n=156)		
Prematurity	68	43.6
Septicemia	24	15.4
LBW	22	14.1
IUGR	21	13.5
Asphyxia/hypoxia/RDS	16	10.3
Jaundice	4	2.6
Congenital malformation	1	.6

5.7.4. Determinants of twin B Perinatal outcome

By using bivariate regression, parity, maternal complications (antepartum, HTN, PROM, intrapartum), and delivery method were associated with the twin B outcome. The results of the multivariate regression showed that neonates delivered by cesarean section had a 55% lower chance of having a poor perinatal outcome than those delivered by SVD (AOR = 0.45, 95% CI: 0.23, 0.88), and multipara mothers were 47% less likely than primiparous women to have a poor twin B perinatal outcome. (AOR = 0.53, 95% CI: 0.29, 0.96). The twin B complication rate was 3.2 folds (AOR = 3.2, 95% CI: 1.08, 9.38) and 9.5 folds (AOR = 9.5, 95% CI: 3.64, 24.76) higher in newborns of mothers with maternal antepartum and intrapartum complications than with those without such complications. Neonates with inherited twin complications were 8.7 times more likely to experience twin B complications than those in their opposite compartment (AOR = 8.7, 95% CI: 3.81, 20.01), whereas those with favorable maternal outcomes were 47% less likely to experience bad twin B perinatal outcomes.

Table 10. Bivariate and multivariate logistic regression evaluating the relationship between independent variables and twin B outcome.

Variable	Twin B outcome		P-value	COR with 95%CI	P-value	AOR with 95%CI
	Poor	Good				
Age (Yrs)						
≤19	2	3	0.802	1.3(0.19, 8.72)	0.480	0.44(0.04, 4.36)
20-24	45	54	0.053	1.6(0.72, 3.56)	0.287	0.57(0.20, 1.61)
25-29	59	97	0.696	1.2(0.54, 2.52)	0.268	0.59(0.24, 1.49)
30-34	43	69	0.061	1.2(0.54, 2.65)	0.491	0.72(0.28, 1.85)
≥35	12	23	1		1	
Parity						
Primipara	71	75	1		1	
Multipara	89	168	0.006	0.56(0.37, 0.85)	0.037	0.53(0.29, 0.96)
Grand multipara	1	3	0.371	0.35(0.04, 3.46)	0.865	0.81(0.08, 8.78)
Mode of delivery						
Vaginal delivery	50	56	1		1	
ABD	17	26	0.397	0.73(0.36, 1.51)	0.392	0.68(0.28, 1.65)
Instrumental	2	10	0.061	0.22(0.05, 1.07)	0.163	0.26(0.04, 1.73)
CS	92	154	0.087	0.67(0.42, 1.06)	0.019	0.45(0.23, 0.88)
Delivery interval b/n 1 st and 2 nd twin						
≤ 15min	126	193	1		1	
15-30min	21	37	0.637	0.87(0.49, 1.55)	0.496	0.75(0.32, 1.74)
≥ 30min	14	16	0.445	1.3(0.63, 2.84)	0.688	1.2(0.44, 3.49)
Antepartum complication						
Yes	100	79	0.000	3.5(2.29, 5.25)	0.036	3.2(1.08, 9.38)
No	61	167	1			
Hypertensive disorder of pregnancy						
Yes	48	45	0.007	1.9(1.19,3.03)	0.339	0.61(0.22, 1.69)
No	113	201	1			
PROM						
Yes	48	28	0.000	3.3(1.97, 5.55)	0.920	1.1(0.38, 2.95)
No	113	218	1			
Intrapartum complication						
Yes	135	99	0.000	7.7(4.72, 12.59)	0.000	9.5(3.64, 24.76)
No	26	147	1			
Inherited twin complication						
Yes	40	10	0.000	7.8(3.7, 16.14)	0.000	8.7(3.81, 20.01)
No	121	236	1			
Maternal outcome						
Poor	18	113	1			
Good	143	133	0.000	6.8(3.89, 11.71)	0.028	0.53(0.16, 1.72)

6. DISCUSSION

This study found a greater prevalence of twin pregnancies (26.7 per 1000 live births) than those done in Mekelle (13.7 per 1000 live births), Gondar (14.4 per 1000 live births), and Southern Nigeria (19.5 per 1000 live births)[22], [25], [26]. This study's high incidence could be explained in part by the study environment; the study area receives and manages high-risk pregnant mothers from the nearby primary health facilities, which could result in more twin pregnancies occurring in these institutions. But compared to research conducted in Nekemete, Jimma, Adama, and other African nations, the results of this study are less[19].[5], [8], [11], [12], [19].

The study found that mothers in the 25–29 age range recorded 38.5% of twin births, with a mean and SD of 27.7 ± 4.6 , respectively. A Jimma survey found that over half of twin births were born to mothers under the age of 24 [8]. Different socio-cultural factors, such as early marriage, may cause some variation in the sociodemographic characteristics linked to twin pregnancies.

Three of the four deliveries are operative, with CS accounting for the majority of these (60.4%). This result is higher than studies in Adama, Nekemete, India (57.14%), and the Global Network for Women's and Children's Health Research in six different low- and mid-income countries (13.5% in singleton pregnancy, 24.5% in twin pregnancies), but lower than studies in Southern Nigeria (67.3%) and India (62.04%) [6, 11, 12, 17, 22, 27]. Malpresentation of the leading twin (35.4%), pregnancy-induced hypertension (21.5%), prior cesarean section (14.6%), and protracted pregnancy (10.6%) were the most common reasons for a caesarean delivery. The indications match those from earlier research[12],[17], [19]. Malpresentation of the leading twin, the higher prevalence of caesarean delivery in the general population, and the greater incidence of obstetric complications in twin pregnancies could all be contributing factors to the higher caesarean delivery rate in twin pregnancies in this study.

According to this study, 68% of women experience at least one postpartum, intrapartum, and antepartum problem. This outcome is marginally higher than that of the Adama study, which indicated that 61.8% of paired births encountered at least one unfavorable perinatal outcome on one or both twins[12].

Of the 44% who experienced antepartum complications, 51.9% had PIH, 42.4% had PROM, and 5% each had anemia and APH. The results of studies conducted in Jimma (PIH 25%,

PROM 15.3%), Mekele (PIH 9.1%, PROM 31.3%), Nekemete (PIH 23.1%, PROM 13.5%), Bangladesh (PIH 48.07% PROM 28.84%), Pakistan (PIH 31.2%), Turkey (PIH 6.2% PROM 26.2%), India (PIH 22.5-28.5%), and South-South Nigeria ([PIH 9.6%])[3], [6], [11], [19]–[21], [25] are all higher than the percentage of PIH and PROM. However, the study's results on APH and anemia rate are less than those of a few earlier investigations[6],[8],[11],[18]–[20], and [25]. Additional research is necessary to identify the elements that may be connected with this variation, which may be related to the sociodemographic features of the study participants.

Intrapartum or postpartum problems affected a considerable majority of the patients (58%) of which the most common were preterm labor (57.3%), anemia (38.9%), preterm LSCS (38.4%), postpartum preeclampsia/eclampsia (3.4%), and main PPH (2.6%). Studies conducted in Adama, Mekele, Jimma, Nekemete, Turkey, Akwa Ibom state, Nigeria, and India revealed a greater rate of preterm labor.[3, 6, 8, 11, 12, 19, 20, 25, 25], however it is less than research from Bangladesh, Pakistan, and South-South Nigeria [3, 18, 21]. Increased intrauterine pressure in twin pregnancies, a high prevalence of PROM, and a lack of infection screening may be the cause of the study's higher findings of premature labor. The PPH is less than research findings from South-South Nigeria, Pakistan, India, Mekele, Nekemete, and Jimma[3], [6], [8], [11], [18], [25]. Documentation, the institution's diagnostic standards, and other elements like parity could all be to blame for this variance. The third factor could be the consistent utilization of the third stage of labor for all deliveries within the research areas. In comparison to earlier research, the rate of postpartum anemia is higher [6], [9], [12], [18], [20], and [25]. Possible causes of this include poor antepartum detection and optimization, insufficient iron supplementation, poor iron supplementation practice or adherence, a high rate of caesarean delivery, and inadequate recognition of PPH.

Pregnancy-related complications were 2.1 times more common among participants under the age of 19 than in those over the age of 35 (AOR = 2.1, 95% CI: 1.19, 22.4). Comparable to a study conducted in Adama, twin births registered to mothers between the ages of 15 and 24 were four times more likely to result in unfavorable perinatal outcomes (AOR = 4.1, 95% CI: 1.3, 12.5), compared to births registered to mothers between the ages of 35 and above[12]. The odds of maternal complications were 36% and 89% lower for multiparous and grand multiparous study participants, respectively, than for primiparous participants (AOR = 0.64, 95% CI: 0.37, 0.71 & AOR = 0.11, 95% CI: 0.01, 0.43).

Twin pregnancies have been shown to be associated with notable perinatal morbidity and mortality [24]. According to this study, the incidence of unfavorable perinatal outcomes was found to be 38% in twin A and 40% in twin B, which is both higher and in line with research findings in Adama & Dessie, respectively[4], [12]. Low birthweight (LBW) twins made up the bulk of the twin population—54.4% of twin A and 63.6% of twin B. Research conducted in Jimma (57.7%), Mekele (53.5%), Adama (50.8%), India (87.1%, 92.3%), Bangladesh (84.6%), Southern Nigeria, and South-West Nigeria (59%) revealed low birthweight as one of the main findings.[6, 7, 8, 12, 17, 21, 22, 25, 28, 29]. The high percentage of premature births in this study may be linked to the high rate of LBW, which is consistent with the results of earlier research.

The first and fifth minute APGAR scores were low in 4.2% and 2.5% of twin A and 8.1% and 2.5% of twin B, respectively. The results are less than those of studies carried out in North India, Jimma, Adama, Dessie, Nigeria, and elsewhere[4], [8], [12], [24], [29]. The fact that the study was conducted retrospectively raises the possibility of incorrect APGAR score scoring, but the improvement in the fifth-minute APGAR score indicates adequate planning and effective newborn resuscitation.

Within seven days of birth, 14 (3.4%) of the twin A and 18 (4.4%) of the twin B perished. Approximately 32.4% of the twins A and 33.9% of the twin B were admitted to the NICU. Prematurity (43.8%), septicemia (15.8%, 15.4%), IUGR (15.1%, 13.5%), low birth weight (13.0%, 14.1%), and asphyxia/hypoxia/RDS (8.4%, 10.3%) were the primary reasons for perinatal illness. The increased percentage of preterm deliveries in the current study might be because our patients have more obstetric and/or medical co-morbidities, which necessitate an early delivery.

Thirteen stillbirths (eight twin A (2%; six (1.5%) fresh, two (0.5%) macerated, and seven twin B (1.7%; two (0.5%) fresh, five (1.2%) macerated) and eight neonates that died within seven days after birth (eight twin A (3.4%) and eight twin B (4.4%)) were recorded in this study. In comparison to the first infant, there were more neonatal deaths in the second baby. It is well known that the second twin is usually more susceptible than the first. This was also noted in the current investigation, and more research is required to identify the contributing variables.

When comparing the bad outcome of twin A and twin B to their opposite compartment, neonates with a mother antepartum problem showed an increase of 2.3 folds (AOR = 2.3, 95% CI=1.61, 8.52) and 3.2 folds (AOR = 3.2, 95% CI: 1.08, 9.38), respectively. Furthermore, compared to their opposite compartment, neonates with mother intrapartum complications had 1.6 times (AOR = 1.6, 95% CI: 1.06, 3.37) more bad outcome of twin A and 9.5 folds (AOR = 9.5, 95% CI: 3.64, 24.76) more twin B complication. According to a Dessie study, there is a strong correlation between unfavorable birth outcomes and hypertension (AOR = 6.01, 95% CI: 2.43–14.87), residency (AOR = 2.46, 95% CI: 1.39–4.37), and PROM (AOR = 6.39, 95% CI: 2.52–16.16)[4].

Comparing twin A neonates born at gestational ages of 34–36+6, 37–38+6, and 39–40+6 weeks, respectively, to those born at gestational ages of 28–33+6 weeks, the likelihood of a bad outcome was 92%, 98%, and 98% lower. In comparison to a weight of ≥ 2500 grams, the poor outcome was increased 4.1, 22.6, and 9.8 times for newborns weighing 1500-2499, 1000-1499, and less than 1000 grams, respectively. This research indicates that additional work has to be done in the NICU to enhance preterm and LBW treatment and to prevent preterm delivery.

For twin B, the neonate delivered by cesarean section had a 55% lower chance of a poor perinatal outcome than the neonate delivered by SVD (AOR = 0.45, 95% CI: 0.23, 0.88), and the mother of multipara had a 47% lower chance of a poor perinatal outcome than the mother of primiparous (AOR = 0.53, 95% CI: 0.29, 0.96). According to a research carried out in Adama, twin newborns registered to mothers between the ages of 15 and 24 had four times the odds of having unfavorable perinatal outcomes (AOR = 4.1, 95% CI: 1.3, 12.5), in contrast to births recorded for women aged 35 and above [12]. Similar findings were seen in a few studies, which suggests that more research is needed to particularly address the role of maternal age in adverse perinatal outcomes in twin pregnancies, preferably with a population-based sample [30].

There were two (3.2%) TTTS, three (4.8%) congenital anomalies, fifteen (23.8%) co-twin fatalities, and forty-three (68.1%) sIUGR among the special problems of twin pregnancies. When compared to their opposite compartment, neonates with inherited twin complications had 8.7 times more complications (AOR = 8.7, 95% CI: 3.81, 20.01), while those with favorable maternal outcomes had a 47% lower chance of having a bad twin B perinatal outcome. Compared to a research conducted in Jimma, the co-twin death rate is lower[8], which could be attributed to ANC follow-up, early discovery of difficult pregnancies, and effective treatments. The rate of sIUGR is greater than that of a study conducted in Jimma[9], and it might be because two hospitals—TMH and TASH—have MFM units available.

6.1. Limitations and strengths of the study

6.1.1. Strength of the study

- All illegible subjects within the study region have been included in the research.
- This study establishes these hospitals' twin gestation data, adding to the body of knowledge already in existence.

6.1.2. Limitations of the study

- Since the current study was based on retrospective hospital data and did not include information on certain sociodemographic and maternal-related variables that may influence the feto-maternal outcomes in twin pregnancies, a future study that addresses all the pertinent variables in relation to the feto-maternal outcomes among twin pregnancies is warranted.
- Risk factors for twin pregnancies are not covered in the study.

7. CONCLUSION

The study concluded that there is a significant incidence of twin pregnancies in the region under investigation. Furthermore, there were substantial rates of maternal morbidity and perinatal morbidity and mortality linked to twin pregnancies.

8. RECOMMENDATION

More prospective studies are required to identify the risk factors for twin pregnancies and investigate the sociodemographic factors affecting the perinatal and maternal outcomes of these pregnancies.

Low birth weight and prematurity, which are the results of preterm labor, were the most frequent causes of perinatal death in this study. Therefore, efforts should be done during the antenatal period to prevent premature birth. Furthermore, enhancing current newborn services during this crucial time in their lives can greatly lower the related morbidities and fatalities.

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11. ANNEXES

11.1. Study Instruments and Tools

Structured checklist for study on Maternal and fetal outcome of twin pregnancy among women who delivered at three teaching hospitals, Addis Ababa, Ethiopia, 2022.

No	Question	Options
001	MRN	
002	Age in year	_____
003	Parity	☐ Primipara (Para-I) ☐ Multipara (Para II-IV) ☐ Grand multipara (Para $\geq$ V)
004	ANC history	☐ Yes ☐ No
005	Gestational age at delivery (Wks.)	☐ 28 ⁺⁰ -33 ⁺⁶ ☐ 34 ⁺⁰ -36 ⁺⁶ ☐ 37 ⁺⁰ -38 ⁺⁶ ☐ 39 ⁺⁰ -40 ⁺⁶ ☐ 41 ⁺⁰ -41 ⁺⁶ ☐ $\geq$ 42 ⁺⁰
006	Chorionicity	☐ Dichorionic diamniotic ☐ Monochorionic diamniotic ☐ Monochorionic monoamniotic ☐ Unknown
007	Fetal presentation	☐ Cephalic- Cephalic ☐ Cephalic-breech ☐ Cephalic-transverse ☐ Breech- Cephalic ☐ Breech-breech ☐ Breech-transverse ☐ Others
008	Mode of delivery	☐ Spontaneous ☐ Assisted Breech ☐ Instrumental vaginal delivery ☐ C/D

009	Delivery interval b/w 1 st and 2 nd twin	☐ <15 min ☐ 15-30 min ☐ ≥ 30 min
010	Indication of C/D in twin pregnancy	☐ Mal-presentation of leading twin breech ☐ Previous CS ☐ Fetal distress ☐ Non progress of labor ☐ Retained second twin ☐ Cord prolapse ☐ Prolonged pregnancy ☐ PIH ☐ PROM ☐ APH (abruption, placenta previa) ☐ MCMA
011	Antenatal complications encountered among Patients (you can select more than one)	☐ Anaemia ☐ Hyperemesis gravidarum ☐ APH (abruption, placenta previa) ☐ Hypertensive disorder ☐ Polyhydramnios ☐ PROM ☐ Gestational diabetes ☐ No associated complications
012	Complications inherent to twinning	☐ TTTS ☐ TRAP ☐ sIUFD
013	Intrapartum and postpartum maternal complications encountered among patients	☐ Preterm labor ☐ Primary PPH ☐ Sepsis ☐ Preterm LSCS ☐ Anemia ☐ Postpartum eclampsia ☐ Deep vein thrombosis ☐ No complication

Neonatal characteristics				
No			Twin A	Twin B
020	Birth weight (gms)	>2500 1500-2499 1000-1499 <1000	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
021	Sex	Male Female	☐ ☐	☐ ☐
022	APGAR score	0 1-3 4-6 >7	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
023	Neonatal outcome	Live births NICU admission Neonatal death in the 1 st wk. Still birth Fresh still born Macerated still born	☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
024	Causes of perinatal morbidity	Prematurity Low birth weight IUGR Birth asphyxia/hypoxia/RDS Septicemia Jaundice Anaemia Congenital malformations	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐