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Multiple Pregnancy and its Maternal Complications among Deliveries attending Nangarhar Univesity Teaching Hospital, Jalalabad, Afghanistan

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ABSTRACT

Multiple pregnancies are associated with an increased risk of obstetric complications as well as perinatal morbidity and mortality in developing countries because of the increased risk to both mother and baby. Therefore, the current study aimed to identify the maternal complications of multiple pregnancies among deliveries at Nangarhar University Teaching Hospital, Jalalabad, Afghanistan. A descriptive cross-sectional study was conducted on 442 mothers who gave multiple births at Nangarhar University Teaching Hospital, Jalalabad, Afghanistan, from March 2022 to September 2023 after obtaining ethical approval from the Institutional Review Committee (reference number: 10/02-15-2022). A non-probability-convenient sampling technique was used to select study participants. Data were collected using questionnaires from the hospital-based medical records of all participants. Those patients who were admitted to the obstetrics and gynecology ward for delivery with a clinical or ultrasound-confirmed diagnosis of multiple pregnancies after examination were included. The data were analyzed using the Statistical Package for Social Sciences (SPSS) version 26. A total of 22,409 births were recorded during this study at Nangarhar University Teaching Hospital; 442 were twin pregnancies, with a prevalence of 19/1000 births. The mean age of the study participants was 28.6 ± 5.3 years, while the mean age of gestation at the presentation was 36.5 ± 2 weeks. Among these, 425 (96.2%) births were twins, and 15 (3.4%) were triplets. The seven leading maternal complications of multiple pregnancies were postpartum hemorrhage (14.7%), preterm delivery (12.7%), preeclampsia (10.4%), antepartum hemorrhage (5.9%), urinary tract infection (5.9%), polyhydramnios (4.1%), and anemia (32.4%). The most common route of delivery was normal vaginal (78.5%). Multiple pregnancies are associated with a high risk of maternal complications, particularly postpartum hemorrhage, preterm labor, and preeclampsia; thus, maternal risks can be reduced by receiving adequate prenatal and postnatal care and early detection of maternal complications. Mothers carrying multiple pregnancies should receive immediate counseling regarding all the complications and should be kept under constant monitoring.

Keywords: Maternal Complications, Multiple Pregnancy, Singleton Pregnancy, Twin Pregnancy

INTRODUCTION

Multiple pregnancies and births are associated with more complications for both mothers and babies, resulting in higher rates of mortality and morbidity (Hibberd et al., 2022). When more than one fetus simultaneously develops in the uterus, it is called a multiple pregnancy. Twins are defined as two babies carried during one pregnancy; triplets are defined as three babies carried during one pregnancy; and high-order multiples are

defined as more than three babies carried at one time, such as quadruplets, quintuplets, or sextuplets (Clinic, 2023). The rate of multiple births has climbed by a third worldwide over the last four decades, from 9.1 per 1000 births in 1980 to 12.0 per 1000 live births in 2021. This means that one in 42 births, or 1.6 million twin births, occur each year (Beyene et al., 2022). The worldwide prevalence of multiple pregnancies varies from approximately 2–20 per 1000 live births (Fell & Joseph, 2012). This surprising increase in multiple pregnancies, particularly in higher-order multiple pregnancies, has been attributed to the increase in the use of ovulation-inducing agents and the development of assisted reproductive technologies (Wen et al., 2020), such as multiple embryo transfers or ovarian stimulation (Rissanen et al., 2019), and delaying childbearing until later in life, especially in developed countries(Lee et al., 2019). It is necessary to prevent these high-risk, artificially induced pregnancies (Rissanen et al., 2019). According to a recent study, over 80% of multiple gestations occurred in Asia or Africa (Beyene et al., 2022). Multiple pregnancies result from a complex interaction of different inherent biological and environmental factors, such as advanced maternal age, advanced parity, family history of multiple births, assisted reproductive technology, ovulation induction, use of oral contraceptives, and others, which are well-established risk factors for multiple pregnancies. Multiple fetal pregnancies are linked to a substantially higher risk for both the mother and the babies than singleton pregnancies (Murray & Norman, 2014). Multiple pregnancies are considered high risk for obstetric complications such as miscarriage, anemia, pregnancy-induced hypertension, postpartum hemorrhage, caesarean delivery, and postnatal morbidity. The risk of developing pre-eclampsia is about three times higher in twins' pregnancies and nine times higher in triplets' pregnancies compared to singleton pregnancies (Jayaraj & Remani, 2023). Preterm delivery is the main concern, as are its consequences for multiple pregnancies (Lam et al., 2001). Multiple-birth infants also have a substantially higher risk of perinatal mortality, and globally, multiple births account for 14% of all infant deaths (Doris, 1990). Multiple pregnancies carry an increased risk of a complete miscarriage. Furthermore, it is believed that 14% of multiple pregnancies spontaneously end. Multiple pregnancies significantly increase the risk of postpartum hemorrhage and antepartum hemorrhage due to the larger surface area of the placental bed.

Due to their rarity, there is a dearth of information regarding the maternal outcomes of higher-order multiples, such as quintuplets and quadruplets. In this group of women, prematurity is a significant issue as it can affect up to 98% of pregnancies. Collins et al. reported on 71 sets of quadruplets that gestational hypertension (32%), anemia (25%), urinary tract infections (14%), gestational diabetes (10%), and postpartum hemorrhage (21%) were frequent maternal complications (Murray & Norman, 2014). Maternal mortality linked to multiple pregnancies is typically 2.5 times higher than that of singleton pregnancies.

Approximately 83% of twin pregnancies have overall complications, compared to 25% of singleton pregnancies (Jayaraj & Remani, 2023). Moreover, the number of medical and surgical procedures, such as cesarean sections, increases with twin pregnancies. In addition, mothers carrying twins are almost six times more likely to require hospitalization for pregnancy-related issues compared to mothers carrying singletons, which results in higher medical costs (Beyene et al., 2022).

Hence, it is applicable to categorize twin pregnancies as high-risk pregnancies. Quick obstetric care helps to improve the outcome of the baby as well as reduce maternal morbidity and mortality. However, studies investigating multiple pregnancies and their maternal complications among deliveries at Nangarhar University Teaching Hospital in Jalalabad, Afghanistan, are lacking. Therefore, the present study was designed to

determine the maternal complications of multiple pregnancies among deliveries at Nangarhar University Teaching Hospital, Jalalabad, Afghanistan.

MATERIALS AND METHODS

Study Setting and Design

A hospital-based, retrospective descriptive cross-sectional study was conducted on 442 mothers who gave multiple births at Nangarhar University Teaching Hospital, Jalalabad, Afghanistan, during the time frame from March 2022 to September 2023 to assess the maternal complications of multiple pregnancies among deliveries at Nangarhar University Teaching Hospital after receiving ethical approval (referencing IRB no. 10/02-15-2022) from the Institutional Review Board (IRB), Faculty of Medicine, Nangarhar University. The inclusion and exclusion criteria were: 1) A woman who has multiple pregnancies and has given birth with complications. 2) A woman with multiple pregnancies attending the labor room or outpatient department after 20 weeks of gestation. 3) Antenatal women with multiple pregnancies who attended our department from March 2022 to September 2023. 4) All women who have multiple pregnancies and have given birth normally. 5) All women who have multiple pregnancies and undergo a Caesarean section. 1) Women who have multiple pregnancies but whose period of pregnancy was less than 20 weeks of gestation, and those women who have multiple pregnancies but do not have a complete medical record, were excluded from the study.

Sample Size and Sampling Technique

All mothers fulfilling the inclusion criteria were included in this study. The sample size for non-probability sampling was calculated by using a single population proportion formula $(n = z2 * p(1-p)/d2)$ to identify a representative sample with the following assumptions: Where **n** is the sample size, **p** is the prevalence of the outcome expressed as a proportion of 50%, $\mathbf{d^2}$ is the margin of error, which is 0.5 (5%) in this case, and 1.96 is the standard normal **z**-value corresponding to the 95% confidence interval (**CI**). The required minimum sample size was 384 participants. The sampling method chosen is non-probability convenience sampling for data gathering.

Calculation:

$$n = \frac{z^2 \times p(1-p)}{d^2} = \frac{(1.96)^2 \times 0.5(1-0.5)}{(0.05)^2} = 384$$

To increase the study power and cover the probable non-response rate, a 15% increase in the minimum required sample size is calculated to be: 0.15 x 384 = 57.6 ≈ 58. Therefore, the calculated number of participants to be selected was 384 + 58 = 442.

Data collection and patients' characteristics

Data were collected using questionnaires from the hospital-based medical records of all participants. The data contained demographic characteristics (age, residence, education, socioeconomic status, number of gravidities, gestational age), associated factors (history of hypertension, family history of multiple pregnancies, history of infertility, history of anemia, type of delivery, number of fetus, condition of the fetus, and type of genesis), as well as important maternal complications such as postpartum hemorrhage (PPH), preterm delivery, preeclampsia, antepartum hemorrhage (APH), urinary tract infection (UT), polyhydramnios, anemia, and ultrasonography findings. The data collectors received extensive training on the questionnaire and data

extraction techniques. The principal investigator routinely checked and monitored each questionnaire's consistency, completeness, and methods of data collection.

Statistical Analysis

Initial data were entered into an Excel spreadsheet and then exported to the Statistical Package for Social Sciences (SPSS) version 28.0. A descriptive analysis was conducted to examine the data, and the results were presented in terms of frequency and percentage.

RESULTS

Sociodemographic characteristics of study participants

During this study period, a total of 442 twin pregnancies were found, with a mean age of gestation at presentation of 36.5 ± 2 weeks. The total number of births during this period was 22,409, with a prevalence of 19/1000 births of twin pregnancies. 425 (96.2%) of these births were twins, 15 (3.4%) were triplets, and 2 (0.5%) were quadruplets. The median gestational age at delivery was 37 weeks. The statistical data on the baseline information of the study participants is shown in Table 1.

Table 1. Sociodemographic characteristics of study participants [N= 442].

Variables	Categories	Frequency	Percentage (%)
Age (in years)	17-25 26-35 35-45	134 273 35	30.3 61.8 7.9
Residence	Urban Rural	270 172	67.6 34.1
Education	Educated Uneducated	105 337	23.8 76.2
Income group	High Medium Low	94 171 177	21.3 38.7 40.0

Obstetric characteristics and Factors associated with multiple pregnancies

Regarding obstetric characteristics, the mean parity was 1.75 (SD ± 0.43) and the majority of mothers (96.2%) had 2 paras. Approximately 87.3% of the mothers gave birth at term, and 12.7% of mothers gave birth before term (less than 37 completed weeks). 78.5% of the mothers gave birth through spontaneous vaginal delivery, and 21.3% of them gave birth by caesarean section. Among 442 mothers, 85.7% had alive children, 7.5% had dead children, and the remaining 6.8% had one alive and one dead child. The most common route of delivery was normal vaginal (78.5%). The statistical data on the obstetric characteristics and factors associated with multiple pregnancies are shown in Table 2.

Table 2. Obstetric characteristics and Factors associated with multiple pregnancies [N= 442].

Variables	Categories	Frequency	Percentage (%)
Type of Delivery	Normal	347	78.5
	Cesarean	94	21.3
	Assisted	1	0.2
Gravidities	Prime gravida	110	24.9
	Multigravida	322	75.1
Number of fetuses	Twin	425	96.2
	Triplets	15	3.4
	Quadruplets	2	0.5
Condition of fetus	Alive	379	87.7
	Death	33	7.5
	One alive & one death	30	6.8
Type of genesis	Mono Chorionic	143	32.4
	Di Chorionic	299	67.6
History of hypertension	Present	40	9.0
	Absent	402	91.0
Family history of multiple pregnancies	Present	7	1.6
	Absent	435	91.0
History of infertility	Present	9	2.0
	Absent	433	98.0
History of anemia	Present	15	3.4
	Absent	427	96.6

Maternal complications among study participants

Totally 254 (57.5%) out of the 442 multiple birth records had at least one adverse maternal outcome. The most common maternal complications in this study were postpartum hemorrhage (14.7%), followed by preterm delivery (12.7%), Preeclampsia (10.4%), antepartum hemorrhage (5.9%), urinary tract infection (5.9%), polyhydramnios (4.1%), and anemia (3.8%). Table 3 presents these maternal complications.

Table 3. Maternal complications among study participants [N =442].

Variables	Categories	Frequency	Percentage (%)
Maternal complication	Present	254	57.5
	Absent	188	42.5
PPH	Present	65	14.7
	Absent	377	85.3
Preterm delivery	Present	56	12.7
	Absent	386	87.3
Preeclampsia	Present	46	10.4
	Absent	396	89.6
APH	Present	26	5.9
	Absent	416	94.1
UTI	Present	26	5.9
	Absent	416	94.1
Polyhydramnios	Present	18	4.1
	Absent	424	95.9
Anemia	Present	17	3.8
	Absent	425	96.8
PPH, Postpartum Hemorrhage; APH, Antepartum Hemorrhage; UTI, Urinary Tract Infection.			

DISCUSSION

Multiple pregnancies are associated with more complications for both mothers and babies, resulting in higher rates of mortality and morbidity (Hibberd et al., 2022). The current descriptive cross-sectional study findings reveal the most common complications of multiple pregnancies during deliveries. To the best of our knowledge, this was the first study to investigate these types of findings. As a result, our study was conducted to identify the maternal outcomes of multiple pregnancies among deliveries at Nangarhar University Teaching Hospital, Jalalabad, Afghanistan.

In this study, a total of 22,409 births were recorded during the study period at Nangarhar University Teaching Hospital. Among 442 mothers, 105 (23.8%) were educated and 337 (76.2%) were uneducated. 425 (96.2%) of the total number of patients with multifetal gestation had twin pregnancies, 15/442 (3.4%) had triplet pregnancies, and 2/442 (0.5%) had quadruplet pregnancies. According to the current study, the mean age calculated was 28.6 years. It was lower than that reported by Aziz et al.(Aziz & Mulhim, 2001).

In his study, the mean age was 31 years. Most studies have revealed that the incidence of twin pregnancies increases with advancing maternal age up to 35 years, after which the rate declines (Hamilton, Martin, & Sutton, 2004).The lower mean age in our study group as compared to international data may be due to differences in the ethnicity or culture of marriages at an early age in our society. As for the frequency of multifetal pregnancy with regards to parity, our study found that the highest frequency was among multipara (75.1%) and the lowest was in primigravidae (24.9%). This highest frequency may be because most of our patients were in the older age group, and they were mostly multi-para.

This finding is in contrast to that reported by Jayaraj and Remani P. S., who found that the highest incidence was among primigravidae compared to multipara. The highest incidence may be because most of the patients were in the younger age group, and they were mostly primigravidae (Jayaraj & Remani, 2023). Our study reported that the highest frequency was for twins' pregnancy (96.2%), and the frequency for triplets was 3.4%. The present study also revealed that dichorionic twin pregnancies had the highest frequency (67.6%), followed by monochorionic twins (32.4%). These findings are comparable with the findings reported in the previous studies(Jayaraj & Remani, 2023).

In this study, the majority of twin births (94.9%) were recorded among mothers within the age range of 26–35 years. However, in a study conducted in Ethiopia, it was found that more than half of twin births occurred among people under the age of 24. Such variations in the sociodemographic characteristics related to twin pregnancies might be partly explained by the differences in socio-cultural issues such as early marriage (Tilahun et al., 2015). Regarding the mode of birth among twin pregnancies, it was revealed that 78.5% of mothers gave birth through normal vaginal deliveries, while 21.3% required a caesarean section. These findings are consistent with those of studies conducted by Beyene et al. and Chauhan et al. (Beyene et al., 2022; Chauhan et al., 2010)

In our study, the frequency of polyhydramnios was 4.1%. The frequency was higher when compared to a study published previously(Jayaraj & Remani, 2023). In the present study, preterm delivery complicated 12.7% of multifetal pregnancies. The findings were comparable to those obtained from the studies conducted by Naila Nasr Malik (Malik, 2014). The findings were lower when compared to the studies conducted by Bhattacharya et al. (44%) and Bangal et al. (88%) (Bangal, et al. 2012). In this study, the frequency of pregnancy-induced hypertension was 10.4%. These findings are comparable with those of studies conducted by Laine K et al.

(12.9%) and Remani P. S. (12%) (Jayaraj & Remani, 2023; Laine et al., 2019). Our study reported that anemia was the most common complication of a multifetal pregnancy (32.4%). These findings are in contrast to those reported by Deepthi et al. (2015), who found that the proportion of anemia was only 16.6% of the patients (Deepthi, Pradeep, & Lalitha, 2015). The higher rate of anemia in our study may be explained by the delayed first visit, delayed medical checkup, and inadequate treatment during the antenatal period. The present study showed that postpartum hemorrhage (PPH) occurred in 14.2% of patients, which was less than what was reported by Chowdhury S et al. (18.9%), which may be due to the prophylactic use of misoprostol in addition to oxytocin after delivery in our hospital in all multifetal pregnancies (Chowdhury & Hussain, 2011). Regarding the frequency of ante-partum hemorrhage among multiple pregnancies, it was found that 5.9% of mothers had ante-partum hemorrhage, which is comparable with the findings reported in the previous studies (Chowdhury & Hussain, 2011; Dubey et al,. 2018). Whereas Shetty MB et al. reported a much higher frequency of antepartum hemorrhage in multiple gestations (32.2%) (Shetty et al., 2016). Furthermore, in our study, we found out that 5.9% of multiple pregnancies were complicated by urinary tract infections. The findings of this study, however, are in agreement with the findings reported in the previous studies(Jayaraj & Remani, 2023).

This study had several limitations. First, as the study was based on retrospective hospital medical records, it was not feasible to obtain information on certain sociodemographic and maternal-related variables that might have an impact on the maternal outcomes of multiple pregnancies. This warrants future research that takes into consideration all relevant variables related to the maternal outcomes of multiple pregnancies. Second, as the focus of this study was on maternal outcomes in multifetal pregnancies and fetal-related outcomes were not available, the fetal outcomes were not included in this study. This suggests that further studies are needed. Third, the data were collected from a single health center, and the study has a relatively small sample size; therefore, it may not be truly representative of all Afghan women. However, a larger sample size may have increased our ability to analyze different individual factors more reliably. Finally, it was a descriptive cross-sectional design, and we failed to determine the association and causality between multiple pregnancies and their complications and risk factors; therefore, further analytical study is needed.

CONCLUSION

Multiple pregnancies are associated with a high risk of maternal complications, particularly postpartum hemorrhage, preterm labor, and pregnancy-induced hypertension. Postpartum hemorrhage, preterm labor, and pregnancy-induced hypertension are the well-known causes of maternal mortality; thus, both maternal and fetal risks can be reduced by receiving adequate prenatal and postnatal care and early detection of maternal and fetal complications. Mothers carrying multiple pregnancies should receive immediate counseling regarding all the complications and should be kept under constant monitoring. Further study is needed to better understand the best approach to screening for both maternal and fetal complications during multiple pregnancies and managing them accordingly.

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Conflict of Interest: The authors declare that they have no conflict of interest.

Authors Contributions: Sherzad and Rahimi conceptualized the study topic, drafted the protocol, and designed the questionnaires. Rahimi and Kamawal provided the raw data for the study. Sherzad did statistical analyses. Rahimi and Sherzad wrote the first draft of the manuscript, and Sherzad critically revised the final draft of the manuscript. All authors have read and approved the final version of the manuscript.

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