ORIGINAL ARTICLE

EPIDEMIOLOGICAL PROFILE AND FETO-MATERNAL OUTCOME OF TWIN PREGNANCY: A PROSPECTIVE OBSERVATIONAL STUDY

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Background: Twin pregnancies are complex and have often been associated with various complications affecting both mother and baby. Understanding the different maternal and foetal outcomes can provide crucial insights for healthcare practitioners. The aim was to determine the maternal and foetal outcomes of twin pregnancies and understand the factors influencing these outcomes. **Methods:** A prospective observational study was conducted with women experiencing twin pregnancies of more than 28 weeks gestation. Patients were followed up until 7 days postnatally and the outcomes were analyzed against various parameters such as age, foetal presentation, and mode of delivery. Statistical software SPSS V 26 was utilized for data analysis and ethical considerations were duly met. **Results:** A total of 22,922 deliveries were recorded, with 195 being twin pregnancies. Most twin deliveries were among women aged 20–29 years, with nearly half being first pregnancies. Major findings include a prevalence of preterm deliveries (59.6%), a high incidence of maternal anaemia (54%), and a significant number of neonatal intensive care unit (NICU) admissions (45.45%). No statistically significant difference was observed in the feto-maternal outcomes about the mode of delivery or booking status. **Conclusion:** Twin pregnancies are associated with a higher likelihood of preterm deliveries, maternal anaemia, and newborn NICU admissions. Importantly, the mode of delivery and booking status did not significantly affect the feto-maternal outcomes. This study underscores the need for individualized patient care in managing twin pregnancies.

Keywords: Twin Pregnancies; Maternal Outcomes; Foetal Outcomes; Maternal Anaemia; Caesarean Section; Low Birth Weight; Primigravida

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INTRODUCTION

Multiple pregnancies have considerable implications for maternal and perinatal risks on a global scale, impacting society in terms of social and economic factors.[1] Over the past decades, the incidence of multiple gestations has notably increased, mainly attributed to the growing use of fertility drugs for ovulation induction, superovulation, and Assisted Reproductive Technologies (ART) like in vitro fertilization. While naturally occurring, twin pregnancies occur at a rate of approximately 1 in 80 births, higher-order multifetal gestations are rare. However, advancements in infertility treatments have contributed to a decline in higher-order multifetal births. The incidence rate of multiple pregnancies has varied across different regions worldwide.[2–4]

Historically, twin pregnancies constituted only 1% of all pregnancies, indicating that human reproduction is naturally programmed to support and nurture a single foetus at a time.[5] However, between 1980 and 2001, there was an observed increase in the rates and numbers of twin and higher-order multifetal gestations.[6] The prevalence of twin births has been reported to vary between 2 and 20 per 100 live births. While specific data on multiple and twin gestations in Pakistan are limited, some estimates have been derived from other sources. One approach based on Hellin's law, which assumes that the probability of having twins is inversely proportional to the square root of the population, suggests frequencies of twins, triplets, and quadruplets:[7]

• Twins: Approximately 1 in 89 births
• Triplets: Approximately 1 in 7,921 births
• Quadruplets: Approximately 1 in 704,969 births

Another source reports that the lowest rates of twin births are found in certain regions, including South America, South Asia (India, Pakistan, Bangladesh, Nepal), and Southeast Asia, with only 6–9 twin sets per 1,000 live births.[8] This suggests that the frequency of twin births in these areas ranges from 0.6–0.9%. Utilizing these estimates, it can be inferred that the frequency of multiple gestations in Pakistan falls somewhere between 0.6% and 1.1%, while the frequency of twin gestations lies somewhere between 0.6% and 0.9%. However, these figures are

approximations and might not fully represent the actual situation in Pakistan due to other influencing factors, such as fertility treatments, maternal age, genetics, and environmental influences. Reported frequencies of twin pregnancies in different parts of Pakistan have varied from 1.5–5%[9–11], but caution should be exercised in interpreting these findings as they are primarily derived from single-centre retrospective studies with limited sample sizes. For example, a retrospective study from India reported an incidence of twin pregnancies of 1.32% (142 out of 10,682 pregnancies).[12]

Twin pregnancies often lead to specific common outcomes, including early labour and delivery, low birth weight, pregnancy-induced hypertension, anaemia, postpartum haemorrhage, twin-to-twin transfusion syndrome, growth discordance, and perinatal mortality. These outcomes can have serious consequences for both the infants and mothers, necessitating regular antenatal care and close monitoring during pregnancy and delivery. In light of this, this study aimed to investigate the frequency and nature of fetomaternal outcomes in twin pregnancies delivered at our hospital.

MATERIAL AND METHODS

This study was a prospective observational study aimed at determining the maternal and foetal outcomes of twin pregnancies. and the selected participants were pregnant women carrying twins beyond the 28th week of pregnancy, who were receiving prenatal care either at an outpatient clinic or in the hospital ward. Those carrying more than two foetuses, pregnancies below the 28th week, as well as patients with a known medical history of persistent hypertension, diabetes, renal diseases, or other chronic conditions were not considered for this study. Furthermore, cases where the childbirth occurred outside of the hospital setting were not included in this research Patients with twin pregnancies were followed up until the termination of pregnancy and were observed for at least 7th postnatal days to assess the feto-maternal outcomes. The outcomes were described in frequencies and percentages, and the outcomes were stratified against age, foetal presentation, mode of delivery, etc. Post-stratification chi-square test was used to analyze the data, with a significance level of $p<0.05$. Data were collected using a structured questionnaire, which included demographic information, medical history, and details of the pregnancy and delivery. The data were analyzed using statistical software, and the results were presented in tables and graphs. Ethical considerations were taken into account, and informed consent was obtained from all participants. The study was approved by the hospital's ethical committee.

RESULTS

This prospective observational study examined the medical records of patients who delivered babies at our teaching hospital during the two years from 2021 to 2022. A total of 22,922 deliveries were recorded during this time, with 195 of these pregnancies (0.849%) being twin pregnancies. From the pool of twin pregnancies, 154 patients were eligible for inclusion in the study, meeting the predefined criteria. Among the patients with twin deliveries, the majority (71.8%) fell within the age group of 20–29 years, which corresponds to the highest proportion of reproductive-age women delivering at our hospital.

Regarding pregnancy history, nearly half (48.3%) of the patients with twin deliveries were primigravida, indicating that this was their first pregnancy. Furthermore, the booked and unbooked status of patients with twin deliveries did not show any significant difference, with 52% being unbooked and 48% being booked. Within the study population, a considerable proportion (78%) belonged to a low socioeconomic status, while the majority of patients (71.5%) identified as housewives.

In terms of gestational age at delivery, a significant number (59.6%) of twin pregnancies were delivered between 32 and 36 weeks of gestation, indicating a prevalence of preterm deliveries. Only a small fraction (9.2%) of twin pregnancies went beyond 37 weeks of gestation. An overwhelming majority of the pregnancies (85%) were spontaneous conception, and the remaining were a result of assisted fertility techniques.

Based on the distribution of chorionicity, the most common type observed was Di-amniotic Dichorionic (65%), followed by Monochorionic di-amniotic (33.5%), and the least common was Monochorionic Monoamniotic (2.5%). Spontaneous labour was the predominant mode of delivery, occurring in 71% of cases, while 25% of patients underwent spontaneous vaginal delivery. Assisted breech delivery was conducted in 11.6% of cases due to the second twin presenting in a breech position, and 63.4% of patients underwent caesarean section.

Analyzing the presentation of twins in utero, the most frequent presentation was vertex-breech (38.8%), followed by vertex-vertex (22%), breech-breech (22%), breech-vertex (15%), while Transverse cephalic and transverse-transverse presentations were the least common.

During the study, some patients experienced multiple complications. Maternal anaemia (54%) emerged as the most common complication, followed by preterm labour leading to preterm delivery, affecting 72.3% of patients. Other associated complications included premature rupture of

membranes (PROM) in 23% of cases, pregnancy-induced hypertension in 19%, post-partum haemorrhage in 7.2%, placental abruption in 4.8%, intrauterine growth restriction (IUGR) in 3.8%, gestational diabetes in 3.5%, among others. Assessing the foetal outcomes, out of 308 newborn babies, 140 (45.45%) required admission to the neonatal intensive care unit (NICU).

Low birth weight was observed in 71% of newborns, while 62% of newborns had an APGAR score greater than 7 at 5 minutes, and 38% had an APGAR score below 7 at 5 minutes. Perinatal death occurred in 20 foetuses, accounting for 6.49% of the cases. When stratified by mode of delivery, and booking status, no statistically significant difference was observed in the feto-maternal outcomes of twin pregnancies.

DISCUSSION

Even with the improvements in perinatal care, multiple pregnancies, including twins and higher-order pregnancies, continue to pose a significant challenge to obstetricians today. These types of pregnancies are associated with an elevated risk for both the mother and the unborn child due to various complications that may arise during the antepartum, intrapartum, and postpartum periods. These complications could lead to long-term developmental issues.[13]

The last twenty years have seen an uptick in multiple gestations due to the advancement and increased usage of assisted reproductive technologies. Indian studies conducted since the 1970s indicate a maternal twinning rate ranging from 9 to 16 per 1000 births.[13,14]

Our research suggests that 85% of these instances were spontaneous conceptions, while 15% resulted from ovulation induction procedures. The data reveal that the potential for maternal and perinatal morbidity and mortality in a low-resource setting is higher among twin births, indicating that twin pregnancies inherently possess elevated risk levels for both the mother and neonates.

Interestingly, we observed the highest incidence in the 20–29 age group, constituting 71.8% of the total cases. The lowest incidence, however, was found in women over 30 years of age, comprising only 4.35% of the total cases. First-time mothers, or primigravida, were more likely to encounter these incidents. Despite receiving regular antenatal check-ups and comprehensive ultrasound examinations, the study group experienced a high preterm delivery rate at 72%, which is in line with the figures presented by other studies ranging from 29–88%.[13,15,16]

Antepartum complications often linked to twin pregnancies, as shown by our research, include anaemia (54%), pre-eclampsia (19%), and preterm deliveries (72.3%). These figures, however, vary when compared to other studies. For example, Rizwan and Colleagues showed that pre-term labour, anaemia and pregnancy-induced hypertension were the commonest maternal complications observed in twin pregnancies.[17] On the other hand, a lesser incidence of anaemia in twin pregnancies has also been reported.[18,19]

As a general rule, the odds ratio for the incidence of twin gestation compared to singleton pregnancies is 2.6.[19] In our study, we noted a higher rate of 19% of pre-eclampsia while the reported incidence of eclampsia varies from 12–26%.[13,19] Furthermore, 63.4% of the participants underwent a caesarean section, a figure that aligns with the findings of other studies.[13,20,21]

It is important to note that no maternal mortality was observed in our study. However, admission to the Neonatal Intensive Care Unit (NICU) was necessary in 65.22% of the cases. The study also recorded a perinatal mortality rate of 6.49%, which is less than the rates reported in other research studies.[13,22]

Limitations of the study: Overall, this study provides valuable insights into the characteristics and outcomes of twin pregnancies in our hospital setting, highlighting important factors that may impact maternal and foetal health during such pregnancies. Further research and interventions may be warranted to improve the care and management of twin pregnancies, particularly those with associated complications.

Here are several limitations of this research that could influence its applicability to a wider population:

Non-random sample: Twin studies' outcomes may not extend to the broader population due to non-randomized selection. The growth conditions in twin pregnancies differ from those in singleton pregnancies since two foetuses are concurrently developing. This constraint indicates that the study's conclusions may not be relevant to all pregnant women.

Precise selection criteria: The research disregarded patients with triplet or higher-order multiple pregnancies, those with a gestational age of under 28 weeks, and those with known chronic illnesses. These stringent selection parameters could confine the findings' applicability to a larger twin pregnancy population.

Potential for participation bias: Numerous twin registries rely on twins' voluntary participation. This dependence could introduce a selection bias, as twins who opt to participate might differ in characteristics or experiences from those who refrain. This could affect the broad applicability of the findings.

Misconceptions and overstatement of results: Twin studies' results are frequently misconstrued, misread,

and overly emphasized, by both media and some serious scientists who publish their work. This can result in the propagation of incorrect or inflated information, influencing the results' wider applicability.

Outdated assumptions: Modern twin studies continue to depend on assumptions made in the 1920s, many of which are fundamentally flawed. This implies that the study's core assumptions may not sufficiently capture the intricacies of twin pregnancies, which could affect the findings' wider applicability. Overall, several limitations of this study, including the non-random sample, precise selection criteria, potential for participation bias, misconceptions and overstatement of results, and outdated assumptions, could affect the applicability of the results to a larger twin pregnancy population.

CONCLUSION

The study concludes that twin pregnancies, especially in the age group of 20–29, tend to be associated with a higher likelihood of preterm deliveries, maternal anaemia, and newborn NICU admissions. Despite the complexity associated with twin pregnancies, the mode of delivery and booking status don't significantly impact feto-maternal outcomes, indicating that each case should be evaluated individually based on its specific characteristics and complications. This information could be vital for medical practitioners to improve their approach and patient care for twin pregnancies.

AUTHORS' CONTRIBUTION

AI: Study conceptualization, data collection, write-up. IS: Data analysis, Data interpretation. AAS, MUI: Literature search. HJ, AB: Data collection

REFERENCES

1. Edmonds DK, editor. Dewhurst's textbook of obstetrics & gynaecology. Blackwell Publisher; 2007.
2. Mathew R, Wills V, Abraham J. Maternal determinants and fetal outcome of twin pregnancy: a five-year survey. Int J Reprod Contracept Obstet Gynecol 2017;6(6):2459–66.
3. Jahanfar S, Lim K. Adverse maternal outcomes and birth weight discordance in twin gestation: British Columbia, Canadian data. Int J Womens Health 2017;9:871–8.
4. Santana DS, Silveira C, Costa ML, Souza RT, Surita FG, Souza JP, *et al*. Perinatal outcomes in twin pregnancies complicated by maternal morbidity: evidence from the WHO Multicountry Survey on Maternal and Newborn Health. BMC Pregnancy Childbirth 2018;18(1):1–11.
5. Jones HW. Multiple births: how are we doing? Fertil Steril 2003;79(1):17–21.
6. Blickstein I, Keith LG, editors. Multiple pregnancy: epidemiology, gestation, and perinatal outcome. CRC Press; 2005.
7. American College of Obstetrics & Gynecology. Multiple Pregnancy [Internet]. ACOG; 2023 [cited 2023 Jul 31]. Available from: https://acog.org/womens-health/faqs/multiple-pregnancy
8. ESHRE Capri Workshop Group. Multiple gestation pregnancy. Hum Reprod 2000;15(8):1856–64.
9. Zulfiqar A, Sadaf M, Abbasi A, Ashraf S, Zulfiqar OA, Sadaf M, *et al*. Perinatal Outcome of Twins Delivered Vaginally in a Tertiary Care Hospital. J Rawalpindi Med Coll 2021;25(1):66–71.
10. Ramzan M, Yasmeen F, Afzal S, Ghani S, Mahmood S, Syeda BR. Frequency of Multiple Gestations in Kohat. Pak Armed Forces Med J 2022;72(5):1779–82.
11. Aziz S, Soomro N. Twin births and their complications in women of low socioeconomic profile. J Pak Med Assoc 2012;62(11):1204–8.
12. Kundariya KR, Shah JM, Mewada BN, Shah MM, Patel AS. Fetomaternal Outcome in Twin Pregnancy. J South Asian Fed Obstet Gynaecol 2023;14(6):663–6.
13. Akhter S, Islam M, Zaman L, Alam ST, Banu FA. Fetomaternal Outcome of Patients with Multiple Pregnancy: A Single Centre Experience. Sch Int J Obstet Gynec 2022;5(11):522–6.
14. Smits J, Monden C. Twinning across the developing world. PLoS One 2011;6(9):e25239.
15. Bangal VB, Patel SM, Khairnar DN. Study of maternal and fetal outcome in twin gestation at a tertiary care teaching hospital. Int J Biomed Adv Res 2012;3(10):758–62.
16. Chowdhury S, Hussain MA. Maternal complications in twin pregnancies. Mymensingh Med J 2011;20(1):83–7.
17. Rizwan N, Abbasi RM, Mughal R. Maternal morbidity and perinatal outcome with twin pregnancy. J Ayub Med Coll Abbottabad 2010;22(2):105–7.
18. Spellacy WN. Antepartum complications in twin pregnancies. Clin Perinatol 1988;15(1):79–86.
19. Spellacy WN, Handler AR, Ferre CD. A case-control study of 1253 twin pregnancies from a 1982-1987 perinatal data base. Obstet Gynecol 1990;75(2):168–71.
20. Qazi G. Obstetric and perinatal outcome of multiple pregnancy. J Coll Physicians Surg Pak 2011;21(3):142–5.
21. Chittacharoen A, Singhakun D, Ayudhya NI. Pregnancy outcome of twin pregnancy in Ramathibodi Hospital. J Med Assoc Thai 2006;89(4):S76–80.
22. Bonet M, Brizuela V, Abalos E, Cuesta C, Baguiya A, Chamillard M, *et al*. Frequency and management of maternal infection in health facilities in 52 countries (GLOSS): a 1-week inception cohort study. Lancet Glob Health 2020;8(5):e661–71.

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