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Original Research Article

A comprehensive analysis of twin births: clinical characteristics, morbidity trends, and risk determinants

Nazma Parvin[1]*, Begum Sharifun Naher[2], Kazi Farhana Binta Shamim[3], Golam Riad Chowdhury[4]

[1]Department of Pediatrics, Central Drug Addiction Treatment Centre, Dhaka, Bangladesh
[2]Department of Neonatology, Green Life Hospital, Dhaka, Bangladesh
[3]Department of Pediatrics, Sylhet M. A. G. Osmani Medical College Hospital, Sylhet, Bangladesh
[4]Department of Marketing, Incepta Pharmaceuticals Limited, Dhaka, Bangladesh

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***Correspondence:**
Dr. Nazma Parvin,
E-mail: drnaaz2005@gmail.com

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ABSTRACT

Background: Twin births are often associated with increased risks and complications compared to singleton births. This study aims to analyze the clinical profile, morbidity pattern, and risk factors associated with twin births, focusing on maternal characteristics, neonatal outcomes, and the prevalence of conditions such as low birth weight (LBW) and preterm births.
Methods: This hospital-based observational study was conducted at a tertiary care center, involving 25 mothers who had given birth to twins and their 50 neonates. The study assessed maternal age, antenatal care, parity, medical history, and neonatal outcomes including birth weight, gestational age, respiratory and cardiac parameters, and overall health status. Data were collected through medical records and direct observations in the neonatal intensive care unit.
Results: The majority of mothers (64%) were aged between 21-30 years, with a mean age of 24.8 years. A significant proportion (92%) had regular antenatal visits, and 96% were multiparous. The majority of neonates (68%) were aged ≤12 hours at assessment, with a near-equal distribution between very low birth weight (VLBW) and LBW. Preterm births were common, affecting 84% of the neonates. Respiratory challenges were evident, with 62% of neonates having SpO_2 levels below 94%. The mortality rate among the neonates was 32%.
Conclusions: The study highlights the high-risk nature of twin pregnancies, characterized by a significant prevalence of LBW, VLBW, and preterm births. The findings emphasize the need for enhanced prenatal care and specialized neonatal interventions. The high mortality rate among neonates indicates the critical need for targeted strategies to improve neonatal outcomes in twin pregnancies. These insights are crucial for informing clinical practices and developing comprehensive care protocols for managing twin pregnancies and their associated risks.

Keywords: Low birth weight, Very low birth weight, Twinning, Multi-pregnancy, Preterm birth

INTRODUCTION

Twins have long been a subject of both fascination and extensive research, dating back to ancient times. The clinical profile, morbidity patterns, and risk factors associated with twin births are complex and multifaceted. Historically, twin births have been associated with significant challenges. A report from the Dublin Lying-in Hospital in 1784 highlighted the high mortality rates among twins, noting that 'one-half of twins die and near one-third are stillborn'.[1] In recent times, despite advancements in medical care, twins still face increased risks compared to singletons, including gestational complications like intrauterine growth restriction (IUGR) and preterm birth.[2-4] Perinatal mortality rates remain

disproportionately high in twin babies, being four times higher than in singletons.[5]

The incidence of twinning varies significantly across the globe, from as low as 1.3 in 1,000 births in Japan to between 49 and 53 per 1,000 births in Nigeria.[6-9] In Europe and the United States, the typical twin birth rate ranges between 9 and 20 per thousand.[10] This variation underscores the influence of geographical and possibly genetic factors in twin births. A study across the developing world shows a low natural twinning rate in South and South-East Asian regions, contrasting with the higher rates observed in other parts of the world.[7]

Globally, preterm births are a significant concern, with about 15 million neonates born preterm annually, predominantly in Asia and Africa.[11,12] These preterm births account for a substantial proportion of neonatal deaths and are a leading cause of death in children under five years of age.[13] In developing countries, neonatal mortality constitutes over half of the infant mortality rate.[14] This highlights the urgency of addressing twin birth complications to improve overall infant survival rates.

The health, mortality, and management of twin pregnancies have garnered considerable attention over the last two decades. While it is known that twins face increased risks of adverse outcomes, the exact magnitude of these risks, especially when compared with singletons of the same gestational age, remains less clear.[15-17] The number of twin births has doubled in the last 25 years, with more than 3 percent of newborns now being twins. A significant number of these require tertiary level hospital care, including NICU support, due to complications like prematurity and low birth weight (LBW).

This study's findings on the risk factors of twin pregnancies and the epidemiological features of twins at birth, along with their clinical implications, will be instrumental in planning specialized care patterns for the prevention and management of twin birth complications. This study aims to elucidate the patterns of gestational age, size at birth, and the mortality and morbidity patterns of twins at neonatal age. Identifying risk factors for twin births is crucial for targeted interventions and preventive measures. Despite numerous studies on twin pregnancies, there remains a gap in data regarding the risk factors and clinical profiles of twin babies.

METHODS

This hospital-based observational study was conducted at the Neonatal Intensive Care Unit (NICU) and Special Care Neonatal Unit (SCANU) of Sir Salimullah Medical College and Mitford Hospital, Dhaka, Bangladesh. The study spanned from January 2017 to June 2017.

The study population comprised all inborn and out born twin newborns admitted to the NICU and SCANU in the Department of Neonatology of SSMC and MH during this period.

The sample size for this study included 25 mothers who had given birth to twins, resulting in a total of 25 pairs of twins. The inclusion criteria were strictly adhered to, encompassing both inborn and out born twin newborns admitted to the NICU and SCANU. However, certain exclusions were made to maintain the specificity of the study.

These exclusions were singleton births and cases where only one twin was admitted to the units. This approach ensured a focused and relevant study group, aligning with the objectives of the research to comprehensively analyze the clinical characteristics, morbidity trends, and risk determinants associated with twin births. The data was expressed in numbers and percentage.

RESULTS

The majority of the mothers (64%) were aged between 21-30 years, with a mean age of 24.8 years (SD=4.8). A smaller proportion of the mothers were aged≤20 years (28%) and >30 years (8%). Regarding antenatal care, a significant majority (92%) had regular antenatal visits, while only 8% had irregular visits. In terms of parity, nearly all mothers (96%) were multiparous, with only one participant (4%) being nulliparous.

Table 1: Distribution of participants by baseline maternal characteristics (n=25).

Maternal characteristics	N	%
Maternal age (years)		
≤20	7	28
21-30	16	64
>30	2	8
Mean±SD	24.8±4.8	
Antenatal care		
Regular	23	92
Irregular	2	8
Parity		
Nulliparity	1	4
Multiparty	24	96

Table 2: Distribution of participants by maternal medical history (n=25).

Maternal medical history	N	%
Hypertension	1	4
Diarrhoea	1	4
Gestational diabetes mellitus	1	4
Pre-eclampsia	2	8
Poor health	1	4
Family history of multiple gestation	1	4
No known medical history	18	72

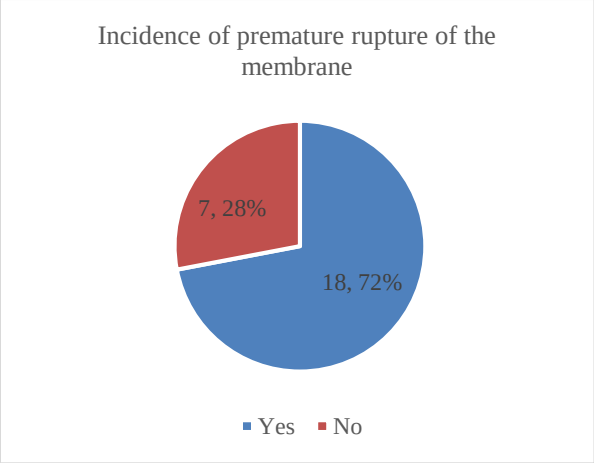

Figure 1: Distribution of PROM incidence among participants (n=25).

The majority (72%) of the mothers had no known medical history. Among those with specific medical conditions, 4% had hypertension, 4% experienced diarrhea, 4% had gestational diabetes mellitus, and 4% reported poor health. Notably, pre-eclampsia was observed in 8% of the participants (2 mothers), and a family history of multiple gestations was reported in 4% of cases. Out of the 25 mothers, a significant majority, 72% (18 participants), experienced premature rupture of the membrane (PROM). Conversely, 28% (7 participants) did not experience PROM.

Table 3: Age and gender distribution among the neonates (n=50).

Variables	N	%
Age (in hours)		
≤12	34	68
13-24	6	12
>24	10	20
Mean±SD	26.4±56.3	
Sex		
Male	22	44
Female	28	56

The age distribution shows that a majority of the neonates (68%, 34 neonates) were aged ≤12 hours. Those aged between 13-24 hours constituted 12% (6 neonates), and those older than 24 hours accounted for 20% (10 neonates).

The mean age was 26.4 hours, with a standard deviation of 56.3 hours. In terms of gender distribution, 44% (22 neonates) were male, and 56% (28 neonates) were female.

The majority of twin pairs, 68% (17 pairs), were of the same sex, while 32% (8 pairs) were of different sexes. The blood group distribution among the twin pairs shows that 76% (19 pairs) of the twins had the same blood group, whereas 24% (6 pairs) had different blood groups.

Table 4: Distribution of clinical characteristics among neonates (n=50).

Clinical parameters	N	%
1st cry		
Immediately	37	74
Delay	13	26
Birth weight (g)		
≤1000 (ELBW)	2	4
1001-1500 (VLBW)	23	46
1501-2500 (LBW)	23	46
2501-4000 (normal)	2	4
Breast feeding		
Yes	14	28
No	36	72
Gestational age (weeks)		
<37 weeks (preterm)	42	84
37-40 weeks (term)	8	16
SpO_2		
<94	31	62
94-99	19	38
Heart rate (beats per minute)		
<100 (bradycardia)	15	30
100-160 (normal)	35	70
Respiratory rate (breaths per minute)		
<30	4	8
30-50 (normal)	22	44
>50	24	48
Lungs		
Clear	45	90
Crepitation	5	10
Hemoglobin (g/dl)		
<11	1	2
13-Nov	5	10
>13	44	88
Other ailments		
Grunting	11	22
Breathing difficulty	10	20
Pallor	6	12
Cyanosis	4	8

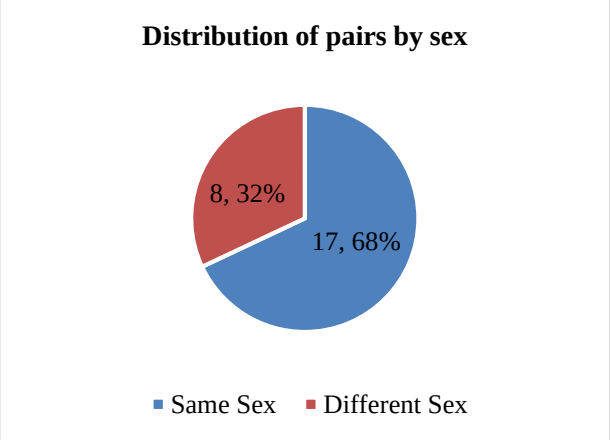

Figure 2: Sex distribution among twins (n=25).

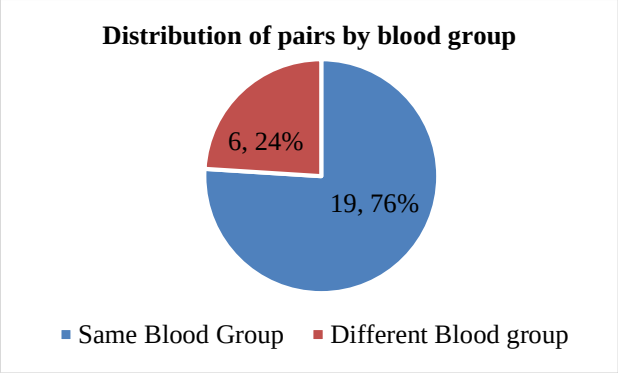

Figure 3: Blood group distribution among twins (n=25).

Regarding the first cry, a significant majority (74%, 37 neonates) cried immediately after birth, while 26% (13 neonates) experienced a delay. In terms of birth weight, the neonates were almost evenly split between very low birth weight (VLBW, 1001-1500 g) and low birth weight (LBW, 1501-2500 g), each category accounting for 46% (23 neonates). Extremely low birth weight (ELBW, ≤1000 gm) and normal birth weight (2501-4000 g) were less common, each observed in 4% (2 neonates) of cases. Breastfeeding initiation was low, with only 28% (14 neonates) being breastfed, while a majority of 72% (36 neonates) were not breastfed.

The gestational age distribution showed a high prevalence of preterm births (<37 weeks), which accounted for 84% (42 neonates), while term births (37-40 weeks) comprised 16% (8 neonates). Oxygen saturation (SpO_2) levels were below 94% in 62% (31 neonates) of the cases, while 38% (19 neonates) had SpO_2 levels within the normal range (94-99%). Heart rate measurements indicated that 30% (15 neonates) had bradycardia (<100 beats per minute), and 70% (35 neonates) fell within the normal range (100-160 beats per minute). Respiratory rate analysis showed that 48% (24 neonates) had a rate of more than 50 breaths per minute, 44% (22 neonates) had a normal rate (30-50 breaths per minute), and 8% (4 neonates) had a rate of less than 30 breaths per minute. Lung examination revealed that 90% (45 neonates) had clear lungs, while 10% (5 neonates) exhibited crepitation. Hemoglobin levels were predominantly normal (>13 g/dl) in 88% (44 neonates) of the cases, with 10% (5 neonates) having levels between 11 and 13 g/dl, and only 2% (1 neonate) having a level below 11 g/dl. Other ailments observed included grunting in 22% (11 neonates), breathing difficulty in 20% (10 neonates), pallor in 12% (6 neonates), and cyanosis in 8% (4 neonates).

The majority of neonates had relatively short hospital stays, with 44% (22 neonates) staying for less than 5 days and 50% (25 neonates) staying between 6 to 10 days. A smaller group, 6% (3 neonates), had a hospital stay exceeding 10 days. The mean duration of hospital stay was 6.8 days, with a standard deviation of 5.8 days. A high prevalence of LBW was observed, with 96% (48 neonates) being diagnosed with this condition. Preterm birth was also a common diagnosis, affecting 84% (42 neonates) of the neonates. Other conditions were less frequently observed: perinatal asphyxia in 20% (10 neonates), early onset neonatal sepsis in 2% (1 neonate), and neonatal jaundice also in 2% (1 neonate). Half of the neonates (50%, 25 neonates) showed improvement and were discharged, while 18% (9 neonates) were discharged on a risk bond. Notably, a significant proportion, 32% (16 neonates), resulted in death.

Table 5: Distribution of the neonates according to final diagnosis (n=50).

Final diagnosis	N	%
Hypertension	1	4
Diarrhoea	1	4
Gestational diabetes mellitus	1	4
Pre-eclampsia	2	8
Poor health	1	4
Family history of multiple gestation	1	4
No known medical history	18	72

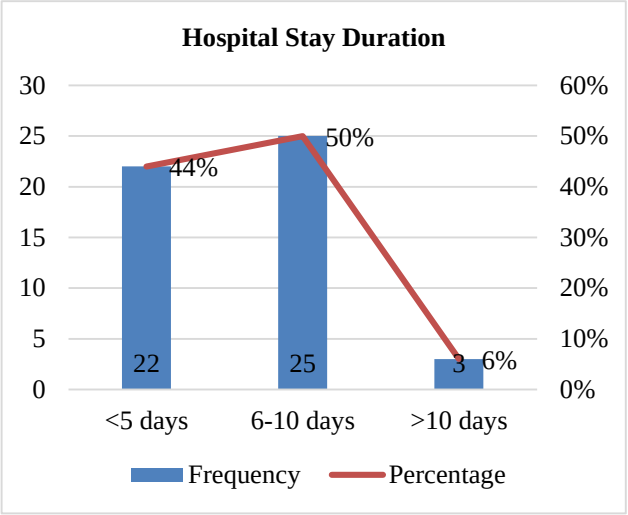

Figure 4: Distribution of the neonates according to hospital stay (n=50).

DISCUSSION

The maternal age distribution in this study, with a majority (64%) of mothers aged between 21-30 years and a mean age of 24.8 years, aligns with global trends in twin births. This age group is often associated with a higher likelihood of twin pregnancies, particularly in the context of ART and natural conception.[18] The presence of a smaller proportion of mothers aged ≤20 years (28%) and >30 years (8%) in our study reflects the broader demographic trends in maternal age for twin births.

The high rate of regular antenatal visits (92%) observed in our study is crucial for the management and monitoring of twin pregnancies, which are often associated with higher risks of complications.[19] Regular antenatal care is essential

for early detection and management of conditions such as pre-eclampsia, which was observed in 8% of our participants, aligning with findings from other studies.[20,21]

The predominance of multiparity (96%) in our study is noteworthy. Multiparous women have been reported to have a higher likelihood of twin pregnancies, possibly due to physiological factors and previous pregnancy history.[22] The medical history of the mothers in our study, with a majority (72%) having no known medical history, suggests a generally healthy profile, although the presence of specific conditions like hypertension and gestational diabetes mellitus in 4% of cases each, aligns with known risk factors for twin pregnancies.[23]

The incidence of premature rupture of membranes (PROM) in 72% of the mothers in our study is significant, as PROM is a known risk factor for preterm labor, which is common in twin pregnancies.[24-26] This high incidence of PROM necessitates careful monitoring and management to prevent adverse outcomes. Regarding neonatal demographics, the majority of neonates being aged ≤12 hours (68%) at the time of assessment indicates the immediacy of postnatal care required in twin births.

The gender distribution of the neonates, with a slightly higher prevalence of females (56%), does not show a significant deviation from the expected norm. However, the finding that 68% of twin pairs were of the same sex and 32% were of different sexes provides an interesting insight into the zygosity and genetic patterns in twin births, which could be explored further in future studies. The blood group distribution, with 76% of twins having the same blood group, might reflect genetic similarities in monozygotic twins, although this aspect warrants further genetic analysis for conclusive insights. The immediate cry post-birth in 74% of neonates in our study is a positive sign of neonatal vigor and respiratory effort, a crucial aspect in the assessment of newborns, especially in preterm and LBW infants.[19]

The delay in the first cry observed in 26% of neonates could be attributed to factors associated with preterm births and low birth weights, necessitating immediate neonatal care. The prevalence of VLBW and LBW in our study's twin births, with nearly equal distribution between the two categories, highlights the intrinsic risks of twin pregnancies. This phenomenon, consistent with global observations, can be attributed to factors like intrauterine competition for nutrients and a higher likelihood of preterm birth in multiple gestations, leading to restricted fetal growth and shorter gestational periods.[27-29]

LBW and VLBW in twins not only necessitate immediate intensive neonatal care but also pose long-term health risks, including developmental and chronic health issues. This underscores the need for enhanced prenatal monitoring and specialized postnatal care strategies to improve outcomes for twins with LBW and VLBW. The low rate of breastfeeding initiation (28%) in our study is concerning, given the established benefits of breast milk, especially for VLBW and LBW neonates. This could be due to the challenges faced in the immediate postnatal period, such as the infants' medical condition or maternal factors.[19]

The high prevalence of preterm births (84%) in our study further complicates the neonatal outcomes, as preterm neonates are at increased risk for various complications, including respiratory distress and feeding difficulties.[23] The oxygen saturation (SpO2) levels below 94% in 62% of neonates and the observed rates of bradycardia (30%) and tachypnea (48%) highlight the respiratory challenges faced by preterm and LBW infants. These findings underscore the need for vigilant respiratory monitoring and management in this vulnerable population.[26]

The majority of neonates in our study had clear lung fields upon examination (90%), which is a reassuring finding. However, the presence of crepitation in 10% of neonates could indicate underlying respiratory pathology, common in preterm and LBW infants.[20] The haemoglobin levels were predominantly within the normal range, which is a positive indicator of neonatal health. However, the presence of other ailments such as grunting, breathing difficulty, pallor, and cyanosis in a significant proportion of neonates reflects the multifaceted challenges faced by neonates born from twin pregnancies. The hospital stay duration, with a mean of 6.8 days, reflects the intensive care required for neonates born from twin pregnancies, especially those with LBW and preterm births. The mortality rate of 32% in our study is a stark reminder of the high risk associated with twin pregnancies and the need for specialized neonatal care.[29,30]

Limitations

The study was conducted with a very small sample size. So, the results may not represent the whole community.

CONCLUSION

In conclusion, this study underscores the complexities and heightened risks associated with twin pregnancies and their neonatal outcomes. The maternal characteristics, including age distribution and high engagement in antenatal care, highlight the critical need for diligent monitoring of twin pregnancies. The prevalence of LBW and VLBW, coupled with a high rate of preterm births, emphasizes the importance of specialized neonatal care. The study's findings on respiratory challenges and other neonatal ailments reflect the multifaceted healthcare needs of these infants. Notably, the significant mortality rate of 32% in our study is a stark reminder of the risks inherent in twin pregnancies. Overall, these insights advocate for enhanced prenatal surveillance and tailored postnatal care strategies to improve outcomes for twins, particularly those with LBW and VLBW, contributing to better-informed practices in neonatology and obstetrics.

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