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NEONATAL OUTCOMES OF TWIN BIRTHS IN NINEVEH

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ABSTRACT

Background: The rate of twin pregnancies has increased by a third internationally over the past 40 years, with a number of maternal and neonatal outcomes. **Aim of the study:** To assess the neonatal outcomes among the twin and singleton births. **Subject and Methods:** A retrospective hospital-based case-control study design was conducted among pregnant mothers who gave birth to twins at Al-Batool Teaching Hospital between 1st January to 31st May 2023. The sample consisted of 50 women with singleton babies and 50 women with twin babies with none-probability convenient sampling technique. The trained and approved data collector went over the medical records and extracted the data using a predefined checklist. **Results:** The study sample included 50 women with singleton babies and 50 women with twin babies. Most of the singleton babies group had gestational age group higher than the twin group with significant lower gestational age and weights for twin babies group compared to singleton babies group. No significant difference regarding maternal age and neonatal sex. Compared to the singleton babies group, the twin babies group had significantly higher rates of a positive family history, cesarean delivery, and NICU admission. Nine babies of the twin group were died while there was no neonatal death among singleton group. The most clinical causes of death were RDS in 44.4% and low weight 44.4%. **Conclusions:** Numerous newborn outcomes were impacted by the twin pregnancies, including gestational age, birth weight, delivery method, and NICU hospitalization. Family history was discovered to be quite important. Compared to singleton births, twin pregnancies had a greater rate of neonatal mortality, and RDS and low birth weight were the most common reasons.

KEYWORDS: Neonatal outcomes, Singleton births, Twins.

INTRODUCTION

Globally, the rate of twin pregnancy has increased by a third over the past 40 years (from 9.1 per 1000 births in 1980 to 12.0 per 1000 births in 2021), accounting for one in every 42 births or 1.6 million twin births annually.[1] Approximately 3% of live births and 97% of multiple births in the US are twin births. Dizygotic twins are significantly more prevalent than monozygotic twins and make up 70% of all twin gestations in the absence of assisted reproductive technology.[2] The increase, especially in high-income nations, has been primarily attributed to improvements in assisted reproductive technologies.[3-5] and the deferral of motherhood till later in life.[6-8]

When compared to singleton pregnancies, multiple gestations are associated with a number of obstetric complications, such as spontaneous abortion, hypertensive disorders, placenta previa, abruption, mal-presentation, malformations, and cerebral palsy. Additionally, the maternal mortality rate associated with a twin pregnancy is 2.5 times higher than that of a singleton pregnancy.[9] Additionally, twin pregnancies are two to three times more likely than singleton pregnancies to result in low birth weight and preterm, with negative outcomes.[10] Multiple births provide a significantly increased risk of perinatal mortality and are responsible for 14% of all newborn deaths worldwide.[11]

Twin pregnancies are frequently accompanied by maternal obstetric problems, such as hemorrhage, preeclampsia, and maternal mortality.[12,13] Additionally, twin pregnancies increase the need for caesarean sections (CS) and other medical and surgical procedures.[14,15] Additionally, mothers of twins are almost six times more

likely than mothers of singletons to require hospitalization owing to pregnancy problems, posing an increase in healthcare expenses.[16]

Aim of the study: To assess the neonatal outcomes among the twin and singleton births.

SUBJECTS AND METHODS

Study design and setting

A retrospective hospital-based case-control study design was conducted among mothers who gave birth to twins at Al-Batool Teaching Hospital between 1st January to 31st May 2023. Al-Batool Teaching Hospital the only maternity-specialized hospital located on the right bank of Tigris River at Nineveh. The hospital serves the entire community by offering inpatient and outpatient treatments. Antenatal care (ANC), labor and delivery services, and post-natal care are all offered by the hospital in the field of obstetrics and gynecology.

Study population

All twin births registered at Al-Batool Teaching Hospital between January 1 and May 31, 2023, that met the inclusion criteria, comprised the study population. The sample was made up of 50 women who had given birth to singletons and 50 women who had given birth to twins. A convenient sampling procedure was utilized to get the sample.

Inclusion and exclusion criteria

If a second twin was retained and the delivery took place after 20 weeks of gestation, twin births were counted. The Last Normal Menstrual Period and ultrasound were both used to assess the gestational age at birth. The study removed birth records that contained insufficient information about labor and delivery.

Data collection procedure

Mother and newborn cards, birth/delivery logbooks, operation registration books, newborn admission and discharge registration books, and newborn admission and discharge registration books for those babies referred to Neonatal Intensive Care Unit (NICU) were some of the medical records used to collect maternal and birth-related data. The trained and approved data collector went over all of these medical records and extracted the data using a predefined checklist.

Statistical analysis

Microsoft Excel 2007 sheets were used to summarize the study's data collection. using IBM-SPSS 26 to do the statistical analysis. These data's normality was determined using the Shapiro-Wilk test, and the parametric tests were used. Calculations were made for frequencies, means, and standard deviations. The Chi square test (x^2) used for the nominal data with the Freeman-Halton exact test was used instead when any cell present with expected value less than 5 for more than 2*2 tables and fisher exact test for 2*2 tables. The numerical data were comparing by the t-test for independent two means. P-value $\leq$ 0.05 considered as significant.

RESULTS

The study sample included 50 women with singleton babies and 50 women with twin babies; the gestational age in both groups was demonstrated in table (1) which revealed that 72.0% of the singleton babies had gestational age of ≥37 weeks while only 22.0% of twin babies were at gestational age of ≥37 weeks; the difference among the gestational age between the study groups was statistically significant (0.000). The mean gestational age among the twin babies (33.52±4.550 weeks) was significantly lower than that among the singleton babies (36.82±1.996). Moreover, neonatal weight among twin babies was (1995.100±755.618 gram) and among the singleton babies was (2930.000±575.786 gram) with a statistically significant difference (p=0.000). The maternal age showed no significant difference between the study groups.

Table (1): Comparison of gestational and maternal age between the study groups.

Gestational age/week	Twin baby group (n=50)		Singleton baby group (n=50)		p-value*
	No.	%	No.	%	
≤24	1	2.0	0	0.0	0.000
25-26	3	6.0	0	0.0	
27-28	2	4.0	0	0.0	
29-30	6	12.0	1	2.0	
31-32	7	14.0	1	2.0	
33-34	8	16.0	4	8.0	
35-36	12	24.0	8	16.0	
≥37	11	22.0	36	72.0	
	Mean ±SD		Mean ±SD		p-value**
Gestational age/week	33.52±4.550		36.82±1.996		0.000
Neonatal weight/gram	1995.100±755.618		2930.000±575.786		0.000
Maternal age /year	27.62±4.940		27.64±5.805		0.985
*Freeman-Halton Exact test has been used; **t-test for independent two means					

Comparison of sex between the study groups was demonstrated in table (2). It elicited that 56.0% of the twin babies group was males and 44.0% of them was female, while among the singleton babies group, the males constituted 42.0% and the females 58.0%; the difference was statistically not significant.

Table (2): Comparison of sex between the study groups.

Sex	Twin baby group (n=100)*		Singleton baby group (n=50)		p-value**
	No.	%	No.	%	
Males	56	56.0	21	42.0	0.106
Females	44	44.0	29	58.0	
*Number of babies born; ** Chi square test has been used					

Comparison of family history between the study groups was showed in table (3). The positive family history was found in 54.0% among the twin babies group and in 22.0% among the singleton babies group; the difference was statistically significant (p=0.001).

Table (3): Comparison of family history between the study groups.

Family history	Twin baby group (n=50)		Singleton baby group (n=50)		p-value*
	No.	%	No.	%	
Yes	27	54.0	11	22.0	**0.001**
No	23	46.0	39	72.0	
*Chi square test has been used					

Comparison of types of delivery between the study groups was showed in table (4) and demonstrated that 58.0% of the twin babies group and 28.0% of the singleton babies group were delivered by CS while 42.0% and 72.0% of the study group respectively were delivered by normal vaginal delivery (NVD); the difference was statistically significant (p=0.001).

Table (4): Comparison of types of delivery between the study groups.

Type of delivery	Twin baby group (n=50)		Singleton baby group (n=50)		p-value*
	No.	%	No.	%	
CS	29	58.0	14	28.0	**0.002**
NVD	21	42.0	36	72.0	
*Chi square test has been used					

Comparison of NICU parameters between the study groups was demonstrated in table (5). It revealed that 60.0% of the twin babies group need admission to NICU in compared to only 12.0% of the singleton babies group with a statistically significant difference (p=0.000). Among the twin babies group, 9.0% were died and 91.0% discharged in well status while all the singleton babies group were discharged in well status; the difference was statistically significant (0.030).

Table (5): Comparison of NICU parameters between the study groups.

NICU parameters		Twin baby group (n=100)		Singleton baby group (n=50)		p-value
		No.	%	No.	%	
Admission to NICU	**Yes**	60	60.0	6	12.0	**0.000***
	No	40	40.0	44	88.0	
Outcomes	**Well**	91	91.0	50	100.0	**0.030****
	Died	9	9.0	0	0.0	
*Chi square test has been used; **Fisher Exact test has been used						

The causes for the admission to NICU was illustrated in figure (1) which showed that Respiratory distress syndrome (RDS) was the most frequent cause representing 73.3% followed by low weight in 16.7%, jaundice in 13.3%, sepsis in 10.0%. The most clinical causes of death were RDS in 44.4% and low weight 44.4%.

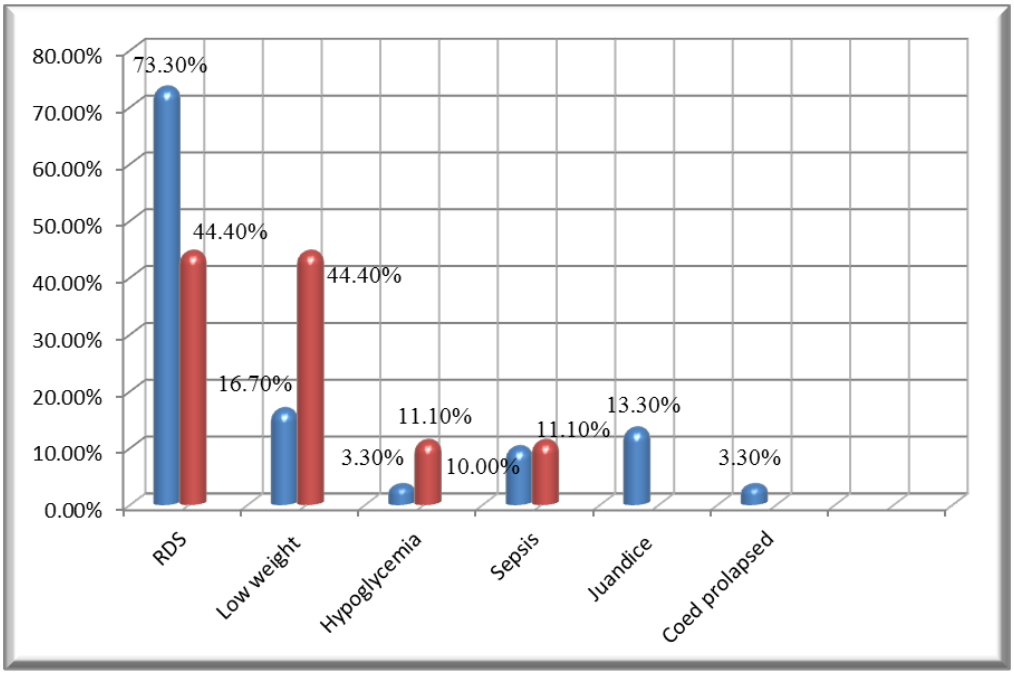

Figure (1): The causes for the admission to NICU and death.

DISCUSSION

Among the current study sample, it was shown that the twin babies had gestational age lower than that singleton babies. In a research by Kalikkot *et al.*[17] triplet and higher-order deliveries had significantly greater percentages of premature newborns in each GA category from 24 to 34 weeks than twin births, who in turn had much higher percentages than singletons. At 38.30 (2.21) weeks of gestation, the mean GA for singletons, represented as mean (SD), was substantially greater than for twins (36.39±4.21) weeks of gestation. Furthermore, Alexander *et al.*,[18] study conducted in United States, which reported mean GA as 39 weeks in singleton and 35.8 weeks in twin.

Regarding the neonatal weight, the current study showed that twins had lower weights in compared to single births. The estimated weight of twin fetuses was shown to be lower than that of singletons in a retrospective study by Hiersch *et al.*[19] beginning at 26 weeks of gestation. These discrepancies grew with gestational age, reaching a mean difference of 300-350 g or about 10% at term. The number of multiple births compared to singleton births was considerably greater in a research by MacDorman *et al.*[20] The current results were consistent with earlier studies that suggested that multiple gestation births increase the likelihood of preterm and low birth weight (LBW) deliveries.[21,22]

The current study found no significant difference between the study groups regarding their mothers' ages. The majority of twin births (44.4%) in the study by Beyene *et al.*[23] were observed in mothers between the ages of 24 and 29. However, it was discovered in a study.[24] carried out in southwest Ethiopia that moms under the age of 24 accounted for more than half of twin births. The differences in socio-cultural concerns like early marriage may help to explain these variances in the sociodemographic traits connected to twin pregnancies. According to a Niazi study.[25] 51% of pregnant women carrying twins were in the age range of 31 to 45; a similar finding was made in the US.[26] Twin pregnancies and advanced mother age are two prominent obstetric issues with rising incidences globally. Pregnancies at advanced ages, multiple pregnancies, and the co-occurrence of both have increased in proportion as a result of the current trend toward increased women's social participation and delayed childbearing.[27,28]

The present study groups showed no sex differences. While Olusanya.[30] from Nigeria found neonates born to multiple pregnancies were more likely to be female, Sabzehei *et al.*[29] and Kalikkot Thekkeedu *et al.*[17] did not detect a difference in the gender distribution among twin and singleton newborns.

The present study demonstrated a positive family history of multiple pregnancy were associated with increase twinning rate. Similar results were reported in Nwobodo *et al.*,[31] study. There is more evidence for familial DZ twinning, according to studies. Lewis *et al.*[32] study of 6,596 twin pairs from the Australian Twin Registry examined familial twinning and discovered a relative risk of 1.7 for DZ twin sisters and mothers and a related risk of 2.5 for the kids of female DZ twins. By using formal segregation analysis, Meulemans *et al.*[33] looked into the inheritance of DZ twinning in 1,422 Dutch and Flemish families.

The current study revealed a substantial difference in the type of delivery, with caesarean sections occurring more frequently in multiple births than in singleton deliveries.

According to a study by Bajagain *et al.*[34] of 35 multiple pregnancies, 30 (85.71%) of the cases required caesarean sections, whereas 5 (14.29%) of the twins were born vaginally on their own. According to Chauhan *et al.*[35] study, 50.0% of mothers delivered their babies naturally vaginally, while 47.0% required a caesarean section. Twin pregnancy has been identified as one of the contributing factors for rising caesarean section rates, along with factors like advanced maternal age and maternal request without clinical indication.[36]

Among the current twin births group, the admission to NICU was significantly high. These findings run in parallel to Ganhão *et al.*,[37] study in which five babies (21%) in twin births required admission to the NICU, but none in singleton births (p = 0.007).

The study discovered a very high percentage of infant mortality among multiple births. Neonatal mortality is still considerably higher when compared to singletons. While Uthman *et al.*[39] study in Nigeria indicated that children born from multiple births were more than twice as likely to die during infancy as infants delivered as singletons, Katz *et al.*[38] study in Nepal found that the probability of neonatal mortality was 7.32 times increased. In 2003, Papiernik *et al.*[40] population-based cohort research of very preterm infants in ten European regions came to the conclusion that twins had higher death risks than singletons between 24 and 27 weeks of gestation. It's vital to remember that twins continue to have a considerably higher risk of giving birth prematurely, which increases their risk of death and morbidity from preterm birth. In fact, twins were 10 times more likely than singletons to give birth extremely prematurely. Furthermore, Kalikkot *et al.*[17] discovered that twin births had comparable adjusted odds for death to singleton births (aOR: 1.004, 95% CI: 0.960-1.051, p = 0.8521).

The number of the died neonate in the present study was nine, of them 44.4% due to RDS, 44.4% due to low weights, 11.1% due to hypoglycemia, and 11.1% due to sepsis. Prematurity and low birth weight accounted for 74.6% of clinical causes of mortality in the study by Aisien *et al.*[41] study, while the retention of the second twin accounted for 7.3%, antepartum hemorrhage 6%, severe pregnancy-induced hypertension/eclampsia 3.0%, birth asphyxia 2.4%, and congenital deformity 1.8%. While Refuerzo *et al.*[42] investigation discovered that respiratory morbidities accounted for the majority of the variations in newborn outcomes. The major factor that most significantly affected the main result was RDS. In the meantime, Rajkumar *et al.*[43] discovered that sepsis was the most common diagnostic in singletons 34.71%, whereas jaundice was found in 37.62% of twin neonates and respiratory distress syndrome in 36.67%. Neonatal sepsis was the most frequent cause of mortality in singletons 33.9% and respiratory distress syndrome in twins 35.38%.

CONCLUSION

Numerous newborn outcomes were impacted by the twin pregnancies, including gestational age, birth weight, delivery method, and NICU hospitalization. Family history was discovered to be quite important. Compared to singleton births, twin pregnancies had a greater rate of neonatal mortality, and RDS and low birth weight were the most common reasons.

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