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ORIGINAL ARTICLE

Multiple Births: Clinical profile of Neonates and Associated Risk Factors in a 5- Year Comparative Review in a Tertiary Hospital

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Abstract

Background:

Multiple gestation has been known to be associated with unfavorable outcomes of pregnancy for both the mother and the fetus.

Objective: The objective of the study was to review the clinical profile of neonates from multiple births and their associated risk factors for multiple births (MB) over a 5-year period at the study center.

Methods: This was a comparative review of neonates from multiple births and neonates from singleton births from 2018-2023 at the study centre. All live neonates delivered from MB and all live neonates delivered as singleton births were eligible, if their mothers had no comorbidities. Data collected included maternal age, booking status, parity, mode of deliveries, sex, Apgar score and birth weight. Frequencies and percentages were calculated for categorical variables, t-test was done to compare means of continuous variables and chi-square test for categorical variables. A p-value < 0.05 considered to be significant.

Results: There were 425 neonates included in the study with 30(7.1%) neonates from MB and 395(92.9%) neonates from singleton births. The mean of mothers with MB was 31.0 ± 5.7 years while the mean age of mothers with singleton births was 31.1±5.5 years, and the difference was not significant. The mean parity of mothers with MB was 2.0±1.2 while the mean parity of mothers with singleton births was 2.1±1.3, and the difference was not statistically significant. Neonates from MB had significantly more cases of severe birth asphyxia, low birth weight and prematurity. However, after matching for gestational age, term neonates from MB had significantly more cases of SBA and LBW while preterm neonates from MB had significantly more cases of LBW.

Conclusion: Neonates from MB were significantly at increased risk of LBW, SBA and prematurity. Also, increasing maternal age and parity were not significantly associated with MB.

Keywords: Multiple Births, Singleton, Clinical profile

Introduction

Multiple gestation has been known to be associated with unfavorable outcomes of pregnancy for both the mother and the fetus.[1] The prevalence of multiple births has been reported to be about 2.0-4.0% in the literature.[2] Nigeria is said to have the highest

number of multiple gestations globally, and this phenomenon has been reported to be significantly influenced by genetics.([3] Other factors, such as multiparity, advanced maternal age, low socioeconomic status, family history, and the use of oral contraceptives, have been linked to multiple births.[4] Adverse fetal outcomes, such as low birth weight, preterm deliveries, asphyxia, and mortality, have been reported to be significantly higher among multiple births. Studies on multiple gestation globally are reportedly rare due to the small number of cases, with most studies being reviews.[1,2] The advent and popularity of assisted reproductive technologies and the changing epidemiology of pregnancy in recent years, with older women becoming pregnant, is likely to affect the prevalence of multiple births. In a study by Obiechina et al in South-Eastern Nigeria, the authors compared neonates from twinning and neonates from singleton gestation and found neonates from twin gestation to have significantly higher prevalence of with low birth weight, low Apgar score and prematurity.[5] However, their study did not exclude deliveries with maternal comorbidities that could have affected the outcome. A similar study by Olusanya also did not exclude confounding variables that could have resulted to poor neonatal outcome such as asphyxia, low birth weight and prematurity.[3] In view of this, there was a need to compare the clinical profile of neonates from multiple births whose mothers had no comorbidity to those from singleton births from mothers without comorbidity at the point of delivery. The objective of the study was to review the clinical profile of neonates from multiple births and their associated risk factors for multiple births over a 5-year period at the study center.

Methods

This was a comparative review that utilized secondary data from the Obstetrics and Gynaecology department. All live neonates delivered from multiple births and all live neonates delivered as singleton births were eligible, as long as their mothers had no comorbidities. The study was carried out after ethical approval was obtained from the Research and Ethics Committee of DELSUTH. Data collected included maternal age, booking status, parity, mode of delivery, sex, Apgar score, and birth weight. A persistently low Apgar score of 3 or below beyond 5 minutes was described as severe birth asphyxia. Data was first entered into an Excel spreadsheet for setting up and cleaning, after which it was entered into IBM SPSS version 20 for analysis. Frequencies and percentages were calculated for categorical variables, and a t-test was conducted to compare the means of continuous variables. Associations between dependent and independent variables were determined, and a p-value of < 0.05 was considered significant.

Results

Out of a total of 810 neonates registered in the facility over the study period, 37 (4.3%) neonates were from multiple births, 395 (50.4%) neonates were from singleton births from mothers without comorbidities, and 378 (45.3%) neonates were from singleton births from mothers with comorbidities and were therefore excluded. Seven out of the 37 neonates from multiple births were excluded due to maternal comorbidities, leaving 30 neonates from multiple births and 395 neonates from singleton births to be included in the final analysis.

The mean maternal age of the neonates from MB 31.0 ± 5.6 years, while the mean maternal age for the neonates from singleton births was 31.1 ± 6.5 years, and the difference between

the two groups was not statistically significant. The mean parity for the neonates from MB was 2.0 ± 1.2, while the mean parity for the neonates delivered from singleton births was 2.1 ± 1.3, and the difference between the two was not statistically significant. However, the mean gestational age and mean birth weight of the neonates delivered from MB were 34.9 ± 3.6 weeks and 1.9 ± 0.6 kg, respectively, while the mean gestational age and mean birth weight of the neonates delivered from singleton births were 37.6 ± 3.1 weeks and 3.0 ± 0.7 kg, respectively. The differences in mean gestational age and mean birth weight between the neonates from MB and neonates from singleton births were statistically significant, with a p-value < 0.05, as shown in Table I.

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Table I: Comparison of mean maternal age, mean parity, mean gestational age and mean birth weight of both cases and controls using Anova

Variable	Mean MB	(SD) Singleton	F	p-value
Maternal age(yrs)	31.0 (5.6)	31.1(6.5)	0.019	0.8900
Parity	2.0(1.2)	2.1 (1.3)	0.000	0.9970
GESTage (weeks)	34.9(3.6)	37.6 (3.1)	25.792	<0.0001
Birth weight (kg)	1.9(0.6)	3.0 (0.7)	77.603	<0.0001

SD- Standard Deviation; MB-Multiple Births

A comparison of neonates from multiple births and singleton neonates was conducted to assess their association with certain demographic characteristics. Low birth weight, prematurity, and unsupervised pregnancy were found to be significantly associated with neonates from multiple births compared to those from singleton births, as shown in Table II.

Table II: Association between neonates from MB, neonates from Singleton births and some Demographic Characteristics

	NMB (%)	NSB (%)	total	χ^2	df	p-value
<35yrs	18(58.6)	282(71.4)	300(70.6)	2.19	1	0.139
>35 years	12 (41.4)	113 (28.6)	125 (29.4)			
Total	30	395	425			
UnSUP	8 (26.7)	48 (12.2)	56 (13.2)	6.58	1	0.037
SUP	22 (73.3)	347 (87.8)	369 (86.8)			
Total	30	395	425			
PRMPR	17(56.7)	187(47.3)	204(48.0)	0.23	1	0.893
Multipara	13(45.3)	208(52.7)	221(52.0)			
Total	30	395	425			
CS	21 (70.0)	143 (36.2)	164 (38.6)	13.44	1	0.0001
VD	9 (30.0)	252 (63.8)	261 (61.4)			
Total	30	395	425			
SBA	5 (16.7)	29 (7.3)	34 (8.0)	3.29	1	0.070
No SBA	25 (83.3)	366 (92.7)	391 (92.0)			
Total	30	395	425			
Low BW	24 (80.0)	50 (12.7)	74 (17.4)	87.93	1	<0.0001
NBW	6 (20.0)	345(87.3)	351(82.6)			
Total	30	395	425			
Preterm	15 (50.0)	64 (16.2)	79 (18.6)	21.93	1	<0.0001
Term	15 (50.0)	331 (83.8)	346 (81.4)			
Total	30	395	425			
Male	14 (46.7)	189 (47.8)	203 (47.8)	0.02	1	1.0000
Female	16 (53.3)	206 (52.2)	222 (52.2)			
Total	30	395	425			

NMB-Neonates from multiple births; NSB- Neonates from singleton births; AS- Apgar Score; BW-Birth weight; CS-Caesarean section; VD-Vaginal Delivery

Further analysis was carried out by appropriately matching the gestational ages of the two groups (neonates from multiple births and neonates from singleton births) and then assessing the association with certain demographic features. Low birth weight, severe birth asphyxia, and cesarean delivery were also found to be significantly associated with term neonates from multiple births compared to singleton neonates, as shown in Table III.

Table III: Association between Term Neonates from MB, Term Neonates from Singleton Births and LBW, Severe Birth Asphyxia and CS delivery

	NMB (%)	NSB (%)	total	χ^2	df	p-value
UnSUP	2(13.3)	32(9.7)	34	1.25	1	0.536
SUP	13(86.7)	298 (90.3)	311(90.1)			
Total	15	330	345 (9.9)			
CS	12 (80.0)	115 (34.8)	127 (36.8)	12.58	1	0.000
VD	3 (20.0)	215 (65.2)	218 (63.2)			
Total	15	332	345			
SBA	3 (20.0)	21 (6.4)	24 (7.0)	4.12	1	0.042
No SBA	12 (80.0)	309 (93.6)	321 (93.0)			
Total	15	330	345			
Low BW	9 (60.0)	14 (4.2)	23 (6.7)	71.69	1	0.0001
Normal BW	6 (40.0)	316 (95.8)	322 (93.3)			
Total	15	330	345			

NMB-Neonates from multiple births; NSB-Neonates from singleton births; SBA- Severe Birth Asphyxia; BW-Birth weight; CS-Caesarean section; VD-Vaginal Delivery

However, when the preterm neonates were matched, severe birth asphyxia was not significantly associated with neonates from multiple births, as shown in Table IV.

Table IV: Association between Preterm Neonates from MB, Preterm Neonates from Singleton Births and LBW, Severe Birth Asphyxia and CS delivery

	NMB (%)	NSB (%)	total	χ^2	df	p-value
UnSUP	6 (40.0)	16 (25.0)	22 (27.8)	2.46	1	0.292
SUP	9 (60.0)	48 (75.0)	57 (72.2)			
Total	15	64	79			
CS	9 (60.0)	28 (43.8)	37 (46.8)	12.58	1	0.000
VD	6 (40.0)	36 (56.2)	42 (53.2)			
Total	15	64	79			
SBA	2 (13.3)	8 (12.5)	10 (12.7)	0.01	1	1.000
No SBA	13 (86.7)	56 (87.5)	69 (87.3)			
Total	15	64	79			
Low BW	15 (100.0)	36 (56.2)	51 (64.6)	10.17	1	0.001*
Normal BW	0 (0.0)	28 (43.8)	28 (35.4)			
Total	15	64	79			

*Fishers Exact; NMB-Neonates from multiple births; NSB- Neonates from singleton births; SBA- Severe Birth Asphyxia; BW-Birth weight; CS- Caesarean section; VD-Vaginal Delivery

Discussion

The majority (71.4%) of mothers in the study were in the young reproductive age group (under 35 years), reflecting the high fertility rate typical of developing countries, a pattern also noted in the literature.[6] Additionally, the mean age of mothers with multiple births (MB) was like that of mothers with singleton births. The mean parity for both groups was approximately 2, indicating comparable reproductive histories. Ezenwa et al. reported that most mothers of higher-order multiple births were either para-one or para-two and aged between 20 and 35.

Similarly, the study revealed that age and parity were not significantly associated with MB. This suggests that genetic factors may

primarily influence the occurrence of multiple births at the study center. Advanced maternal age has been reported as a risk factor for multiple gestation, and the past 40 years have seen a nine-fold increase in the number of women over 35 having their first child.[4,7] This trend correlates with the rising use of assisted reproduction, which may not be an independent risk factor for multiple births. Although, Obiechina et al reported in their study that increasing maternal age and increasing parity were more associated with twinning, the mean maternal age from their study was 30 ± 2.33 and the mean parity was 2.7±2.33. Also, a study in the US showed that repeated pregnancies in teenagers has increased risk of multiple births when compared to first pregnancies in teenagers and this shows that increasing parity is a risk factor for twining in that population.[8]. However, our findings are at variance with these findings perhaps because of poor representation (29.4%) of women 35 years and above in the present study.

The cesarean section (CS) rate is significantly higher for multiple births (MB) compared to singleton births, a finding consistent with other studies.[5,9] This increased CS rate in MB is primarily due to a greater association with obstetric complications. Additionally, since multiple gestations are classified as high-risk pregnancies, the threshold for intervention tends to be lower than for singleton gestations. While CS is intended to improve pregnancy outcomes, current research indicates that a higher CS rate may not enhance outcomes for MB. In many cases, an elective CS for twin gestation does not confer significant advantages over a planned vaginal delivery.[10] However, more than 80% of these procedures were emergency CS in the present study, which limited the opportunity for planned vaginal deliveries. This highlights the importance of early pregnancy booking and consistent follow-up in antenatal clinics to identify high-risk pregnancies, facilitate timely referrals, and ensure proper management.

Neonates from multiple births were significantly more likely to experience low birth weight, prematurity, and severe birth asphyxia (SBA) than those from singleton births, a finding corroborated by other researchers. Obiechina et al reported that the odds of preterm delivery were 6.5 times higher, the odds of low birth weight (LBW) were 9 times greater, and the odds of a low Apgar score were 6 times more for neonates born as MB than singleton neonates.[5] Similarly, Olusanyan B found that the odds of preterm delivery before 34 weeks were 1.91 times higher, the odds for intrauterine growth restriction (IUGR) were 9.1 times greater, and the odds of a low Apgar score beyond 5 minutes were 1.47 times higher for neonates delivered as MB than for those delivered as singletons.[3]

When gestational age was appropriately matched, term neonates from multiple births (MB) were still significantly more affected by low birth weight (LBW) and severe birth asphyxia (SBA) compared to neonates from singleton births. However, preterm neonates from MB did not show a significant difference in SBA prevalence, although they still had a notably higher incidence of LBW than their singleton counterparts. This suggests that the mechanisms leading to LBW involve both preterm delivery and intrauterine growth restriction. The reason only term neonates from MB were significantly more affected by SBA, while their preterm counterparts were not, may be attributed to SBA being primarily more associated with term neonates.

Conclusion: Neonates from MB were significantly at increased risk of LBW, SBA and prematurity. Increasing maternal age and parity were not significantly associated with MB.

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