

Maternal determinants and fetal outcome of multifetal pregnancies in Ahmadu Bello University Teaching Hospital, Zaria, Nigeria

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ABSTRACT

Background: Multifetal pregnancies remain a challenge to both parents and clinicians. With the increasing application of assisted reproductive technology in infertility management, the incidence is likely to continue to rise.

Aim and Objective: To determine maternal characteristics of multifetal pregnancies, maternal and fetal outcomes, at the Ahmadu Bello University Teaching Hospital (ABUTH), Nigeria.

Patients and Methods: A retrospective observational study of women who had multifetal pregnancy in ABUTH Zaria over a period of 5 years was conducted. Information regarding maternal determinants and fetal outcome was collated. The data were analyzed using SPSS version 20.0. Demographic variables were presented using tables and figures, while summaries were done using means, standard deviation, and percentages. Test of association was done using Chi-square. *P* value <0.05 was considered statistically significant.

Results: The total number of deliveries during the study period was 9399 out of which 254 were twins and 2 were higher order multifetal pregnancies. Giving us a rate of 27/1000 multifetal deliveries, majority of the women were booked (91%) and the average number of antenatal visits was 7.4 ± 3.1 . The mean maternal age was 29 ± 6 and the mean parity was 2.4 ± 2.2 . The mean gestational age at delivery was 36.5 ± 2.2 . History of ovulation induction was present in 33% and 57% gave a family history of twinning. The Yoruba ethnic group had the highest incidence with 42.7%. A total of 19% were admitted for various indications, the commonest indication was hypertensive disorders (18%), 64% of the women had preterm deliveries, and 7.5% of the women delivered before 34 weeks. The caesarean section (CS) rate was 39.7%. The commonest presentation was cephalic. There was statistical significant difference between presentation and mode of delivery $\chi^2 = 31.579$ and $P = 0.000$. The mean birth weight of $T_1 = 2.3 \pm 0.5$, and that of $T_2 = 2.7 \pm 3$, and 68.3% of T_1 compared to 60.2% of T_2 had weight <2.5 kg. There was statistically significant difference between the mean birth weight and Apgar score of the leading fetuses $P = 0.009$. Up to 92.6% of T_1 were delivered alive, compared to 84.6% of T_2 , Mean interbaby delivery interval between T_1 and T_2 was 11.7 minutes. Male:female ratio was 1:1.1. A total of 23% were admitted to neonatal intensive care unit and the commonest indication for admission was low birth weight (35%). The commonest causes of perinatal mortality were asphyxia and sepsis. Perinatal mortality was 114 per 1000 births and maternal mortality rate was 1,639/100,000 live births.

Conclusion: Parity, ethnicity, maternal age, ovulation induction, and family history were the major determinants of multifetal pregnancies. There was association between presentation and mode of delivery and also the birth weight and Apgar score of the leading twins. Our multifetal pregnancy rate and caesarean section rate were high, associated with high maternal and perinatal morbidity and mortality.

Key words: Indications; maternal mortality; multifetal pregnancy; perinatal mortality; rate; training.

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Introduction

Multifetal pregnancy occurs when a woman carries more than one fetus during pregnancy and the most common variety is twins, but women have given birth to up to eight babies (octuplets) from a single pregnancy.^[1]

The rate of and interest in multifetal pregnancy is increasing with the advent of assisted reproductive technologies (ARTs),^[2] while advanced maternal age heredity, race, and high parity in developing countries like ours are natural factors that drive the incidence of multifetal pregnancy. The incidence of multifetal pregnancy is highest among the Yoruba people of South-West Nigeria where it is 49-53/1,000,^[3] other local incidence include Maiduguri 14.4/1000, Kano^[4] 21.1/1000, Enugu^[5] 19.6/1000, and in Katsina^[6] 45/1000.

Multifetal pregnancy is always a high-risk pregnancy, due to the increased risks of exaggerated pregnancy symptoms, miscarriages, pre-eclampsia, abnormal lie, fetal growth restriction, preterm birth, maternal hemorrhage, postnatal depression, stillbirth, and perinatal death,^[7,8] Fetal challenges include twin-twin transfusion syndrome, low birth weight (LBW), anemia, neonatal jaundice, increased incidence of cerebral palsy,^[3] all these lead to increase in rate of admissions into neonatal units. For the mother and baby the rate of cesarean section is increased, breastfeeding is psychologically and physically more demanding, hence higher incidence of postnatal depression.^[9-11]

The proven method of using audit of clinical performance to drive quality improvement in outcome is the objective of this work.

Materials and Methods

This is a retrospective analysis of all multifetal deliveries in the Obstetrics and Gynecology department of Ahmadu Bello University Teaching Hospital (ABUTH) Zaria over a period of 5 years between 1st January 2010 and 31st December 2014.

The group included 256 pregnant mothers with multiple fetuses who delivered 515 babies in ABUTH. All mothers who presented with multiple fetuses in the obstetrics' unit were included.

Data were retrieved from patient's case-notes and supplemented by information from the delivery room, operating room, and medical records department. Only 253 case-notes had adequate information out of 256 and were used for analysis in this study. Details of patients, like age, parity, period of gestation at the time of diagnosis and

delivery, family history of twinning, ovulation induction (OI), complications that occurred in the antenatal period, during labor/delivery as well as the mode of delivery were collated and analyzed.

Data regarding fetal complications and chorionicity were collected. Chorionicity was determined either from the first trimester ultrasound where available or by postnatal examination of the placenta or both. Perinatal mortality rate (PMMR), i.e., the total no of still births and early neonatal deaths (death within 7 days of life) per thousand total births was calculated. Information about the fetus, which includes birth weight, admissions, indication for admissions, and congenital abnormalities were collected. The collected data were entered into a computer. Descriptive analysis of data was done using means and percentages, and statistical analysis was done using SPSS for Windows (version 20). Statistical significance was set at the *P* value <0.05.

Results

The total number of deliveries during the study period was 9399 out of which 254 were twins and 2 were higher order multifetal pregnancies. The rate of multifetal deliveries in ABUTH during the period under review was 27/1000 deliveries, (about 1 in 37 deliveries). An analysis of maternal characteristic [Table 1] revealed the following details. Majority of the women were booked (85%). The mean maternal age was 29 ± 6 and the mean parity was 2.4 ± 2.2 . The mean gestational age at delivery was 36.5 ± 2.2 weeks. History of OI was present in 33% and 57% gave a family history of twinning. And 64% percent of the women had preterm deliveries, while 7.5% of the patients delivered before 34 weeks.

The incidence according to ethnic group revealed that the Yoruba had the highest with 42.7, closely followed by the Hausas [Table 2]. Average number of antenatal visits was 7.4 ± 3.1 , and 19% were admitted for various indications in the antenatal period which include hypertensive disorders (18%), antepartum hemorrhage (9.8%), and preterm labor (4.9%) which were the leading complications among others. Majority of the presentations were cephalic 26 (10.6%), second twins presented with breech and had assisted breech delivery (2.3%), breech extraction (8.3%) and internal podalic version and breech extraction (0.5%) was used in some who had transverse lie.

The various modes of presentation in multifetal pregnancies are shown in Figure 1. There was statistical significance between presentation and mode of delivery $\chi^2 = 31.579$ and $P = 0.000$. see Table 3. A total of 98 (39.7%) of the women

Table 1: Various maternal profile studied among multifetal pregnancies

	Twins No/%	Triplets No/%	Quadruplets No/%
Age group			
<20 years	18 (7.1%)		
20-years	33 (13%)		
25-29 years	76 (30%)	1 (0.4%)	
30-35 years	77 (30.6%)		1 (0.4%)
>35 years	46 (18.5%)		
Mode of conception			
Induced	33 (13%)	1 (100%)	1 (100%)
Spontaneous	218 (86.2%)		
Family history			
Yes	144 (57%)		
No	107 (42.3)	1 (100%)	1 (100%)
Antenatal visit			
Booked	232 (91.6)	1 (100%)	1 (100%)
Unbooked	19 (7.5%)		
Placenta			
Monochorionic	101 (39.9%)		
Dichorionic	150 (59.2%)		1 (0.4%)
Trichorionic		1 (0.4%)	
Period of gestation			
28-34 weeks	19 (7.5%)		1 (0.4%)
34-37 weeks and 6 days	143 (56.5%)	1 (0.4%)	
≥37 weeks	89 (35.1%)		
Previous Multifetal Pregnancy			
Yes	48 (19%)		
No	203 (80.2%)	1	1

Table 2: Ethnic group and incidence of multifetal pregnancies in ABUTH

Ethnic group	Total no of deliveries	No of multiple deliveries	Incidence of multiple deliveries/1000
Fulani	701	8	11.3
Hausa	3199	114	35.6
Ibo	1058	13	12.0
Northern minorities	2002	59	29.5
Southern minorities	1101	15	13.6
Yoruba	1007	43	42.7
Others	331	4	12.0
Total	9399	256	27.2

had cesarean section due to various indications and 3.2% had CS for retained second twins. The commonest indication for cesarean delivery was fetal malpresentation (59%), followed by hypertension complicating pregnancy [Figure 2].

The mean birth weight of $T_1 = 2.3 \pm 0.5$ and that of $T_2 = 2.7 \pm 3$. 68.3% of T_1 compared to 60.2% of T_2 had LBW (<2.5 kg). There was statistically significant difference between the mean birth weight and Apgar score of the leading fetuses $P = 0.009$ but no significant difference for the subsequent fetuses(s) $P = 0.2$. This implies the leading

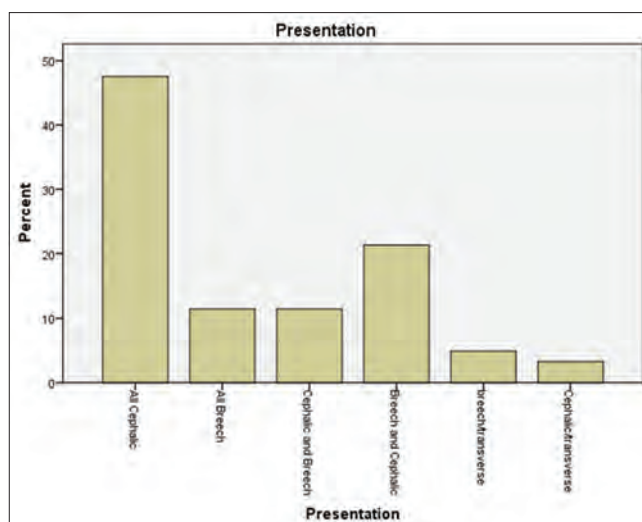


Figure 1: Presentation of fetus in multifetal pregnancies

fetuses are more likely to have asphyxia, especially if the fetus is LBW.

The triplets were all LBW weighing 2.4, 2.1, and 2.2 kg, respectively, while the quadruplets were all very low birth weight weighing 1.10, 1.25, 1.10, and 1.20 kg respectively, while for the twins 9 (3.5%) of T_1 had birth weights below 1 kg (ELBW), 17 (6.6%) were between 1 and 1.49 kg, 149 (58.2%) were between 1.50–2.49 kg and 81 (31.6%) had birth weight of at least 2.5 Kg normal birth weight (NBW). For the T_2 , 16 (6.3%) were below 1 kg, 17 (6.6%) were between 1 and 1.49 kg, 121 (47.3%) were between 1.5 and 2.49 kg, and 102 (39.8%) were at least 2.5 kg, ($X_2 = 1.77$, Df = 3, $P = 0.62$) [Table 4].

Up to 239 (92.6%) of T_1 were delivered alive, and 19 (7.3%) were stillborn or had early neonatal death. For T_2 , 215 (84.6%) were delivered alive, and 40 (15.3%) were stillborn or had early neonatal death. The outcome of one T_2 was not recorded in the case note. Male:female ratio was 1:1.1. Mean interbaby delivery interval between T_1 and T_2 was 11.7 minutes. A total of 23% of the babies were admitted to the neonatal intensive care unit and the commonest indication for admission was LBW (35%), followed by anemia and birth asphyxia each accounting for 20% of admissions respectively [Figure 3].

The commonest causes of perinatal mortality were asphyxia and sepsis. Perinatal mortality was 114 per 1000 births. Maternal death during the study was 1.6% giving us a maternal mortality ratio of 1,639/100,000 live births.

Discussion

Multifetal pregnancies remain a challenge to obstetricians, despite advances in obstetrics and neonatal care and it will

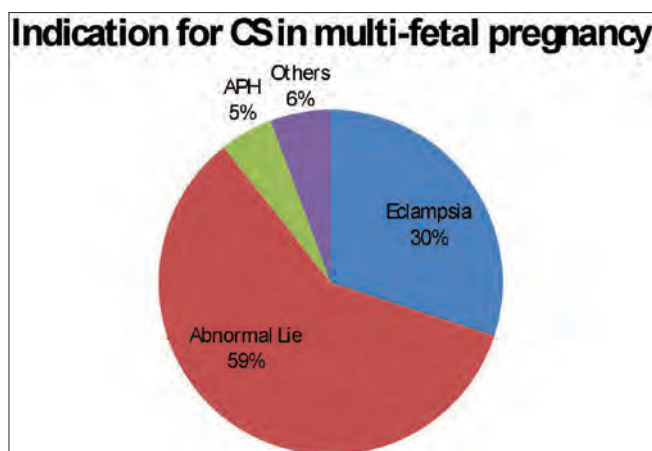


Figure 2: Indication for CS. others:- fetal distress, cord prolapsed, retained 2nd twins

Table 3: X² test results of mode of delivery and some maternal characteristics

X ² test	X ² result	P
Intrapartum complication and mode of delivery	10.096	0.73
Age and mode of delivery	3.808	0.433
Mode of delivery and maternal medical condition	4.875	0.188
Parity and mode of delivery	4.251	0.119

Mode of delivery (Vaginal or LSCS). Level of significance P=0.05

Table 4: Distribution of birth weights according to birth order of multiple fetuses in ABUTH

Twin	Birth weight (BW) Kg							
	ELBW (<1 kg) No (%)		VLBW (1-1.49 kg) No (%)		LBW (1.5-2.49 kg) No (%)		NBW (2.5-3.9 kg) No (%)	
T1	9 (3.5%)	17 (6.6%)	149 (58.2%)	81 (31.6%)				
T2	16 (6.3%)	17 (6.6%)	121 (47.3%)	102 (39.8%)				
T3		1 (50%)	1 (50%)					
T4		1 (100%)						

ELBW (Extremely low BW), VLBW (Very low BW), LBW (Low BW), NBW (Normal BW)

remain so for the foreseeable future, the reason is that they are high-risk pregnancies and the incidence of multifetal pregnancies is increasing.^[8] Twins constitute 25–30% of deliveries resulting from assisted reproduction.^[8]

The prevalence of natural multifetal pregnancies is influenced mainly by heredity, race, and parity, but of recent age became a very important factor because many women are delaying childbearing while advancing their careers, this is complemented by advancement and acceptance of assisted reproductive technologies to overcome infertility.^[2,3,8,9] Our study of multifetal gestation shows a rate of 27/1000 deliveries. This rate is similar to the findings of other studies in the country^[5,6,10] but contrast significantly with the higher rates from Ibadan, Igbo-Ora, Katsina in the pre-ART era and Abuja.^[7,11] There is no doubt that ART has had a great impact on the prevalence of multifetal pregnancy in Nigeria as is in other countries of the world.^[1-3,8,12]

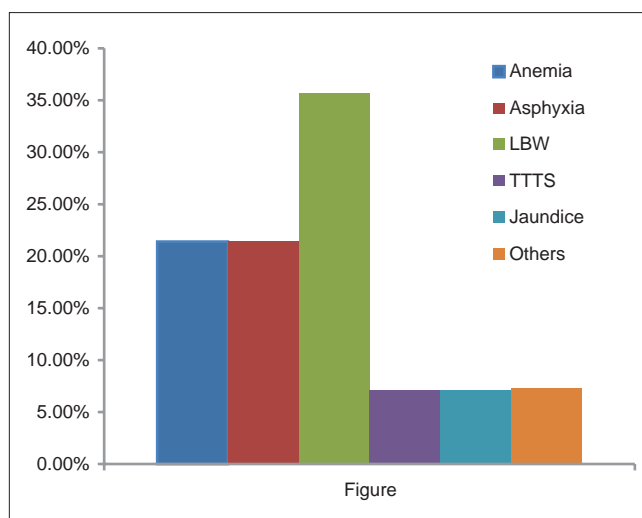


Figure 3: Reasons for SCBU admission

Maternal age has always been thought to be the most important nongenetic factor that influences the incidence of multifetal pregnancies. In this study, the age group with the highest incidence was the over 35 years group, this is in agreement with earlier studies by Bulmer, Bortolus *et al.*, and Nylander^[13-15] and more recent ones by Olusanya and Pison and D'Addato.^[16,17] Indeed there is a paradox of declining fertility but increasing twinning rates with advancing maternal age according to Beemsterboer *et al.*^[18]

There is a clear superiority of incidence among the nulliparous group in this study as against findings from some studies from Africa; earlier studies by Rehan and Tafida^[11] and Roberts and Tanner exhibited clear increases in incidence as parity increases and this also was the finding of a more recent work by Akaba *et al.*^[7,19] Bulmer has postulated the possibility of increase in ovarian activity as parity increases which may be responsible for multiple ovulation and increase in incidence of at least the dizygotic variety of twins. Nevertheless, there is no doubt that there are many other factors that influence twinning rate although they may vary from region to region.^[13]

In more than half of the women there was a positive history of twinning. This has been the finding of other workers. A history of twins in the family was positive in 51% of our study population, this is close to 40% associated with twinning in a Southern India^[20] study, but only 10% in another study in the North of the same country.^[9] The factor for familial determination of twinning is said to domicile in the female gene, most especially for the dizygotic variety and appears to be recessive in expression according to Bulmer.^[13]

That OI was accessed by more than 10% of the women whether prescribed or not by their physicians, is not surprising. It is

not uncommon even for women to purchase the induction agents that do not appear to be controlled, all for the quest to have twins! In this study, there was no discrimination between those that had prescriptions or not for the agents. Our findings agrees with findings of other studies.^[20-23]

Our region of the world is notorious for lack of or late registration for antenatal care for various reasons according to Onwuhafua.^[24] There appears however to be an improvement in attitude according to a recent demographic survey as high as 86% among urban dwellers (NDHS 2013). Pregnancies complicated by multiple fetuses are adjudged now by most care givers to be high risk; hence, there is a tendency for referral to higher centers like ours. The finding of this very high incidence of booking among the women in this study should therefore not be surprising. Nevertheless, the reasons for this very high incidence of booking in this study, compared to studies from other similar academic centers may only be inferential at this time.

That multifetal pregnancies contribute to significant proportion of preterm births and neonatal deaths are no longer under question as has been acknowledged by various workers.^[3,25-27]

There is no international consensus on the appropriate timing of delivery for multifetal pregnancies. It is however understandable that complications are likely to be greater in higher multiples with consequent higher incidence of preterm deliveries that may be either spontaneous or iatrogenically induced. Furthermore, associated clinical complications and interventions may play important roles in determining the timing of delivery. It is salutary that in this study more than 80% of the pregnancies were delivered after 34 weeks, a gestational age it is believed most fetuses will survive even in less equipped service centers. This is similar to the findings in Kano and Laskov (60%) reported from Israel.^[28,29]

Race as a predisposing factor for multifetal pregnancy was demonstrated by the proportion of Yorubas (42.7/1000) who had multifetal pregnancy, followed closely by the Hausas (35.6/1000).^[4-7] The high rate of the Hausas could be as a result of the high risk associated with multifetal pregnancies, necessitating referral from other centers. There is a general belief that Yoruba's predisposition to multifetal gestation is complemented by consumption of yam (*Discorea sp.*) a favorite of the Yorubas which is believed to contain a natural hormone phytoestrogen which may stimulate multiple ovulation.^[14]

After an uncomplicated antenatal care, clinical decision on the route of delivery of the fetuses becomes the next

important challenge to the obstetrician. This is not unrelated to the various complications that are associated with this abnormality of human reproduction. No wonder the need for a skilled leader of the team to take charge. Many articles have tried to provide justification for one choice over the other, but adduced evidences lack enough power to be adopted universally. Many factors govern decision making with regards to mode of delivery; these include associated maternal complications, number of fetuses, status of the fetuses, the ease of fetal monitoring, the dexterity of the accoucheur, and of course the desire of the gravida among others. In this study, vaginal delivery was the most popular and is in agreement with findings of others.^[7,30,31] Furthermore, cesarean section is favored with better fetal outcome compared to vaginal delivery. This is in agreement with other studies^[32-34] During the period of study the CS rate for multifetal pregnancies was higher than the 24.5% reported by Adelaiye *et al.* for the general obstetric population.^[35] Nevertheless, the rate is higher than the rates reported from Kano^[5] and Abuja.^[7] However, our rate is far less than that reported from Lagos by Adegbola and Akindele.^[31] The statistical significance between presentation and mode of delivery $X^2 = 31.579$ and $P = 0.000$ suggest that presentation was a strong determinant of whether the patient had CS or vaginal delivery. In many studies conducted in Nigeria and other parts of the world, cephalic presentation in the leading twins was the commonest.^[4,6,11,12] Suffice to note that many factors influence decision making in patient management and it is therefore of utmost importance to adhere to the professional dictum of *primum non nocere* in all situations.

LBW is common among pregnancies complicated by multiple fetuses due to reasons that have been earlier addressed and more so because of the availability of improved methods of care, for the neonate in the face of adverse growth environment. More than 60% of the babies in this study were LBW. This is similar to the findings of Galandanci *et al.*, Akaba *et al.*, and Olusanya.^[5,7,16] Moreover, this was the most common reason for admission into the special care baby unit (SCBU) like in some other studies.^[4-6]

The PNMR in this study was 114 per 1000 births, and is much higher than the overall PNMR of 43.9/1000 reported in the same center by Adelaiye *et al.*^[35] but similar to that of Akaba *et al.* in Abuja.^[7] Better results have been reported from India.^[4,5,14] There is no doubt that quality of care of multifetal pregnancies needs further strengthening especially in the overall management of birth asphyxia which was associated with most of the perinatal deaths. The high maternal mortality indicates that multifetal pregnancies are high-risk pregnancies.

Conclusion

Parity, ethnicity, maternal age, OI, and family history were the major determinants of multifetal pregnancies. There was statistically significant association between presentation and mode of delivery and also the birth weight and Apgar score of the leading twins. Our multifetal pregnancy (27/1000 deliveries) rate and cesarean section rate were high, associated with high maternal and perinatal morbidity and mortality. Close antenatal and intrapartum care, training and retraining of resident in pediatrics and obstetrics on neonatal resuscitation, more and early recourse to CS, and giving more attention to asepsis will go a long way in improving the outcome of multifetal pregnancies.

Authors contribution

Prof. Onwuhafua: critical appraisal.

Dr Hamdala A. Adelaiye: acquisition of data in neonatal intensive care unit.

Dr Samuel M. Adelaiye: design, planning, acquisition of data in obstetrics, data analysis and writing.

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Conflicts of interest

There are no conflicts of interest.

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