

Frequency of Twinning in Nigeria: A Review

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ABSTRACT

Increased twinning rate in developing countries, especially Nigeria, which has the highest twinning rate, exposes mothers and infants to extremely high risks. Multiple births can contribute significantly to maternal and perinatal morbidity and mortality, women with multiple gestations are at increased risk of preeclampsia, preterm labor, delivery of low-birth weight infants, antepartum or postpartum hemorrhage, cesarean section, congenital anomalies, intrauterine growth retardation, and maternal and perinatal death as compared to women with singleton gestations. This review was undertaken with the objective of providing data on the frequency of twinning across Nigeria, which is implementing measures for safe delivery and monitoring susceptibility to disease. Literature search for incidence of twinning in Nigeria between 2008 and 2014 was carried out and twin birth per 1,000 deliveries was calculated from the frequency recorded across various states in Nigeria. We reported the frequency of twinning across Nigeria to be 6,070 out of 189,178 total births and twin birth per 1,000 deliveries to be 32.1. The maternal age range of 25–34 years showed the highest rate of twinning in this study. Our result also revealed that Nigeria had the highest rate of twinning when compared to studies from other countries except Benin Republic. This might be as a result of massive migration of Nigerians most especially the Yorubas to Benin. This study provides information on incidence/frequency of twinning across Nigeria. It also reveals how the Nigerian populations in the north, south, west, and east vary with respect to twin birth. This vital information will be germane for population genetics and anthropological studies and may be helpful in planning future health strategy, particularly in management of diseases associated with women with multiple gestations.

Keywords: Twinning, Nigeria, multiple births, maternal age

INTRODUCTION

The incidence of multiple births has a broad racial and geographical variation. People of African descent have the highest incidence; the Far Eastern races, the lowest; and the Caucasians of Northern Europe are intermediate. Nigeria is located in Western Africa and the Gulf of Guinea and has a total area of 923,768 km², with an approximate population of 188 million inhabitants. Nigeria is viewed as a multinational state, as it is inhabited by over 500 ethnic groups of which the largest are the Hausa, Igbo, and Yoruba. Within each racial group, ethnicity influences the twinning rate; the rate of twin pregnancy among the three major ethnic groups has been found to be highest in the Yorubas of the west, lowest amidst the Hausas and Fulanis of the north, and intermediate among the Igbos of the east (Akinboro et al., 2008; Sunday-Adeoye et al., 2008; Yakasai & Rabi, 2013). Twins are offspring produced from the same pregnancy; twins basically are either monozygotic (identical) twins resulting from the fission of a developing zygote to give two embryos or dizygotic (fraternal) twins resulting from the fusion of two different eggs and sperm. Differences in twinning rate are found not only in Nigeria but also across the world in different populations and are found to be low in East Asia and Oceania (less than 8 twin births per 1,000 births); intermediate in Europe, USA, and India (9–16 per 1,000 births); and high in some African countries (17 and more per 1,000 births) (Smits et al., 2011).

Twinning rate is however influenced not by social class or poverty but by genetics and environmental factors. Naturally occurring monozygotic twinning is thought to occur at a relatively constant rate of 3.5–4.0 per 1,000 births across the human population (Astolfi et al., 2003). The two common genes that influence dizygotic twinning are the gene variant rs11031006 (FSHB) and the gene encoding the

morphogenic protein rs17293443 (SMAD3). Among the factors that could influence twinning in Nigeria and the rest of the world are maternal age and race, height and weight (170 cm and BMI of 30), parity, diet, cessation of the use of oral contraceptives, and the use of ARTs (assisted reproductive technologies). ART is created to solve the problems of infertility among couples. Infertility, also called primary infertility, is the inability of a woman to become pregnant (regardless of causes) after one year of unprotected sexual intercourse using no birth control method, which is in contrast to secondary infertility (miscarriage), which refers to the inability to maintain a pregnancy (Ola, 2012). The high rate of twinning found among the Yorubas is said to be possibly due to the high consumption of yam tubers, which have been found to contain some natural phytoestrogen substances, which cause the release of multiple eggs during an ovarian cycle (hyperovulation). Twin births were found to occur more commonly within the maternal age group of 25–34 years, after which it dropped sharply due to reduction in the pool of the growing follicles because the increase in dizygotic twinning with age is thought to be due to rising FSH concentrations driving the selection of more ovarian follicles (Lambalk et al., 1998).

Increased twinning rate in developing countries especially in Nigeria with the highest twinning rate exposes mothers and infants to extremely high risks. As multiple births can contribute significantly to maternal and perinatal morbidity and mortality, women with multiple gestations are at increased risk of preeclampsia, preterm labor, delivery of low-birth weight infants, antepartum or postpartum hemorrhage, cesarean section, congenital anomalies, intrauterine growth retardation, and maternal and perinatal death as compared to women with singleton gestations (Kuliima et al., 2011; Attah et al., 2014). Thus, this paper aims to review the

incidence of twinning cases in Nigeria using a search engine.

MATERIALS AND METHOD

A literature search for twinning rate, distribution, and prevalence or frequency in Nigeria was done and used for our data analysis on the frequency of twin birth and maternal age associated with it among the different states in the six geopolitical zones of Nigeria (see Fig. 1). Nigeria is one of the most densely populated countries in Africa, with approximately 200 million people in an area of 920,000 km² (360,000 square miles). It is one of the countries with the largest population in Africa and the seventh largest population in the world. Nigeria is found in the West Africa region and borders Benin, Chad, Cameroon, and Niger. It has 36 states and the Federal Capital Territory (FCT) of Nigeria with over 500 ethnic groups and over 500 languages. The most common ethnic groups are the Yoruba, Hausa, and Igbo.

PubMed, MEDLINE and CAB HEALTH were searched with combinations of the

following keywords: twin birth, multiple birth, assisted reproductive technology (ART), maternal age, six geopolitical zones, and Nigeria. The total number of a maternal age group (m), total number of twin birth (y), and total number of deliveries (z) were calculated. We compiled data for 11 years (2003–2014). Thus, the frequency of twin birth in maternal age per 1,000 deliveries was computed as

$$\frac{\text{Total number of a maternal age group } (m)}{\text{Total number of deliveries } (z)} \times 1000$$

While the number of births in every 1,000 deliveries was computed as

$$\frac{\text{Total number of twin births } (y)}{\text{Total number of deliveries } (z)} \times 1000$$

RESULTS

Twinning rate from different states, locations, and geopolitical zones were compared and the increasing twinning rate in different maternal age group computed with



Figure 1. Map of Nigeria showing the six geopolitical zones.

data compiled from each study. From all the studies observed, total births of 189,178 and total twin births of 6,070 were observed. From the results compiled from different studies in this review, a twinning rate of 32.1 twin births per 1,000 deliveries was recorded in Nigeria. This study does not show data on monozygotic and dizygotic twinning rate in relation to the overall twinning rate. As shown in Table 1, Osun State shows a twinning rate of 46.2 being the highest and Sokoto State shows a twinning rate of 8.5 twin births per 1,000 deliveries. The maternal age of between 25 and 34 years is associated with the high rate of twinning in this study (Table 1). Our results also revealed that Nigeria had the highest rate of twinning when compared to studies from other countries (Table 2). The data presented in Table 3 shows a degree of high percentage of cesarean deliveries in twin births due to perinatal complications.

DISCUSSION

This study investigated the twinning rate and maternal age in Nigeria group compared to other populations. This is germane because despite the lack of advanced ARTs in many hospitals in Nigeria, the rate of twin births is on the increase. This increase is an important public health issue because twin babies are more fragile than singleton ones (Pison et al., 2015). They have lower birth weight, have more complications at birth, and are more often born premature—all of which are associated with many long-term health problems (Delobel-Ayoub et al., 2009; Johnson & Schoeni, 2011; Larroque et al., 2004). Twin pregnancies are associated with a high risk of gestational diabetes, preeclampsia, postpartum depression, and increased divorce risk (Bdolah et al., 2008; Choi, Bishai, and Minkovitz, 2009; Jena, Goldman, & Joyce, 2011; Rauh-Hain et al., 2009)

and thus stillbirth and infant mortality rates are also much higher among twins than among singletons (Guo & Grummer-Strawn, 1993; Monden & Smits, 2014; Pison 1992).

The high rate of twinning in Nigeria (West Africa) in this study complied with that of Vogel and his colleagues, where twinning rates of 24 countries (low- and middle-income countries) were investigated. The probability that a woman who conceives spontaneously or naturally, that is, without medical assistance, gives birth to twins is determined by various factors (Pison et al., 2015). The most important factors are maternal age, birth order or family history, and region. The frequency of twin births varies considerably with the mother's age group; however, this study is compatible with the Norwegian birth study where the mean maternal age for twin birth was 31.3 years (Nilsen et al., 2016), and Zelenik (2001), where the maternal age range for twin birth was between 25–29 and/or 30–34 years. This is also similar to the work of Pison et al. (2015), wherein from 6 per 1,000 births before the age of 20, the frequency of twin births increased steadily until 35–39 years of age, where it reached a maximum 15 per 1,000 and declined to 7 per 1,000 births above age 39 in developed countries.

Twinning rates have been reported to be low in East Asia and Oceania (less than 8 twin births per 1,000 births), intermediate in Europe and India (16–20 per 1,000 births), and high in some African countries (35 and more twin births per 1,000 births) (Smits et al., 2011). This review that twinning rate is common among the people of Southwest (Yoruba) Nigeria. The data presented for the frequency of twinning in this study should have been above that if not for the increased rate of perinatal complications associated with twin birth as reported by Nwankwo et al. (2013). Our results are in line with Mosuro (1996) and Akinboro et al. (2008) wherein they reported that Yorubas in Nigeria have

Table 1. Summary of Twin birth and Maternal Age Group per 1,000 Deliveries in Nigeria

State	Place of Research	Frequency of Twin Birth (Maternal Age group per 1,000 Deliveries)							Twin Birth per 1,000 Deliveries	Total Births	Total Twins Delivered	References	
		15-19	20-24	25-29	30-34	35-39	40-44	40-44					
<i>Kwara (North Central)</i>	University of Ilorin Teaching Hospital (UIITH) and Omosebi Hospital Ilorin (OHI), Erinle General Hospital, Erinle (EGHE)	1.2	3.9	6.7	8.5*	15.1*	10.9	6.6	1.1	37.4	26,709	999	Iyiola et al., 2013
<i>Oyo (Southwest)</i>	Oyo State General Hospital (OSGH)	5.1	6.7	8.5*	6.2	5.3	6.7	6.7	38.5	4,340	167	Akinboro et al., 2008	
<i>Osun (Southwest)</i>	Wesley Guild Hospital (WSH)	0.8	7.6	18.9*	13.1	7.1	1.1	1.1	46.2	13,304	644	Akinboro et al., 2008	
<i>Osun (Southwest)</i>	Obafemi Awolowo University Teaching Hospital	1.8	7.9	19.4*	11.3	7.0	2.1	2.1	46.5	8,620	401	Akinboro et al., 2008	
<i>Ekiti (Southwest)</i>	Ekiti State Specialist Hospital (ESSH)	1.1	3.9	6.0	6.3	6.3	1.1	1.1	22.1	6,968	154	Akinboro et al., 2008	
<i>Maiduguri (North east)</i>	University of Maiduguri Teaching Hospital	1.3	4.7	7.9*	4.2	3.1	0.8	0.8	23.2	8,431	196	Kulima et al., 2011	
<i>Abuja (North central)</i>	University of Abuja Teaching Hospital	0.7	4.9	10.9*	8.2	2.7	0.6	0.6	32.5	10,739	349	Akaba et al., 2013	
<i>Jos (North central)</i>	Jos University Teaching Hospital	0.9	2.6	8.8*	6.7	2.3	0.6	0.6	21.9	3,420	75	Mutihir and Pam, 2007	
<i>Ebonyi (Southeast)</i>	Mater Misericordae Hospital (MMH)	≤19	20-29	30-39	≥40								
		0.6	19.7*	19.0	2.4	2.4	2.4	2.4	43.1	33,689	1,453	Sunday-Adeoye et al., 2008	
<i>Benin (South east)</i>	St. Philemona Catholic Hospital (SPCH)	0.2	12.8	11.4	0.7	0.7	0.7	0.7	25.3	4,544	115	Onyiriuka, 2010	
<i>Uyo (South south)</i>	University of Uyo Teaching Hospital	0.5	17.2*	6.6	0.3	0.3	0.3	0.3	25.9	6,344	164	Abasiatti et al., 2010	

State	Place of Research	Frequency of Twin Birth (Maternal Age group per 1,000 Deliveries)							Twin Birth per 1,000 Deliveries	Total Births	Total Twins Delivered	References	
		≤19	20-24	25-39	30-34	≥40	18-22	23-27					28-32
<i>Bauchi (North east)</i>	Federal Medical Centre, Azare	0.9	3.0	3.7	3.8	2.9					12,068	180	Ibrahim et al., 2013
<i>Enugu (South east)</i>	University of Nigeria Teaching Hospital, Ituku-Ozalla	-	2.6	7.6	6.8	4.9				5298	117	Nwankwo et al., 2013	
<i>Kano (Northwest)</i>	Aminu Kano Teaching Hospital	0.2	3.8	7.2*	2.2	1.8				15,233	353	Attah et al., 2014	
<i>Kano (Northwest)</i>	Aminu Kano Teaching Hospital	≤19	20-24	≥35						15,247	349	Yakasai and Rabi, 2013	
<i>Niger-Delta (South south)</i>	Baptist Medical Centre, Eku, Delta State	15-24	25-34	35-44						3,351	99	Igberase et al., 2008	
<i>Sokoto (Northwest)</i>	Usmanu Danfodiyo University Teaching Hospital (UDUTH)	≤20	21-25	26-30	31-35	36-40	>40			2,116	18	Onankpa and Nauzo, 2014	
<i>Enugu (South east)</i>	University of Nigeria Teaching Hospital	<21	21-30	31-40	>40					8,757	237	Onah and Ugwu, 2008	
Total		1.1	17.6*	7.8	0.6					189,178	6,070	This study	

Table 2. Comparative Analysis of Twin Births per 1,000 Births in Different Populations

Country	Twin Births per 1,000	References
France	15.0	Pison and Couvert, 2004
Singapore	8.0	Chia et al., 2004
USA	31.1	CDC, 2009
Egypt	17.7	Smit and Monden, 2011
Haiti	14.1	Smit and Monden, 2011
Japan	8.0	Smit and Monden, 2011
Bolivia	6.7	Smit and Monden, 2011
Vietnam	6.2	Smit and Monden, 2011
Turkey	9.9	Smit and Monden, 2011
Benin Republic	27.9	Smit and Monden, 2011
Benin Republic	55.3	UNICEF, 2016
Nigeria	32.1	This study

Table 3. Mode of Delivery in Different Populations in Nigeria

State	Vaginal Delivery (%)	Cesarean Section (%)	Vacuum Delivery (%)	References
Enugu	60.8	31.7	—	Onah and Ugwu, 2008
Niger-Delta	36.0	59	2.0	Igberase et al., 2008
Uyo	40.2	51.2	3.7	Abasiatti et al., 2010
Abuja	56.7	24.0	2.0	Akaba et al., 2013
Maiduguri	46.8	24.7	7.0	Kuliima et al., 2011

the highest rate of twinning in the world. The highest rate recorded might be attributed to certain diets and family histories in some parts of Nigeria. The unusually large number of twin births in one of the southern regions of Nigeria (Igbo-Ora) has earned the town the nickname “Twin Capital of the

World.” However, this phenomenon of a large number of twin births is not unique to Igbo-Ora; it has also been observed in the town of Kodinji in India and Cândido Godói in Brazil. In Igbo-Ora, research has suggested that the multiple births could be related to the eating habits of the women in the region.

It is believed that the yam and okra leaves consumed by women in Igbo-Ora influence their multiple births. Though no direct relation between dietary intake and twin births has been proven, a study carried out at the Lagos University Teaching Hospital has suggested that a compound found in Igbo-Ora women and the peelings of a widely consumed tuber (yams) could be responsible. The yam might contain phytoestrogen, which might stimulate multiple fertility in female mammals (the mother). Also, scientifically, no study has given detailed mechanisms behind the diets. Multiple births in Igbo-Ora may be attributed to heredity, due to consanguinity marriages over a period of time; resulting in a gene pool in the environment. It is also a common belief in Igbo-Ora that the stew made from the okra leaves should be eaten immediately and not stored in order to have twins. Thus, this led to the increase rate of okra consumption as well as yams by the Yorubas.

Although, in another survey carried out by UNICEF (2016), the highest rate of twinning was observed in Benin (55.3 twins per 1,000 live births), followed by Ghana and Cameroon (43.3 and 42.8 twins per 1,000 live births). The lowest rates were in Bolivia, the Philippines, and Honduras, with rates below 15 twins per 1,000 live births. Thus, literature review showed that there has been no proper record of twinning in Nigeria since 2014 and this might influence the data survey by UNICEF in 2016. Also, before 2014, a comparison of data from demographic and health surveys of 75 developing countries collected between 1987 and 2010 revealed that Benin had the highest national twinning rate of 27 sets of twins per 1,000 births while Nigeria had a rate of 19 sets of twins per 1,000 births. This implies that, although Benin and Nigeria had the highest number of twin births per 1,000 births when pulled together, large samples size are needed to demystify this claim. A full research survey covering a 20-year period by

experts and other than newspapers or any other nonscientific platforms is needed from each country. With the sparse data of twin birth rates in Nigeria for the past 5 years, more recent data from Benin showed that it has the highest national average of twinning, with a rate of 27.9 twins per 1,000 births in West Africa. Also, migration of Nigerians to Benin is rising; in fact, in 2012, the largest foreign communities in Benin were from Niger (34.8%), Togo (22.1%), Nigeria (20.5%), and other West African countries (11.6%). According to the Benin population (2019), the major ethnic groups in Benin include the Yoruba in the southeast (who migrated from Nigeria), the Dendi in the north-central region (who originated from Mali), the Bariba and Fula in the northeast, the Betammaribe and Somba, the Fon near Abomey, and the Aja, Xueda, and Mina. Thus, the migration of Nigerians most especially the Yorubas to Benin Republic may have influenced the highest twinning rate recorded recently in the country.

Other environmental factors, other than diets that influence twinning rate (of dizygotic twins) or multiple births are use of oral contraceptives and ARTs such as ovarian stimulation, multiple blastocyst transfer, and intra-uterine insemination (Fauser et al., 2005; McClamrock et al., 2012) in developed countries. Despite the higher frequency of twinning rate in Nigeria, cesarean delivery is high and not always 100% successful due to increased rate of perinatal complications associated to twin births when compared to vaginal delivery. Cesarean delivery is high not only in Nigeria but also in some low- and middle-income countries where vaginal delivery was recorded to be 57.7% and cesarean section was 42.9% (Vogel et al., 2013). From this study, it can be deduced that twinning in Nigeria might be truly influenced by ethnicity as in the case of Benin where major ethnic groups include the Yoruba who migrated

from Nigeria. Another factor that might be attributed to increased risk of twinning in United States is increase use of ARTs.

CONCLUSION

This review from Nigeria gives a detailed prevalence of the and how its associated with maternal age. Our results show that Nigeria is among the countries with high rate of twinning in the world. However, twin pregnancy is associated with an increased risk of obstetric complications as well as increased risk of perinatal, neonatal, and infant morbidity and mortality in the country. Therefore, the government of Nigeria needs to be more proactive in tackling maternal and child health issues by way of improving obstetric, neonatal facilities and manpower and also ensure that proper records of twinning in the country are documented.

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