Epidemiology of external birth defects in neonates in Southwestern Nigeria

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ABSTRACT

Background: There is paucity of information on the prevalence of birth defects in Nigeria, particularly in our setting. This study determined the epidemiology of external congenital anomalies in Southwest Nigerian children. **Patients and Methods:** This was a stratified, randomized study of neonates presenting with external birth defects in Ife-Ijesha in Southwestern Nigeria, from August 2003 to July 2004. The neonates were screened for obvious congenital malformations by thorough physical examination. **Results:** A total of 624 neonates were screened, 43 (6.9%) of whom had external birth defects (prevalence: 3.7 ± 0.8% SD). There was a slight male preponderance (M: F= 1.4: 0.9). The overall prevalence rates of external congenital and major anomalies in Ife-Ijesa are 6.9 and 3.7% respectively. A higher prevalence for major malformations, 6.3%, was also found within the minority ethnic groups in these communities compared to the native majority. Musculoskeletal abnormalities are the most common anomaly, followed by those of abnormal external genitalia and head defects. **Conclusion:** Major malformations are more common amongst the minority settlers in this study, and musculoskeletal abnormalities were the most prevalent.

Key words: Birth defects, epidemiology, neonates, Nigeria

INTRODUCTION

Birth defects (congenital anomalies) are usually obvious at birth.[1] There has been an increasing interest in the epidemiology, aetiology, and prevention of birth defects in the last few decades. It has been estimated in highly industrialized countries that about 70% of miscarriages and 20% of perinatal deaths are due to congenital anomalies.[2,3] However, in our setting and perhaps in most African countries, there is paucity of information on birth defects. The literature available for African countries consists of only case reports and reviewed articles.[4-8] Thus, most of the information available to us is based on studies from these highly industrialized countries.

The dearth of population-based studies in our communities forms the basis of this prospective study, which aims to determine the prevalence and the distribution of external congenital anomalies in communities in Southwest Nigeria.

PATIENTS AND METHODS

All neonates delivered in six local government areas of Ife and Ijesha division, Osun State, over a period of one year (August 2003 to July, 2004) were examined for external congenital anomalies by thorough physical examination. Using stratified random selection, two health institutions were selected from each of the six local government areas.

Ethical approval for the study was obtained from the Ethical Review Committee of the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife.

All newborn babies referred to hospitals in the selected local government areas from outside the studied zone and all stillborn babies delivered in the zone during the period were excluded from the study.

The overall prevalence rates of all malformations and of major malformations were determined. A major malformation was defined as a malformation having either cosmetic or functional significance, while a minor malformation had no cosmetic or functional significance.

The data obtained were analysed using Epi info 2002. The Chi-square test was used to determine statistical significance.

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RESULTS

A total of 624 live newborns comprising of 320 (51.3%) males and 304 (48.7%) females (M:F = 1.4:1) were included in the study. Five hundred and eighty-five neonates were of Yoruba indigenes whereas the remaining 39 were of other tribes. The numbers of newborns examined in each of the six local government areas studied are shown in Table 1.

Forty-eight malformations were found in 43 [6.9%] of the 624 neonates; five neonates had two malformations each. Musculoskeletal malformations observed in 21 (3.5%) newborns constituted the largest number of birth defects. This was followed by abnormal external genitalia in nine (1.4%), head abnormalities in eight (1.3%), and abdominal defects in seven (1.1%) neonates. Other malformations are shown in Table 2. Major malformations were found in 23 (3.7%) neonates, occurring mainly in the musculoskeletal system; other malformations are shown in Table 3.

The prevalence of birth defects in the studied population varied; it was highest in Ife East local government with a prevalence of 0.17, and zero in Atakumosa and Ife South local government areas [Table 4].

Table 1: Distribution of examined neonates in the sampled health facilities in each local government

Local Gov.	Examined neonates	Public facilities	Private facilities
Atakumosa West	50	50	0
Ife Central	132	118	14
Ife East	95	46	49
Ife South	34	34	0
Ilesa East	116	49	67
Ilesa West	197	187	10
Total	624	484	140

Gov. = Government

Twenty-three neonates had major external malformations: 17/585 (2.9%) neonates were of Yoruba origin and 6/39 (6.3%) neonates were of other origins (Table 5). A higher prevalence of major malformation (15.4%) was noted among the minority groups compared to 2.9% noted among the Yoruba majority ($P < 0.002$).

DISCUSSION

The overall prevalence rates of external birth defects and major congenital anomalies in this study agree with findings from similar studies carried out in the United Kingdom and Victoria State, Australia, which showed prevalence rates of major congenital malformations of 3.7 and 4.0% respectively.[9,10] In contrast, findings from this study differed by a 2–3% prevalence rate for major congenital malformations reported in other parts of Europe and America.[2,3] A slight male preponderance of major malformations observed in this study is also in keeping with findings in Victoria State, Australia[10] and other parts of the world.[11]

The prevalence rates of any disease condition are essential public health data that help in proper planning of logical and decisive preventive and eradication strategies. Knowledge of prevalence and distribution of external birth defects could therefore be the first step in the study of the epidemiology and planning of preventive and eradication strategies.

The preponderance of musculoskeletal malformations in this study is also in agreement with the 2002 National Statistics of England and Wales Report on Congenital Anomaly which identified musculoskeletal anomalies as the most common congenital malformation occurring in 2,097 out of 6,794 (30.8%) live newborns.[11]

Table 2: Types and locations of congenital abnormalities

Site of defects	Frequency	List of defects	
		Major	Minor
Head	8	Hydrocephalus[1], Anencephaly[2], Epignathus[1]	External angular Dermoid[1], Low-set Ears[2], Frontal exostoses[1]
Chest	1	------	Absent lower left ribs[1]
Abdomen	7	------	Inguinal Herniae[6]
		------	Umbilical Hernia[1]
Genitalia	9	Undescended testes[3], Hypospadias[3],	------
		Urethral Diverticulum[2], Micropenis[1]	------
Musculoskeletal	21	Exomphalos[3],	Polydactyly[9], Syndactyly[1], Spinal Bifida[1]
		Unilateral Aplasia of the Radius[1],	
		Varus deformities[5], Amniotic Band Syndrome[1]	
Skin	1	------	Hyperpigmented Skin
		Patches[1]	
Others	1	------	Macrosomia[1]
Total	48	23	25

Group A: Population of the examined neonates with Birth Defects
Group B: Population with Major Birth Defects from within Group A

Table 3: Distribution of major malformations among the examined neonates

Anatomical Site	Anomalies	Nos. with Defects [%]	Nos. of Females	Nos. of Males
Head	Hydrocephalus	1 [0.16]	1	1
	Epignathus	1 [0.16]	0	1
	Anecephaly	2 [0.32]	2	0
Genitalia	Hypospadias	3 [0.48]	0	3
	Micropenis	1 [0.16]	0	1
	Undescended testes	3 [0.48]	0	3
	Urethral Diverticulum	2 [0.32]	0	2
Musculoskeletal	Exomphalos	3 [0.48]	3	0
	Amniotic Band Syndrome	1 [0.16]	1	0
	Talipes deformities	5 [0.80]	3	2
	Aplasia of Radius	1 [0.16]	0	1
Total		23 [3.68]	9	14

Table 4: Prevalence of birth defects in each local government

Local government	Neonates examined	Neonates with defects	Prevalence of defects
Atakumosa West	50	0	0.0
Ife Central	132	17	12.9
Ife East	95	16	16.8
Ife South	34	0	0.0
Ilesa East	116	5	4.3
Ilesa West	197	5	2.5
Total	624	43	38.5

Table 5: Distribution of externally recognizable birth defects among the various ethnic groups in the study population

Ethnicity	Examined neonates	Population of Group A	Population of Group B
Yoruba	585	30	17
Igbo	15	3	2
Urhobo	13	6	3
Hausa	3	1	1
Others	8	3	0
Total	624	43	23

Group A: Population of the examined neonates with Birth Defects
Group B: Population with Major Birth Defects from within Group A

It is not clear why the prevalence of congenital malformations was highest in Ife-East local government area and zero in Atakumosa and Ife South local government areas. This finding justifies further research directed at identifying probable aetiological agents. The higher prevalence rate of major malformations noted among the minority groups may be due to inherent genetic predisposition in the minority ethnic groups as all the subjects were exposed to the same environmental factors. Terry *et al*.[12] identified multiple ethnicity and varying socioeconomic status of pregnant women as possible factors accounting for the varying incidence of birth defects from one country to another and within the same community.

The highest rate of congenital malformations observed among the children of the Yoruba ethnic group in this study is not surprising considering the fact that the Yorubas, the native indigenes, constituted the largest population in these areas.

In conclusion, there is high prevalence rate of external congenital anomalies with ethnic variation in our setting. Most malformations tend to occur in the musculoskeletal system. Future studies in Nigeria should attempt to ascertain observed differences in prevalence rates of congenital malformations among the ethnic groups, and attempt to identify the aetiology of these anomalies and their impact on infant morbidity and mortality in our community.

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