

# Congenital malformations as seen in a secondary healthcare institution in Southeast Nigeria

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## Abstract

**Objective:** The aim was to determine the prevalence and pattern of congenital malformations. **Materials and Methods:** A retrospective study of neonates with congenital anomalies delivered at Federal Medical Centre Abakaliki, Ebonyi state over 10 year period was conducted. Data were extracted from the delivery records of neonates and mothers. **Results:** The prevalence of congenital anomalies was 0.42%. Highest frequency of congenital anomalies occurred in the digestive system (36.7%), followed by the skeletal system and the least in the cardiovascular system (5%). Majority of cases (83.3%) were term babies while 85% had normal birth weight. Highest proportion of babies with congenital anomalies (35%) was delivered by mothers aged 25–29 years and 40% by those of parities 4, 5. Ninety-three percent of the mothers were booked. **Conclusion:** The prevalence of congenital malformations in this study was 0.42%. Congenital malformations of the digestive system are the most prevalent in this study.

**Key words:** Abakaliki, Congenital, Malformations

## INTRODUCTION

Congenital malformation could be defined as any abnormality of structure, function, behavior or chemical composition arising during pregnancy and manifesting at birth or within a few years later.<sup>[1]</sup> Though congenital malformations are not among the leading causes of perinatal morbidity and mortality in the developing countries as in the developed nations,<sup>[2,3]</sup> their prevalence cannot by any means be insignificant. Congenital malformation often becomes a cause for worry and anxiety for expectant parents when their product of conception anticipated with all sense of impending joy and happiness turns out to be abnormal.

In general, congenital malformations occur more commonly in Negroid races than Caucasians probably due to inadequate

use of antenatal services, maternal infections and malnutrition occurring more in the former.<sup>[4,5]</sup> In up to 40–60% of cases, the cause is unknown. However, identified causes include heredity and environmental factors such as single gene autosomal and sex-linked conditions, maternal infections, malnutrition, irradiation, smoking and use of alcohol, drugs such as anticonvulsants as well as parental advancing age and *in vitro* fertility procedure.<sup>[6-9]</sup>

The burden of disease arising from congenital anomalies can be quite enormous on the family, community and the nation as a whole. Knowledge of the prevalence, types and associated factors makes for better planning and provision of preventive measures where possible as well as treatment and rehabilitation as necessary.

Documented rates of congenital anomalies vary from country to country and even in localities within a country. For instance, rates of congenital malformations noted in Akwa Ibom and Cross River states in the South region and Kano state in the North-East region of Nigeria are 0.4% and 5.8%, respectively.<sup>[10,11]</sup> Rates of 0.4% and 0.2% were documented in different localities of Port Harcourt city, in Rivers state.<sup>[12]</sup> Therefore the more studies done in the process of determining the incidence, the more information obtained

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and the greater insight gained concerning the incidence and types of anomalies.

There is a paucity of data on congenital anomalies from this state located in the South Eastern region of Nigeria. Hence, the need for the survey.

## MATERIALS AND METHODS

This was a retrospective study derived from hospital records of Federal Medical Centre (FMC) Abakaliki before its recent merging with Ebonyi State University Teaching Hospital (EBSUTH) to form Federal Teaching Hospital, Abakaliki. As at the time of this study, FMC was a baby friendly secondary healthcare facility located in Abakaliki, the fast growing capital of Ebonyi state which also harbors another secondary health care facility and the then state university teaching hospital, EBSUTH. Its annual delivery rate averaged approximately 1500, whereas the annual pediatric and neonatal admissions were approximately 1331 and 230, respectively.

The records of congenital malformations in the delivery unit of the Department of Obstetrics and Gynecology and Special Care Baby Unit (SCBU) of Department of Pediatrics were studied over a 10 years period (from April 1, 2002 to March 31, 2012). The lists of congenital anomalies were compiled and arranged according to systems of the body involved. Other data extracted included the maternal age, parity and booking status as well as the gestational age and birth weight of the baby. The incidence of anomalies was calculated per 1000 births and as percentages of anomalies. Simple proportions were used in the descriptive analysis. For the purpose of the study, congenital anomaly was taken as abnormality of structure or form detectable on physical examination and/or with available, investigational services at birth or within a few days after delivery. Parity of the mother was taken as that prior to the delivery of the congenital baby.

## RESULTS

There were 14,446 deliveries during the study period with 60 (0.42%) having detectable congenital anomalies. Congenital anomalies were observed in the body systems in descending order of frequency as follows: Digestive system, 22 cases (36.7%), with a prevalence of 1.52/1000 births; skeletal system, 19 cases (31.7%) prevalence, 1.3/1000 births; central nervous system and respiratory system, 8 cases (13.3%), prevalence 0.05/1000 births each and cardiovascular system, 3 cases (5.0%), prevalence 0.02/1000 births as shown in Table 1.

The mean gestational age of the newborns was 38.4 weeks, range 36–42 weeks. Overwhelming majority (83.3%) were term babies as shown in Table 2.

The mean birth weight of the babies with congenital anomalies was 3100 g, range 2100–3900 g. Eighty-five percent of the babies weighed 2500–4000 g. None was macrosomic [Table 2].

The mean maternal age was 26.4 years, range 18–35 years. Highest proportion of the mothers (35%) was aged 25–29 years. Teenage mothers were the least in number (5%), as shown in Table 3.

Mothers of higher parities, 4.5 (40%) had the higher incidence of deliveries of babies with congenital malformations than those of parities lower parity [Table 3].

Overwhelming majority (93.3%) of the mothers was booked.

**Table 1: Frequency of congenital malformations by systems**

Systems	Frequency	Percentage (n=60)	Incidence/1000 births (n=14,446)
Digestive system	22	36.7	1.52
Imperforate anus	4	6.7	0.027
Omphalocele	4	6.7	0.027
Hirschprung disease	4	6.7	0.027
Anorectal malformation	4	6.7	0.027
Gastroschisis	3	5.0	0.020
Duodenal atresia	3	5.0	0.020
Musculoskeletal	19	31.7	1.30
Talipes equinovarus	4	6.7	0.027
Talipes equinovarus	4	6.7	0.027
Congenital hip dislocation	3	5.0	0.020
Multiple limb anomalies	8	13.3	0.055
Central nervous system	8	13.3	0.055
Spina bifida	4	6.6	0.027
Hydrocephalus	2	3.3	0.14
Microcephaly	2	3.3	0.14
Respiratory system	8	13.3	0.055
Laryngomalacia	8	13.3	0.020
Cardiovascular system	3	5.0	0.020
Congenital heart disease	3	5.0	0.020

**Table 2: Birth characteristics of newborns with congenital malformation**

GA (weeks)	Frequency	Percentage
<37	3	5
37-41	50	83.3
>41	1	1.7
Unknown	6	10.0
Birth weight (g)		
<2500	4	6.7
2500-4000	51	85.0
>4000	0	0.0
Unknown	5	8.3

GA = Gestational age

**Table 3: Maternal characteristics of newborns with congenital anomalies**

Age (years)	Frequency	Percentage
<20	3	5
20-24	18	30
25-29	21	35
30-35	15	25
Unknown	3	5
Parity		
0, 1	16	26.7
2, 3	16	26.7
4, 5	24.0	40.0
Unknown	4	6.6
Booking status		
Booked	56	93.3
Unbooked	4	6.7

## DISCUSSION

The prevalence of congenital malformations in this study was 0.42%. This being a hospital study conducted in a tertiary health care facility; the value is very much likely to be less than the real magnitude of the problem in the community. A large percentage of pregnancies are unsupervised with deliveries taking place in traditional birth attendants' facilities, homes and spiritual places of worship due to ignorance, poverty and negative cultural beliefs.<sup>[13-15]</sup> As a result, many cases of congenital anomalies are not documented.

The prevalence of congenital malformations in this study is similar to that obtained from a teaching hospital in Port Harcourt located in oil-rich Rivers state of Nigeria<sup>[12]</sup> where communities are frequently exposed to environmental pollution from uncontrolled gas flaring and oil spillage. The similarity is not readily explicable. It might be for the reason of both being studies of obvious congenital anomalies delivered in teaching hospitals in adjacent geopolitical zones of Nigeria.

However, the result obtained in this work is much  $<5.5/1000$  births obtained in Kano,<sup>[11]</sup> North-East zone and  $15.8/1000$  births obtained in Lagos,<sup>[16]</sup> South-West zone of Nigeria. The reasons for the wide variations in the results might be for over 90% of the population in the Kano study comprising Hausa-Fulani ethnic group noted for consanguinity of marriage possibly predisposing to increased rate of congenital malformations of genetic origin.<sup>[17,18]</sup> The highly multi-ethnic and industrial nature of Lagos possibly results in increased rates of anomalies of genetic and environmental origin from consanguineous marriages and exposure to pollution from industrial wastes respectively.<sup>[18-21]</sup>

The highest prevalence of congenital anomalies was recorded in the digestive system. This is similar to the observations in studies conducted in Abia State University Teaching Hospital Aba, Abia State<sup>[4]</sup> in the same geopolitical zone as our study center and Kano in Kano State,<sup>[11]</sup> North-Eastern zone of Nigeria. In contrast, central nervous system anomalies were the most frequent congenital anomalies recorded in studies carried out in Akwa Ibom, Rivers and Lagos states of Nigeria.<sup>[10,12,16]</sup> This difference in the body systems manifesting most frequent malformations in the different locations of the country aforementioned is not readily explainable. However, our study center, Abia, and Kano states reporting highest anomalies in the gastrointestinal tract are located in the hinterland of the country unlike rivers, Akwa Ibom and Lagos states showing most frequent anomalies in the central nervous system which are coastline oil-rich states with their populations suffering frequent exposure to environmental pollution from hydrocarbons and their compounds resulting from frequent oil spillage and uncontrolled gas flaring as well as from the activities of petrochemical industries located in these areas. Pollution from the petrochemical industries has been reported as causing birth defects.<sup>[19]</sup> Toxic agents might affect particularly the development of the central nervous system which occurs in the 4<sup>th</sup> and 5<sup>th</sup> weeks of gestation.<sup>[22]</sup>

Most (83.3%) of the congenital malformations were seen in full term newborns. This may be explained by the fact that congenital malformations when occurring in preterm babies delivered in our study center might not be quite obvious and, therefore, possibly missed by the nursing staff and less experienced doctors who usually attend normal deliveries.

Overwhelming majority (85%) of the newborns with congenital malformations were of normal birth weight because most of the malformations recorded in this study except cardiovascular system disorders occurred in body systems or areas not ordinarily associated with low or high birth weight.

The mean age of mothers of babies with congenital malformations is 26 years, while mothers in 24–29 years age bracket had the highest prevalence of congenital malformations. The lower mean maternal age recorded in this study than some previous ones could be due to our study population being younger with age range of 16–35 years while those of Enugu<sup>[23]</sup> and Lagos<sup>[16]</sup> had age ranges of 20–39 years and 18–39 years respectively. The highest prevalence of congenital malformations occurring in mothers aged 24–29 years in this study could be explained by the fact that this is the age bracket with high parity rates.<sup>[4,5]</sup> Congenital malformations have been noted previously as occurring most frequently in women with high pregnancy rates.<sup>[2]</sup>

Overwhelming majority (93.3%) of the mothers in this survey were booked. However, the paucity of documentation in the case notes including the time of booking has denied the authors the ability to evaluate the possible effect of time of booking on the prevalence of congenital anomalies observed in this study. It is known that delayed booking (which is common in developing countries including Nigeria)<sup>[24,25]</sup> often denies expectant women the due prescription and intake of folic acid and vitamins known to be preventive of neural tube defects when administered in the periconceptional period.<sup>[26]</sup>

## LIMITATIONS

This being a retrospective study lacks the purposeful alertness to scrutinize all the deliveries to identify all cases of congenital malformations as would have been the case in a prospective study. Hence some congenital anomalies might possibly have been missed further limiting the prevalence even as might have manifested in the hospital. It would have been appropriate to evaluate the contribution of congenital anomalies to perinatal morbidity and mortality in this study, but for the unavailability of adequate data due to insufficient and missing documentations from the case notes.

## CONCLUSION

The prevalence rate of congenital malformations in this study was 0.42%. Congenital anomalies of the digestive system are the most prevalent malformations in this study.

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