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Original Article

Pattern of Congenital Anomalies at Birth and their Associated Maternal Characteristics in Combined Military Hospital, Dhaka and Chattogram

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Abstract

Background: *Congenital fetal anomalies are an important causes of neonatal morbidity and mortality in developed and developing countries that affect health care system. Knowledge of maternal sociodemographic and antenatal characteristics could identify a pattern of population at risk in order to target preventive interventions. The study aimed to determine the pattern of congenital anomalies in newborns, as well as the associated maternal characteristics at a tertiary level hospital in Dhaka and Chattogram, Bangladesh.*

Materials and methods: *A descriptive cross-sectional study was conducted at Combined Military Hospital, Dhaka and Chattogram between February 2023 to September 2023, February 2021 to September 2021. A total of 50 pregnant women with fetal congenital anomalies admitted to the Department of Obstetrics and Gynaecology were included in this study. Pattern of anomalies and maternal sociodemographic and antenatal characteristics were recorded in a proforma.*

Results: *The mean age of the mother was 27.3±6.4 years. Twenty seven (54%) of the baby were male and 23 were female (gender ratio 1.2:1). More common congenital anomalies were hydrocephalus (26%), anencephaly (22%), cleft lip (6%), cleft lip & palate (6%), polydactyly (6%), and hydrops fetalis (6%). Associated materanl characteristics were high maternal age (34%), consanguinity of marriage (14%), maternal under-nutrition (22%), maternal obesity (6%), exposure to drugs (10%), associated medical conditions (34%), no history of folic acid intake in antenatal period (62%), high grade fever in 1st trimester and history of previous birth defect (8%).*

Conclusion: *Congenital anomalies of the CNS and musculoskeletal or gastrointestinal defects were seen most frequently. More research is required to identify the factors responsible for the different types of congenital anomalies.*

Key words: Antenatal; Congenital anomaly; Maternal sociodemographic; Pregnancy.

INTRODUCTION

The World Health Organization (WHO) defines congenital anomalies as "any potential pathological conditions arising before birth, whether evident at birth or manifesting later in life."[1] The commonest of these defects are the structural (Anatomic or morphological) abnormalities.[2] Congenital disabilities occur in about 6% of total births worldwide.[3]

Congenital anomalies in Low to Middle-Income Countries (LMICs) account for 94% of the global burden. They are among the top five causes of under-five mortalities.[4] Eighty percent (80%) of the global under-five mortality burden lies in Southern and Central Asia and Sub-Saharan Africa, with a significant burden on the health systems.[3]Improved technology and advances in clinical testing have resulted

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in increased detection rates of congenital anomalies during pregnancy. This is mainly seen in high-income countries where sufficient resources and equipment enable increased routine antenatal testing and screening by adequately trained health professionals.[5]

On the contrary, most LMICs lack a structured system for prenatal screening and diagnosis. One major contributory factor is the paucity of data on the prevalence, spectrum, trends, and outcome of these anomalies, which could have otherwise highlighted the problem as a significant public health issue. Very few studies on congenital anomalies have been conducted in Bangladesh.[6-9] There is a need for further work to identify the cause and possible interventions to prevent congenital anomalies. An improved understanding of the epidemiology of birth abnormalities can help design directed efforts to prevent these defects. This study aimed to describe the pattern of congenital anomalies in newborns, as well as the associated maternal characteristics at a tertiary level hospital in Dhaka and Chattogram Bangladesh.

MATERIALS AND METHODS

A cross-sectional observational study was conducted in the Department of Obstetrics and Gynaecology of Combined Military Hospital Dhaka and Chattogram from February 2021 to September 2021, February 2023 to September 2023. The approval of the ethics review committee was obtained prior to the initiation of the study. Participants provided voluntary consent before enrollment for data collection, and strict confidentiality was maintained while processing the data and creating the reports by eliminating all personal identifiers.

The study population consisted of fifty pregnant ladies with anomalous babies. All congenital anomalous babies born in the Department of Obstetrics and Gynecology of CMH during the study period, either detected before birth by ultrasonography of the mother or detected at birth, were included in this study. After inclusion, a detailed history was taken regarding maternal age, gestational age, and previous history of delivery of the abnormal baby. Significant maternal illnesses like diabetes mellitus, hypertension, hypothyroidism, infection with TORCH, and exposure to teratogenic drugs during the antenatal period were recorded. All anomalies were categorized according to the system involved.

Data were analyzed using Statistical Package for the Social Sciences (SPSS) software, version 28.0. Sociodemographic information, risk variables, and congenital malformations were all summarized using descriptive statistics. Categorical data are reported as frequency and percentage, whereas quantitative data are given as mean and standard deviation.

RESULTS

During the study period a total of 50 women delivered baby with one or more congenital

Anomalies were included. Twenty seven (54%) neonates were male with a male to female ratio of 1.2:1. Commonest anomalies were related to nervous system, musculoskeletal system and gastrointestinal tract. Details are given in Table I.

Table I Types of congenital anomalies

Types of congenital anomalies	Frequency	Percentage
Nervous system		
Hydrocephalus	13	26.0
Anenchephaly	11	22.0
Spina bifida	2	4.0
Musculoskeletal system		
Cleft lip	3	6.0
Cleft palate	3	6.0
Cleft lip and palate	2	4.0
Polydactyly	3	6.0
Achondroplasia	1	2.0
Gastrointestinal		
Omphalocele	2	4.0
Gastroschisis	2	4.0
Anorectal malformation	2	4.0
Fetal ascites	1	2.0
Duodenal atresia	1	2.0
Multiple congenital anomaly	4	8.0

Maternal age range between 18-39 years in the present study with a mean age of 27.3±6.4 years. Majority of the women were from rural area and socioeconomic condition was low in most of the cases. Other Sociodemographic characteristics are given in Table II.

Table II Sociodemographic characteristics of the mother (n=50)

Variables	Frequency	Percentage
Maternal age		
18-25 years	23	46.0
26-35 years	22	44.0
>35 years	17	34.0
Educational level		
Primary	14	28.0
Secondary	20	40.0
Higher secondary or above	16	32.0
Occupational status		
Homemaker	36	72.0
Employed	14	28.0
Socioeconomic condition		
Low	38	76.0
Middle	10	20.0
Upper	2	4.0
Residential location		
Urban	9	18.0
Rural	31	62.0
Industrial area	10	20.0

Consanguinity of marriage was noted among seven mothers. Maternal exposure to some drugs (e.g., ACE inhibitors, NSAIDS) were noted in five patients. Maternal illness (diabetes mellitus, hypertension, hypothyroidism), and previous history of malformed baby were also noted (Table III).

Table III Maternal characteristics of babies with congenital anomalies

Variable	Frequency	Percentge
Consanguinity	7	14.0
Maternal body mass index		
Normal	36	72.0
Underweight	11	22.0
Obese	3	6.0
High-grade fever with rash in 1st trimester	6	12.0
History of taking teratogenic drug		
ACE inhibitor	4	8.0
NSAIDS	1	2.0
Comorbid medical condition		
DM and GDM (Uncontrolled)	8	16.0
Hypertension (On ACE)	3	6.0
Hypothyroidism (Untreated)	6	12.0
Previous birth defect	4	8.0
No intake of folic acid	31	62.0
Gestational age		
16-28 weeks	31	62.0
29-37 weeks	12	24.0
38-42 weeks	7	14.0
Gravida		
Primi	24	48.0
Multi	26	52.0
Number of pregnancy		
Singleton	44	88.0
Twins	6	12.0
Antenatal visit		
Regular	23	46.0
Irregular	21	42.0
Not received	6	12.0

ACE: Angiotensin Converting Enzyme, NSAID: Nonsteriodal Antiinflammatory Drug, DM: Diabetes Mellitus.

Detail distribution of different risk factors identified in different congenital anomalies are shown in Table IV.

DIfferent Table IV Associated factors in different congenital different anomalies

Congenital anomalies	Risk factors	Frequency	p value
Hydrocephalus	DM, Consanguinity	8	0.16
	Idiopathic	5	0.10
Anencephaly	Folic acid deficiency,		
	consanguinity, ↑Maternal age, DM	8	0.16
	Idiopathic	3	0.06
Omphalocele	Drug, Hypothyroidism	1	0.02
	Idiopathic	1	0.02
Hydrops fetalies	Rh (-ve), TORCH	2	0.04
	Idiopathic	1	0.02
Cleft lip	Folic acid deficiency	1	0.02
	Idiopathic	1	0.05
Cleft lip &Palate	Folic acid deficiency , Drug	1	0.02
	Idiopathic	1	0.04
Gastroschisis	↑Maternal age, Smoking exposure	1	0.02
	Idiopathic	1	0.02
Polydactyly	Genetic	1	0.02
	Idiopathic	2	0.02
	DM, obesity		
Anorectal malformation	Idiopathic	1	0.02
		1	0.02
Spina bifida	Folic acid deficiency, DM	1	0.02
	Idiopathic	1	0.02
Multiple anomaly	Folic acid deficiency, DM, obesity	1	0.02
	Idiopathic	1	0.02
Fetal ascites	Idiopathic	1	0.02
Duodenal atresia	Idiopathic	1	0.02
Achondroplasia	Idiopathic	1	0.02

DISCUSSION

It is known that birth defects contribute significantly to under-five mortality and their incidence in LMICs forms about 94% of the global cases.[4] Despite this high burden, there is a general lack of epidemiological data on the prevalence, pattern, and outcomes of congenital anomalies in Bangladesh and other LMICs. The pattern and prevalence of congenital anomalies may vary over time or with geographical location.[5]In this study, 27 (56%) were male babies and 23 (46%) were female babies. Another study with congenital anomalies showed 57.5% were males and 42.5% were females.[10]Frequency of congenital malformation were slightly higher in males reported in other series.[7-9]

One of the commonly involved system in the index study was nervous system (52%). With regard to pattern of congenital anomalies in the study, the most common anomaly was hydrocephalous (26%), followed by anencephaly (22%), cleft lip (6%), cleft lip & palate (6%), polydactyly (6%), and hydrops fetalis (6%). Fatema et al from Bangladesh, Hassan et al. From Iraq, Amani et al. from Indonesia, and omatir et al from Turkey found the most common congenital malformations discovered were those relating to the neurological system, followed by those relating to the musculoskeletal system.[7,11-13] Regarding factors associated with congenital anomaly wide variation was observed among studies reflecting a complex interaction of known and unknown genetic and environmental factors including socio-cultural, racial and ethnic variables.[14,15] The previous study evaluated the factors that significantly

increased the risk of congenital malformations were hydramnios, maternal febrile illness in the first trimester, past history of abortions, diabetic mother, eclampsia, history of congenital heart disease in previous child or malformed babies etc.[14,15] In the present series, parental consanguinity, maternal under-nutrition, obesity, high maternal age, a history of abnormalities in the family, maternal diabetes mellitus, hypertension, hypothyroidism, deficiency of folic acid supplementation, birth were associated with a higher prevalence of congenital malformation. However, in a 24 (48%) of the cases define risk factor or cause could not be identified in the present study.

LIMITATIONS

Short study period and absent of a control group of healthy neonates without congenital anomaly were the main limitations of the present study. Neither cytogenetic analysis nor autopsies for still births were performed, because these procedures are expensive and have limited availability in our locality. It is therefore likely that the study missed some congenital anomalies that do not present early in life, such as heart defects, pyloric stenosis, and anomalies of the urinary system.

CONCLUSION

The nervous system and musculoskeletal issues are the most common congenital defects. Congenital anomalies were more common when the mother had a history of exposure to drugs, paternal consanguinity, and diseases.

RECOMMENDATIONS

Public awareness about preventable risk factors is to be created and early prenatal diagnosis and management of common anomalies is strongly recommended. More research is required to identify possible determinants responsible for the various types of congenital anomalies.

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DISCLOSURE

The authors declared no conflicts of interest.

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