

## Original Article

## Prevalence, Pattern and Outcome of Congenital Anomalies in Patients Admitted at a Tertiary Level Hospital in Bangladesh

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### Abstract:

*Congenital anomalies are a major public health concern globally, contributing significantly to perinatal and neonatal mortality. Understanding their prevalence, patterns, and outcomes are essential for effective healthcare planning and interventions. This cross-sectional observational study aimed to investigate the distribution and immediate outcomes of congenital anomalies among infants delivered at Bangabandhu Sheikh Mujib Medical College Hospital, Faridpur, Bangladesh. Study population comprised admitted pregnant mothers who delivered infants with congenital anomalies from January to December 2022. Data were collected from medical records, including parity, gestational age at delivery, mode of delivery and outcomes of congenital anomalies. Total 3461 deliveries occurred during this period, of which 88 had congenital anomalies with a prevalence of 2.54%. Among the 88 infants with congenital anomalies, the most prevalent anomalies were Anencephaly and Hydrocephalus, affecting the central nervous system. Anencephaly had a 100% mortality rate, emphasizing its severity and poor prognosis. Anencephaly was more common in infants delivered between 12 to 28 weeks. Early gestational stages play critical role in its pathogenesis. Hydrocephalus showed a relatively higher proportion of live births. Vaginal delivery was the predominant mode of delivery for most congenital anomalies. Public health efforts targeting early detection, appropriate care and support for affected families can potentially reduce the impact of congenital anomalies on maternal and neonatal health.*

**Key words:** Congenital anomaly, Prevalence, Pattern, Outcome.

### Introduction:

Congenital anomalies, commonly referred to as "birth defects" encompass a wide range of structural or medical conditions that are present at birth<sup>1-3</sup>. They may manifest as malformations or abnormalities in physical

structure or functionality and can have significant cosmetic, medical or surgical implications<sup>2,4</sup>. The causes of congenital anomalies can be genetic or environmental, with some cases remaining of unknown

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etiology<sup>3,5</sup>. These anomalies hold a prominent position in the morbidity and mortality of infants and addressing their prevalence, patterns and outcomes is crucial for improving newborn and child health<sup>6</sup>.

The burden of congenital anomalies on global health is considerable, with estimates indicating an incidence of 3% to 7% worldwide<sup>1,7</sup>. The prevalence however, varies widely among countries. In the United States and Europe, congenital anomalies affect 3% to 5% of live births, while in India, they contribute to 8% to 15% of perinatal deaths and 13% to 16% of neonatal deaths<sup>8,9</sup>. Despite their impact on infant mortality, the underlying causes of many congenital anomalies remain unclear, with approximately 40% to 60% having an unknown etiology<sup>3,10</sup>.

Bangladesh, like many low-and middle-income countries, faces challenges in accurately documenting and understanding the prevalence and causes of child mortality<sup>11</sup>. The country witnessed significant progress in reducing childhood mortality during the 1990s, but the decline seemed to stall in the 2010s<sup>11,12</sup>. Neonatal and under-five mortality rates, though improved, is still high and call for urgent attention and focused interventions.

To address these issues, it is crucial to conduct thorough studies to identify the major contributors to child mortality. This includes exploring the prevalence and patterns of congenital anomalies, which are among one of the leading causes of infant morbidity and mortality. The available data on child mortality in Bangladesh rely on demographic surveillance sites and verbal autopsy tools, which, while valuable, lack nationwide representativeness<sup>11,13</sup>.

The current study aims to fill this gap by focusing on congenital anomalies in patients admitted to a tertiary-level hospital in Bangladesh. This research seeks to provide valuable insights into the overall frequency and patterns of congenital anomalies in a tertiary level hospital.

Understanding the prevalence, pattern, and outcomes of congenital anomalies is essential for advancing newborn and child health in Bangladesh.

### Materials and methods:

This cross-sectional observational study was conducted at Bangabandhu Sheikh Mujib Medical College Hospital (BSMMCH), Faridpur from January to December 2022. The study population included patients admitted to the Obstetrics and Gynaecology Department at BSMMCH during the specified period. The inclusion criteria comprised pregnant mothers who delivered children with congenital anomaly. Written informed

consent was taken from the study population. Data on participants' demographics, clinical details of their pregnancies and congenital anomalies in their newborns were collected from their medical records.

Ethical approval was obtained from the Ethics Review Committee (ERC) of Bangabandhu Sheikh Mujib Medical College, Faridpur. Patient data were anonymized and treated with strict confidentiality. Descriptive statistics, such as frequencies and percentages, were used to present the prevalence and patterns of congenital anomalies in the study population.

### Results:

During this period, total 3461 deliveries occurred at BSMMCH, of which 88 had congenital anomalies with a prevalence of 2.54%.

Table I presents the distribution of congenital anomalies among antenatal patients based on their parity. The study population was divided into three groups: Primi Gravida (first-time pregnant), 2<sup>nd</sup> Gravida (second-time pregnant), and Multi Gravida (women with multiple pregnancies). The table shows the number of cases for each specific congenital anomaly within each parity group. Notably, Anencephaly and Hydrocephalus were the most prevalent congenital anomalies across all parity groups, with varying frequencies observed among Primi Gravida, 2<sup>nd</sup> Gravida, and Multi Gravida.

**Table I:** Distribution of Congenital Anomalies by Parity of Antenatal Patients

Congenital anomaly	n	Parity of antenatal Patient		
		Primigravida	2nd gravida	Multi gravida
Anencephaly	26	13 (50%)	6 (23.07%)	7 (26.93%)
Hydrocephalus	26	8 (30.77%)	11 (42.3%)	7 (26.93%)
Hydrops Fetalis	5	0	3 (60%)	2 (40%)
Gastroschisis	4	1 (25%)	1 (25%)	2 (50%)
Club Foot	1	0	0	1 (100%)
Holoprosencephaly	2	0	2 (100%)	0
Meningomyelocele	1	1 (100%)	0	0
Hydronephrotic kidney	2	1 (50%)	1 (50%)	0
Congenital Heart Disease	1	0	1 (100%)	0
Microcephaly	1	0	0	1 (100%)
Duodenal atresia	3	1 (33.33%)	1 (33.33%)	1 (33.34%)
Omphalocele	1	1 (100%)	0	0
Dwarfism	1	0	1 (100%)	0
Cystic Hygroma	3	1 (33.33%)	1 (33.33%)	1 (33.33%)
Ventriculomegaly	1	1 (100%)	0	0
Multiple congenital anomalies	10	4 (100%)	1 (100%)	5 (100%)
<b>Total</b>	<b>88</b>	<b>32 (36.36%)</b>	<b>29 (32.96%)</b>	<b>5 (30.68%)</b>

Table II displays the distribution of congenital anomalies among infants based on their gestational age at delivery. The gestational age was categorized into three groups: 12-28 weeks, 29-36 weeks, and 37-40 weeks. The table reveals the number of cases for each specific congenital anomaly within each gestational age category. Among the congenital anomalies studied, Anencephaly had a high incidence in infants delivered between 12 to 28 weeks, while Hydrocephalus cases were more distributed in 29-36 weeks of gestational age groups.

**Table II:** Distribution of Congenital Anomalies by Gestational Age at Delivery

Congenital anomaly	Gestational age (weeks)		
	12-28	29-36	37-40
Anencephaly	26	0	0
Hydrocephalus	6	17	3
Hydrops Fetalis	2	3	1
Gastroschisis	4	1	0
Club Foot	1	0	0
Holoprosencephaly	2	0	0
Meningomyelocele	1	0	0
Hydronephrotic kidney	2	1	0
Congenital Heart Disease	1	1	0
Microcephaly	1	1	0
Duodenal atresia	3	2	0
Omphalocele	1	0	0
Dwarfism	1	0	0
Cystic Hygroma	3	2	0
Ventriculomegaly	1	1	0
Multiple congenital anomalies	10	5	0

Table III provides insights into the outcomes of infants diagnosed with congenital anomalies. The outcomes are classified into two categories: "Dead" and "Alive." The table presents the number of infants with each specific congenital anomaly in each outcome category. Anencephaly had a 100% mortality rate, while Hydrocephalus had a relatively higher proportion of cases in the "Alive" category compared to other anomalies.

**Table III:** Outcome of Infants with Congenital Anomalies

Congenital anomaly	n	Outcome	
		Dead	Alive
Anencephaly	26	26 (100%)	0
Hydrocephalus	26	14 (53.84%)	12 (46.16%)
Hydrops Fetalis	5	3 (60%)	2 (40%)
Gastroschisis	4	3 (75%)	1 (25%)
Club Foot	1	0	1 (100%)
(Holoprosencephaly	2	2 (100%)	0
Meningomyelocele	1	1 (100%)	0
Hydronephrotic kidney	2	0	2 (100%)
Congenital Heart Disease	1	0	1 (100%)
Microcephaly	1	0	1 (100%)
Duodenal atresia	3	2 (66.67%)	1 (33.33%)
Omphalocele	1	1 (100%)	0

Dwarfism	1	0	1 (100%)
Cystic Hygroma	3	1 (33.33%)	2 (66.67%)
Ventriculomegaly	1	0	1 (100%)
Multiple congenital anomalies	10	6 (60%)	4 (40%)
<b>Total</b>	<b>88</b>	<b>59 (67.04%)</b>	<b>29 (32.96%)</b>

Table IV illustrates the mode of delivery for infants diagnosed with congenital anomalies. The modes of delivery are categorized as VD (vaginal delivery) or LSCS (lower segment cesarean section). The table shows the number of cases for each specific congenital anomaly within each mode of delivery. The majority of infants with congenital anomalies were delivered through vaginal delivery, with exceptions observed in some anomalies like Anencephaly, which exclusively had cases delivered through VD.

**Table IV:** Mode of Delivery for Infants with Congenital Anomalies

Made of delivery	Congenital anomalies															
	Anencephaly	Hydrocephalus	Hydrops Fetalis	Gastroschisis	Club Foot	Holoprosencephaly	Meningomyelocele	Hydronephrotic kidney	Congenital Heart Disease	Microcephaly	Duodenal atresia	Omphalocele	Dwarfism	Cystic Hygroma	Ventriculomegaly	Multiple congenital anomalies
N	26	26	5	4	1	2	1	2	1	1	3	1	1	3	1	10
Male	VD	26	15	3	3	1	2	1	2	1	2	1	1	2	1	6
	LSCS	0	11	2	1	0	0	0	0	0	1	0	0	1	0	4

\* VD: Vaginal delivery, LUCS: Lower Segment Caesarean Section

**Discussion:**

The overall prevalence of congenital anomalies in the study population was 2.54%, with a variety of anomalies affecting different organ systems. In a study by Fatema et al. in BSMMU, another tertiary-level hospital in Bangladesh had a prevalence of 3.68% congenital anomalies<sup>2</sup>. The most frequently occurring anomalies involved the central nervous system, with Anencephaly and Hydrocephalus being the most common defects. This finding is consistent with previous research indicating that neural tube defects are a major contributor to congenital anomalies globally<sup>2,3,14,15</sup>. Although various researches found cardiovascular defects as the second most common congenital anomaly<sup>1,3</sup>, we have found only 1 case of congenital anomalies with cardiovascular defects.

The distribution of congenital anomalies among different gestational age groups provides valuable information on the timing of anomaly development. Anencephaly, a neural tube defect, had a high incidence in infants delivered between 12 to 28 weeks, indicating that early gestational stages play a crucial role in the pathogenesis of this anomaly. On the other hand, Hydrocephalus cases were more evenly distributed across 29-36 weeks gestational age groups, suggesting a potential multifactorial etiology for this anomaly that may involve genetic and environmental factors<sup>16</sup>.

The outcomes of infants diagnosed with congenital anomalies revealed the severity and potential for survival associated with different anomalies. Anencephaly was found to have a 100% mortality rate, indicating the extremely poor prognosis and high fatality rate associated with this condition. In contrast, Hydrocephalus had a relatively higher proportion of cases in the "Alive" category, suggesting the possibility of successful management and survival in some cases. This highlights the need for improved antenatal detection and counseling to provide appropriate care and support for families facing the diagnosis of a congenital anomaly<sup>17,18</sup>.

The mode of delivery for infants with congenital anomalies was predominantly vaginal delivery (VD) for most anomalies, indicating that vaginal delivery is feasible and safe for many of these cases. This underscores the importance of a multidisciplinary approach involving obstetricians, neonatologists, and other specialists to provide optimal care for infants with congenital anomalies<sup>17</sup>.

The study's findings have several implications for public health and clinical practice. The significant prevalence of congenital anomalies emphasizes the need for increased awareness and early detection through routine prenatal screenings and ultrasonography. Improving access to antenatal care, particularly in vulnerable populations, could aid in the early identification of anomalies and potentially lead to improved outcomes.

### Conclusion:

The design limits the ability to establish causal relationships between risk factors and congenital anomalies. Only immediate outcomes were observed, long term follow-up data was not available. Additionally, the study was conducted at a single tertiary care hospital, which may not fully represent the entire population's prevalence and patterns of congenital anomalies in Bangladesh.

Early detection, appropriate counseling, and comprehensive care for affected infants and their families are crucial in reducing the burden of congenital anomalies and promoting better maternal and neonatal health. By addressing these challenges, healthcare systems can take significant steps toward improving the quality of life for affected individuals and advancing the field of congenital anomaly prevention and management.

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