

# Incidence of Congenital Fetal Malformations in Tribhuban University Teaching Hospital, Kathmandu, Nepal: a Hospital Based Study

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## ABSTRACT

**Background:** Birth defects are the abnormalities in structure or function present at birth. Major abnormalities of birth defects lead to physical or developmental disabilities which may need urgent medical or surgical treatment and may cause death in early days of life. The objective of this study is to find the incidence of congenital abnormalities in this institution.

**Methods:** This was a prospective study conducted in Institute of Medicine, Maharajgunj Medical Campus, Tribhuban University Teaching Hospital from April 2014 to February 2016. All the delivered babies in this hospital during the study period were included. All the birth cases of gross congenital fetal malformation were identified and carefully studied and classified with the help of the International Classification of diseases (ICD-10).

**Results:** Out of total 8300 birth in 22 months study period, congenital fetal malformation delivered during this period was 94 (1.13%) in 7868 live birth. The maximum number of congenital fetal malformation was seen in musculoskeletal system 24.44%. This was followed by a central nervous system 17.02%, gastrointestinal system 12.76%, and cardiac system 10.63%. There was equal number of congenital fetal malformation seen in renal system and genitourinary system 7.44%, in craniofacial system and miscellaneous 9.57%. The lowest number of congenital fetal malformation seen in respiratory system 1.06%.

**Conclusion:** Fetal congenital malformation has a major role in morbidity and mortality of neonates and children as well. The most common system involved in our study was musculoskeletal.

**Keywords:** Birth defects, Congenital malformations, Fetal abnormalities

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## INTRODUCTION

Birth defects are the abnormalities in structure or function present at birth. Major abnormalities of birth defects lead to physical or developmental disabilities which may need urgent medical or surgical treatment and may cause death in early days of life. Birth defects are of major or minor category and about more than 7000 different known birth defects.<sup>1</sup> Minor abnormality of birth defect has structural deformity present at birth with negligible clinical significance and it can be corrected by cosmetic surgical treatment e.g. preauricular tag. Major abnormality has structural deformity with significant effects on its function and difficult social acceptance e.g cleft lip and palate. Many factors are responsible for birth defects, such as genetic (30-40%), environmental (5-10%) and some cause are unidentifiable in 50% causes.<sup>2</sup> Globally, birth defect affect about 1 in 33 infants and approximately there are 3.2 million birth defect related disabilities every year.<sup>3</sup>

Some serious birth defects are lethal. Worldwide congenital malformations has a big contribution in infant mortality and morbidity estimating 9 million infants (7% of births) born yearly with serious congenital anomaly with death or life long disability.<sup>4</sup> About 3.2 million infants who survived without proper care may be disabled for whole life. These disorders may cause lifelong physical, mental, auditory and visual impairments. Congenital defect may have long-term disability effect, which significantly effects on individuals, families, societies and healthcare system. Although congenital defects may be infectious, environmental and genetic in origin, many malformations can be prevented.

The main objective of our study is to find the incidence of congenital abnormalities in this institution.

## MATERIALS AND METHODS

This was a prospective study conducted in Institute of Medicine, Maharajgunj Medical campus, Tribhuvan University Teaching Hospital from April 2014 to February 2016. Approval was taken from Institute of medicine, Teaching hospital for this study. All the babies delivered in this hospital during the study period were included. Congenital anomalies, malformations and birth defects are terminology used to describe a structural or functional abnormality present at birth, which may be clinically diagnosed at the time of birth. The

anomalies included in the study were only cases that were clinically diagnosed at the time of birth and consulted and confirmed by pediatrician. Anomalous cases were determined and categorized according to organ system by following the International Classification of Diseases (ICD-10). Detailed data about sex, maturity, congenital defects of all births including twins and still births with malformation about birth defects of these newborns was collected as per protocol. These defects either major, minor, single, multiple were categorized accordingly to anatomical systems like central nervous, gastrointestinal, cardiovascular, musculoskeletal, genitourinary and others. Statistical analysis was done using SPSS software.

## RESULT

There were total of 8216 deliveries during the period of 22 months. Total number of live birth was 7886 (95.01%) and Intra Uterine Fetal Death 120 (1.44%). Male to female ratio of deliveries is 1.23. Out of 8216 total deliveries, congenital fetal malformations were found 94 (1.13%). (figure 1)

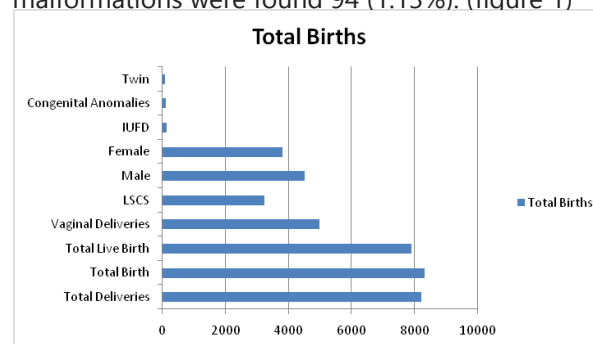


Figure 1: General Distribution of total deliveries

The maximum number of congenital fetal malformation was seen in musculoskeletal system 24.44%. This was followed by a central nervous system 17.02%, gastrointestinal system 12.76%, and cardiac system 10.63%. There was equal number of congenital fetal malformation in renal system and genitourinary system 7.44%, in craniofacial system and miscellaneous 9.57%. The lowest number of congenital fetal malformation seen in respiratory system 1.06% (Table 1).

Congenital fetal malformations detected during antenatal and post natal period were 27.65% and 72.34% and those that were compatible or non-compatible to life were 74.46% and 25.5% , and major and minor malformation were 57.47% and 42.55 % respectively. Regarding the management, 9/10 Congenital fetal malformations detected at 20-22 weeks were terminated by induction of abortion

**Table 1: Distribution of congenital malformation according to system (n=94)**

System Involved	N (%)
Musculoskeletal	23 (24.46)
Central Nervous system	16 (17.02)
Gastrointestinal	12 (12.76)
Cardiac malformations	10 (10.63)
Craniofacial malformations	9 (9.57)
Miscellaneous malformation	9 (9.57)
Renal malformation	7 (7.44)
Genitourinary malformation	7 (7.44)
Respiratory malformation	1 (1.06)

**Table 3: Sex-wise distribution of Fetal Malformation**

SN	System & Type of Malformation	M	F	N (%)
<b>1</b>	<b>Musculoskeletal system</b>	<b>13.8%</b>	<b>10.6%</b>	<b>24.46%</b>
	Congenital Talipes	6	4	10(10.6)
	Equinovarus	1	3	4 (4.25)
	Genu recurvatum	2	1	3 (3.19)
	Polydactyly	2	0	2 (2.12)
	Symbrachidactyly	1	1	2 (2.12)
	Syndactyly	0	1	1(1.06)
	Clynodactyly	1	0	
	Skeletal dysplasia			
<b>2</b>	<b>Central Nervous System</b>	<b>9.57%</b>	<b>7.44%</b>	<b>17.02%</b>
	Meningocele	1	3	4 (4.25)
	Meningomyocele	2	1	3 (3.19)
	Encephalocele	2	0	2 (2.12)
	Hydrocephalus	1	1	2 (2.12)
	Colpocephaly	0	2	2 (2.12)
	Anencephaly	2	0	2 (2.12)
	Cavum vergae	1	0	1(1.06)
<b>3</b>	<b>Gastrointestinal system</b>	<b>6.38%</b>	<b>5.31%</b>	<b>12.76%</b>
	Duodenal Atresia	4	2	6 (6.38)
	Anorectal malformations	2	1	3(3.19)
	Gastrochiasis	0	1	2(2.12)
	Omphalocele	0	1	1(1.06)
<b>4</b>	<b>Cardiac Malformation</b>	<b>4.25%</b>	<b>6.38%</b>	<b>10.63%</b>
	Septal defects	3	5	8(8.51)
	PDA	1	1	2 (2.12)
<b>5</b>	<b>Craniofacial malformation</b>	<b>5.31%</b>	<b>4.25%</b>	<b>9.57%</b>
	Cleft lip/Cleft palate	3	2	5 (5.32)
	Ear anomalies	1	2	3 (3.19)
	Facial asymmetry	1	0	1(1.06)
<b>6</b>	<b>Miscellaneous malformations</b>	<b>5.31%</b>	<b>4.24%</b>	<b>9.57%</b>
	VACTERL	1	2	3 (3.19)
	Single umbilical artery	0	1	1 (1.06)
	Lymphangioma	1	0	1 (1.06)
	Branchial cyst	1	0	1(1.06)
	Orbital teratoma	0	1	1 (1.06)
	Ankyloglossia	1	0	1(1.06)
	Nevus sebaceous	1	0	1 (1.06)
<b>7</b>	<b>Renal Malformations</b>	<b>2.12%</b>	<b>5.31%</b>	<b>7.44%</b>
	Hydronephrosis with PUJ obstruction	2	2	4 (4.25)
	Pylectasis	0	1	1 (1.06)
	Posterior urethral valves	0	1	1 (1.06)
	Renal Agenesis	0	1	1 (1.06)
<b>8</b>	<b>Genitourinary system</b>	<b>7.44%</b>		<b>7.44%</b>
	Ambiguous genitalia	1	0	1 (1.06)
	Hypospadiasis	6	0	6 (6.38)
<b>9</b>	<b>Respiratory malformations</b>		<b>1.06%</b>	<b>1.06%</b>
<b>10</b>	<b>Congenital Diaphragmatic Hernia</b>	0	1	1 (1.06)

(2) and labor (7) except for a case of duodenal atresia, which was allowed to continue pregnancy but the baby died after term vaginal delivery.

**Table 2: Distribution of Malformation (n=94)**

Categories	N (%)
Single malformation	11 (11.7)
Multiple malformation	83 (88.3)
Major malformation	54 (57.47)
Minor malformation	40 (42.55)
Antenatal detected malformation	26 (27.66)
Postnatal detected malformation	68 (72.34)
Life compatible malformation	70 (74.46)
Life non-compatible malformation	24 (25.53)
20-27 weeks gestation	10 (10.64)
28-36 weeks gestation	12 (12.77)
37-40 weeks gestation	72 (76.6)
Male	52 (55.31)
Female	42 (44.68)

Congenital fetal malformations diagnosed at 35-40 weeks were 16 and nine babies were alive at birth. Congenital fetal malformation diagnosed after birth were 68 and 55 baby survived. Of the total 18 LSCS, there were 5 survivors (table 2).

The most common malformations observed in the musculoskeletal system is Congenital Talipes Equino varus (CTEV) 10 (43.47%), followed closely by central nervous system among which meningocele 4 (25%), and gastrointestinal system among which duodenal atresia 6(50%), anorectal malformation 3(25%). Among the genitourinary tract anomalies and cardiac anomalies, hypospadias 6(85%) and cardiac and septal defects 8(80%) are the most prevalent lesions respectively. The systems commonly involved are shown in each malformation is shown (table 3).

## DISCUSSION

Congenital anomalies are primary causes of still births and infants mortality which has a great contribution to childhood morbidity. The incidence of congenital malformation in our study is 1.13%, that includes both single and multiple and minor and major malformations detected at the birth time. This rate is slightly lower than the earlier report published 15 years ago from the hospital of 1.3% on 5739 deliveries;<sup>5</sup> most probably it is due to increasing number of the rate of birth. This rate was higher in comparison to other hospital, reported 0.36% in Maternity Hospital ,Thapathali,<sup>7</sup> 0.42% in Western Regional Hospital,<sup>9</sup> Pokhara and 0.8% in Patan hospital,<sup>6,8</sup> Kathmandu, due to increased referral for congenital anomalies and high risk pregnancy, for better perinatal and maternal outcome, and it increased unbooked cases to this institution and likewise increase in number of anomalous baby. Our study has a higher incidence

of congenital anomalies among male babies 0.63% than female babies 0.51%. In the studies conducted in maternity hospital and western Regional hospital, Pokhara, malformations among the male live births was slightly higher than the female live births. In the study of Swain<sup>11</sup> reported higher incidence rate of 1.2% in his study in India, as higher as in Egypt<sup>4</sup> 2.5%, New York<sup>10</sup> 5.1% and in Abu Dhabi<sup>12</sup> 6.9% were also reported.

In this study, the most common malformations observed in the musculoskeletal system (24.46%), in which Congenital Talipes Equino varus (CTEV) is most common 10(10.6%), followed closely by Central nervous system among which meningocele 5(5.31%), and Gastrointestinal system among which Duodenal atresia 6(6.38%), Anorectal malformation 3(3.19%). Among the genitourinary tract anomalies and cardiac anomalies, hypospadias 6(6.38%) and septal defects 8(8.51%) are the most prevalent lesions respectively. Likewise, in the study of Sharma I in Western Regional Hospital, Pokhara,<sup>9</sup> Ansari, et al.<sup>8</sup> at Patan hospital Baurah,<sup>13</sup> in Northeast India also reported the common malformation were musculoskeletal system. In the study of Malla BK<sup>7</sup> reported the most common system involved in congenital malformations were central nervous system, followed by musculoskeletal system, gastro intestinal system, genitourinary system and sense organ system.

Being a single centre study done in referral tertiary hospital, the incidence calculated might not be projected to the general population, for which population based studies are necessary.

## CONCLUSION

Fetal congenital malformation has a major role in morbidity and mortality of neonates and children as well. The most common system involved in our study was musculoskeletal.

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