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Congenital malformations at birth in 7,922 consecutive deliveries at Patan Hospital, Nepal

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ABSTRACT

Introductions: Congenital malformations need to be identified and intervened early to save lives and prevent sufferings. Many birth defects have well known incidence/prevalence rates but these have not been studied thoroughly in the local population of Nepal. The current study was undertaken to determine the prevalence of congenital malformation at birth, to classify them systematically, to study risk factors and immediate outcome of the newborn babies afflicted.

Methods: This was a cross sectional study. All newly delivered babies were examined carefully for congenital malformation and when detected, the parents were interviewed in detail.

Results: Over the 10 months of study period 7,922 babies were delivered out of which 90 were stillborn. The number of babies with malformations was 64 (0.81%). Polydactyli was observed in 12 (19%) babies whereas cleft lip/palate and malformations of ears in seven (11%) each. Musculoskeletal system was affected in 31 (35%) cases and craniofacial in 18 (21%). Nine (14%) mothers had bad obstetric history and eight (13%) had illness/medication during pregnancy.

Conclusions: Congenital malformation is a significant cause of morbidity and mortality in Patan hospital. Our findings support many established thoughts like higher rates in stillbirths but also challenge some age-old beliefs like higher rates in babies born to older mothers.

Keywords: adverse outcome, congenital malformation, perinatal mortality, risk factor

Plain Language Summary

This study was conducted to see the risk factor for congenital malformation in new born babies. Polydactyl followed by cleft lip and palate was most common congenital anomalies. Unlike old age beliefs, higher rates of anomalies were not seen in babies born to older mothers.

INTRODUCTIONS

Congenital malformations are common cause of morbidity and mortality not only in the newborn period but well into the childhood and beyond. Many congenital malformations have calculated recurrence risk. For example, the risk of a female carrier producing another Down syndrome child is 15%.[1] If diagnosed on time a better counseling can be given to the parents. Therefore it is important to identify congenital malformations at birth.

There is lack of data on this subject in Nepal. Malla K[2] published one year review of congenital malformations in babies born at the Maternity hospital in Thapathali, Nepal. Some publications mentions the incidence of malformations in the general audit of different perinatal events in a few hospitals.[3-5] But no prospective study has been done to determine the incidence of congenital malformations in these institutions.

With more than 700 deliveries a month at Patan hospital our study will appropriately generate reliable information.

METHODS

This was a hospital based, cross sectional study carried out in Patan hospital from June 2013 to April 2014. All newly delivered babies were examined carefully. As soon as a baby with congenital malformation was detected, the parents were interviewed in great depth as per preformed questionnaire which included maternal age, parity, illnesses, drug intake or hazardous substance exposure (smoking, alcohol, x-irradiation) during pregnancy and bad obstetric history if any (like miscarriage, neonatal death) .

RESULTS

A total of 7,922 babies were delivered during the 10-month study period of which 90 were stillborn. Out of these 7,922 babies, 735 (9%) were preterm and 935 (12%) had low birth weight. The number of babies with one or more congenital malformations was 64 (0.81%). The 35 babies with the malformation were born to mothers in 25-29 years age group. Table 1. Of the 64 abnormal babies 39 had single malformation and the remaining 25 had multiple ones. The total number of malformations, thus, was more (88) than the total number of babies with malformations (64). Altogether, 42 different kinds of malformations were detected. Polydactyly was 12 (19%); cleft lip/palate and malformations of ears were seven (11%) each; hypospadias, congenital teeth and talipes equinovarus were four (6%) each.

Malformations of the musculoskeletal system were noted in 31 (35%) cases and craniofacial defects in 18 (21%). The number of cases with defects in the Gastrointestinal System (GIS), Cardiovascular System (CVS), Genitourinary System and genetic/chromosomal disorders was six to nine which amounted to 7% to 10% of the total. Of the 88 malformations 53 (60%) were major/severe and the remaining were minor/moderate. All the genetic/chromosomal disorders were major/severe. The contribution of major/severe defects in the CNS, GIS, Genitourinary System and CVS were eight (89%), seven (88%), five (83%) and four (57%) respectively whereas the proportion of major/severe malformations in the musculoskeletal system was 13 (42%) and in the craniofacial seven (28%). Table 2(a), (b).

Table 1. Babies with malformations (n=64) compared with all newborn babies (n=7922)

Characteristics		All babies	Babies with malformations	% of affected babies
Maternal age (years)	<20	364	1	0.3
	20-24	2572	13	0.5
	25-29	3088	35	1.1
	30-35	1519	13	0.9
	>35	379	2	0.5
Gravidity	Primi (G1)	4160	30	0.7
	Multi (G2 – G3)	3403	29	0.9
	Grand multi (≥G4)	359	5	1.4
Gestational age at birth (weeks)	<26	26	3	11.5
	26-32	108	4	3.7
	33-36	601	13	2.2
	37-40	5795	43	0.7
	>40	1392	1	0.1
Birth weight (grams)	<1000	52	1	1.9
	1000-1499	67	4	6.0
	1500-2499	827	14	1.7
	2500-4000	6886	43	0.6
	>4000	90	0	0.0

Table 2. Effect of maternal age on major/severe malformations

(a) All major/severe malformations

Maternal age group (yrs)	Number of major/severe malformations	Total no. of mothers in the age group	% of mothers having major/ severe malformation
<20	1	367	0.3
20-24	11	2593	0.4
25-29	28	3114	0.9
30-35	9	1532	0.6
>35	0	382	0.0
Total	49	7988	2.2

(b) Genetic and chromosomal abnormalities

Maternal age group (yrs)	Number of newborn with malformations	Number of mothers in the age group	% of mothers having malformation
<20	0	367	0.0
20-24	0	2593	0.0
25-29	6	3114	0.2
30-35	1	1532	0.1
>35	0	382	0.0
Total	**7**	**7988**	**0.3**

Possible maternal risk factors could be identified in 30% (49% of 64 babies with birth defects). Table 3. Nine babies (14% of 64 born with malformation) had adverse immediate outcome, with six still birth. Table 4.

Table 3. Factors which can potentially affect malformations

Factors	Number	%
Previous NND/stillbirth/abortion	9	14
Maternal smoking	0	0
Maternal drinking	1	2
Maternal illness during pregnancy	8	13
Maternal medicinal intake during pregnancy	8	13
Maternal exposure to x-ray during pregnancy	3	5
Consanguinity of marriage	0	0
Congenital malformation in previous child	1	2
Total	**30**	**49**

Table 4. Immediate outcome of babies with malformations

Outcome	Number	%	
Alive	55	86	
Still birth	6	9	
Abortion	2	3	14
Early neonatal death	1	2	
Adverse outcome in babies without malformation	130	2	
Total	**194**	**100**	

DISCUSSIONS

The prevalence of congenital malformations in the present study (0.8%) is slightly higher than an earlier report from the same hospital 11 years ago which gives a prevalence of 0.3%.[3] It is higher than the findings of B. K. Malla also who too reported a malformation rate of 0.3% in babies delivered in the Maternity Hospital at Thapathali in Kathmandu.[2] Swain described even higher incidence of 1.2% in his study in India.[6] Rates as high as 6.9% in Abu Dhabi[7] and 7.5% in New York[8] have also been reported. This difference in the figures in different studies may be due to inaccurate detection at birth, inclusion of minor anomalies, period of observation, geographical and ethnic factors.[9]

The most common major/severe malformation was cleft lip/palate which affected 11% of all malformed babies. Looking at the different organ systems, malformations of the musculoskeletal system were most common (35%). By comparison, in the Maternity Hospital study and the Indian observation cited above, the musculoskeletal malformations were second; CNS being number one in both of these studies. CNS occupied number three position in the current study.

Highest incidence of congenital malformations was noted in the mothers of 25–29 years. The incidence gradually decreased in both sides of this age group. This was the case with all as well as the major and genetic/chromosomal malformations. This finding goes against the conventional teaching which says that the malformations, mainly the genetic/chromosomal ones, occur most in beyond 35 mothers.[10] Some other researchers have also described results which do not agree with this age-old thinking and are similar to our findings.[11]

The rate of congenital malformations was found to increase with increasing gravidity of the mother although the difference was not statistically significant. Investigators in India too have reported significantly higher incidence of malformations in mothers of gravida four or more.[6] Prematurity and low birth weight was found to be associated with higher incidence of congenital malformations. These two factors, however, may be the effect rather than the cause of the defects. The association of low birth weight with malformations was found by C. Mohantyand his co-researchers also.[12]

A significantly higher rate of stillbirth in babies with congenital malformation observed in this study is a common finding described by other researchers in the field.[6] We found only one (2%) congenitally malformed baby dying in early neonatal life which goes against the findings of two previous reports from the same hospital which attribute 16%[12] and 20%[3] of early neonatal deaths to congenital malformations and another report from the TU Teaching Hospital in Kathmandu which found this as the fourth most common cause of neonatal mortality.[5] This may be because of shorter period of observation since a longer follow up was beyond the scope of this study.

Exposure to x-irradiation, smoking or drinking was not found to be associated with occurrence of congenital malformations in this population but any conclusion in this regard can be drawn only if there is significant number of pregnant ladies exposed to these three environmental hazards which was not the case in this

study.

The number of congenital malformations observed in current study may only be partially reflective of the real situation since many conditions (like VSD, congenital hypothyroidism, CAH) only show after several months of life and not at birth. Longer study at least over one year period with scope to follow up every single child for six months or more may be required for true picture of congenital malformations.

CONCLUSIONS

Despite this limitation, this research highlights that congenital malformation is a significant cause of morbidity and mortality in Patan hospital. Our findings support many established thoughts like higher rates in stillbirths but also challenge some age-old beliefs like higher rates in babies born to older mothers.

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