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A Study on Fetal Anomaly Surveillance and its Correlation with Different Maternal Risk Factors

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ABSTRACT
According to WHO Congenital anomalies are defined as structural or functional anomalies, including metabolic disorders which are present at the time of birth. Congenital anomalies are a major health problem accounting for 8-15% of perinatal deaths and 13-16% of neonatal deaths in India. To determine the incidence of fetal anomalies at Medical College Hospital Kolkata and to study the various fetal anomalies in the new-borns in relation to their patterns distribution and associated perinatal factors It was a Prospective Cross Sectional, Hospital Based Study from 1st January 2020 to 30th June 2021 at the Department of Obstetrics and Gynecology Eden Hospital, Medical College, Kolkata. In our study, 124(49.6%) patients had Anaemia, 25(10%) patients had Hypertension, 6(2.4%) patients had Hypothyroidism, 6(2.4%) patients had diabetes or GDM, 9(3.6%) patients had Febrile illness during pregnancy, 5(2.0%) patients had H/O consanguineous marriage, 2(0.8%) patients had Exposure to alcohol and 4(1.6%) patient had Family H/O birth defects. The value of z is 13.4609. The value of p is <.00001. The result is significant at p<.05. This study highlights the significant impact of maternal risk factors, such as age, medical conditions and lifestyle, on fetal anomalies. Early surveillance and screening are essential for detecting abnormalities in high-risk pregnancies. Tailored prenatal care, improved diagnostic methods and on-going research are crucial for better maternal and fetal health outcomes.

INTRODUCTION

According to WHO Congenital anomalies are defined as structural or functional anomalies, including metabolic disorders which are present at the time of birth. Congenital anomalies are a major health problem accounting for 8-15% of perinatal deaths and 13-16% of neonatal deaths in India[1]. Birth defects are important cause of neonatal and infant morbidity and mortality and also of future disabilities. They are often a cause for worry and anxiety for expectant parents. Birth defects can manifest in many ways such as spontaneous abortion or perinatal death or even as unexplained stillbirth[2]. It is estimated that 9 million infants (approximately 7% of all births globally) annually are born with a serious birth defect[3]. With advanced perinatal and neonatal care now a days, pediatricians are now being able to control most of the infectious diseases and other health conditions of childhood like nutritional deficiency diseases. For that reason and also for availability of better screening procedures it has been estimated that birth defects are going to be the leading cause for perinatal mortality in near future in the developing countries[4]. Surveillance programmes have been seen to be carried out for the observation of the various birth defects in various populations around the world since 1960s[5]. The marked variation in the distribution and prevalence of birth defects in different countries around the world has been well documented in the surveys[6]. The case fatality rate for most severe anomalies such as anencephaly, chromosomal disorders like trisomy 13 and trisomy 18 and congenital cardiovascular defects are seen to be around 100% by the child's first year of life[7]. In India, it has been observed that they constitute 22% of all early neonatal deaths[8]. In spite of the frequency of birth defects, most of the underlying causes of birth defects remain unknown. It has been estimated that around 15%-25% of birth defects are due to recognized genetic conditions (chromosome and single gene causes), 8%-12% are due to environmental factors (maternal-related conditions, drug or chemical exposures) and 20%-25% are due to multi factorial inheritance[9]. The majority i.e. 40%-60% of birth defects have no obvious causes[10]. Prevalence of birth defects range between 3-7% and varies in different geographical, racial and ethnic parts of world[9,10]. It has been estimated that out of different systems of the body, brain has the highest incidence of congenital malformation i.e. 10/1000 followed by heart 8/1000, kidney 4/1000, limbs 1/1000 and miscellaneous 6/1000 live births[11].

MATERIALS AND METHODS

Study Design: My study is a Prospective Cross Sectional, Hospital Based Study.

Place of Study: Department of Obstetrics and Gynecology Eden Hospital, Medical College, Kolkata.

Period of Study: 1st January 2020 to 30th June 2021.

Study Population: All antenatal patients with fetal anomalies attending Eden outdoor and who were admitted in the hospital who confound to the inclusion criteria has been recruited for the study.

Inclusion Criteria:

- All antenatal case of who delivered babies with fetal anomalies or underwent MTP or abortion due to congenital anomalies baby at Medical college and hospital Kolkata during the study period.
- Only those cases of fetal anomalies which were detected at time of birth or during the immediate postpartum hospital stay were included.
- Both live and stillborn babies with detected congenital anomalies were included in the study.

Exclusion Criteria: Those cases of birth defects which were delivered outside Medical college and Kolkata and were not diagnosed during immediate post-partum period.

Study Sample: After judging the inclusion and exclusion criteria and with references from previous study, a sample size of about 250 is collected.

Study Design: Al the antenatal cases of diagnosed with fetal anomalies was recruited in the sample size by applying the census method after taking the proper consent from the patients.

RESULTS AND DISCUSSIONS

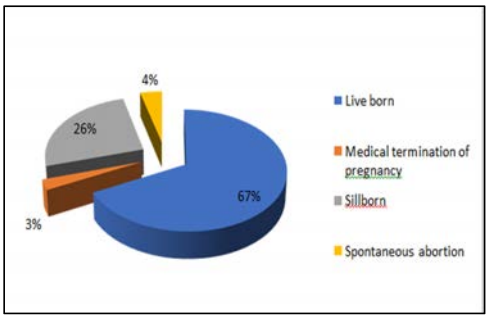

Fig. 1: Distribution of Outcome

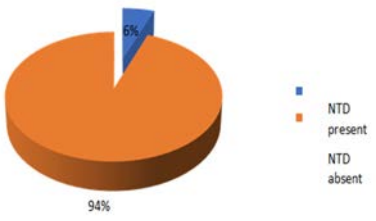

Fig. 2: Showing Correlation Between Folic Acid Intake and NTD

Table 1: Distribution with All Parameters

		Frequency	Percent
Relation to various maternal risk factors	**Presence of Maternal Anaemia**	124	49.60%
	Maternal Hypertension	25	10%
	Maternal Hypothyroidism	6	2.40%
	Maternal diabetes or GDM	6	2.40%
	Febrile illness during pregnancy	9	3.60%
	H/O consanguineous marriage	5	2.00%
	Antenatal exposure to radiation	0	0%
	Exposure to teratogenic drugs	0	0%
	Exposure to smoking	0	0%
	Exposure to alcohol	2	0.80%
	Family H/O birth defects	4	1.60%
	Total	181	100.00%
Time of detection	**After delivery**	177	70.80%
	Antenatal USG before 20 weeks	7	2.80%
	Antenatal USG after 20weeks	66	26.40%
	Total	250	100.00%
H/o first trimester frolic acid intake	**No**	181	72.40%
	Yes	71	27.60%
	Total	250	100.00%

Table 2: Distribution of Types of Birth Defects

Types of birth defects	No. of cases	Percentage
CNS	89	35.60%
MSS	57	22.80%
GIT	33	13.20%
CVS	17	6.80%
GS	21	8.40%
US	13	5.20%
MCA	2	0.08%
GIT+GUS	2	0.08%
MSS+CNS	3	1.20%
GS+GIT	3	1.20%
GIT+MSS	1	0.40%
MSS+ GUS	2	0.08%
Conjoined twin	2	0.08%
Down syndrome	5	2%
Total	250	100.00%

Table 3: Distribution with All Parameters

		No. of cases	Percentage
CNS Anomalies	**Anencephaly**	28	31.40%
	Hydrocephalus	25	28.00%
	Spina bifida	21	23.59%
	Encephalocele	4	4.50%
	Microcephaly	2	3.37%
	Spinabifida and hydrocephalus	8	13.48%
	Dandy Walker malformation	1	1.12%
	Total	89	100.00%
Type of defect	**CTEV**	24	42.11%
	Omphalocele	14	24.56%
	Gastroschisis	4	7.02%
	Congenital diaphragmatic hernia	5	8.77%
	Congenital constriction band	1	1.75%
	Polydactyly	4	7.02%
	Congenital absence of right hand and finger	1	1.75%
	Syndactyly	1	1.75%
	Skeletal dysplasia	1	1.75%
	Lobster claw hand	1	1.75%
	Poland's Syndrome	1	1.75%
	Total	57	100.00%

Table 4: Distribution of Mean Gestational Age at Weeks at the Time of Delivery

	Number	Mean	SD	Minimum	Maximum	Median
Gestational age at weeks at the time of delivery	250	34.444	4.8295	14	40	36

In our study, 124(49.6%) patients had Anaemia, 25(10%) patients had Hypertension, 6(2.4%) patients had Hypothyroidism, 6(2.4%) patients had diabetes or GDM, 9(3.6%) patients had Febrile illness during pregnancy, 5(2.0%) patients had H/O consanguineous marriage, 2(0.8%) patients had Exposure to alcohol and 4(1.6%) patient had Family H/O birth defects. The value of z is 13.4609. The value of p is <.00001. The result is significant at p<.05. In our study, 177(70.8%) birth defects had were detected After delivery, 7(2.8%) were detected by Antenatal USG before 20 weeks and 66(26.4%) defects were detected by Antenatal USG after 20 weeks of gestation. The value of z is 15.7645. The value of p is <.00001. The result is significant at p<.05. In our study no patient took preconceptional folic acid. In our study, 71(27.6%) patients had H/o first trimester frolic acid intake. The value of z is 9.839. The value of p is <.00001. The result is significant at p<.05.

In our study, 89(35.6%) cases had CNS defects, 57(22.8%) cases had MSS defects , 33(13.2%) cases had GIT defects, 17(6.8%) cases had CVS defects, 21(8.4%) cases had GS defects, 13(5.2%) cases had US defects, 2(0.08%) cases had MCA defects, 2(0.08%) cases had GIT+GUS, 3(1.2%) cases had MSS+CNS defects, 3(1.2%) cases had GS+GIT defects, 1(0.4%) cases had GIT+MSS defects, 2(0.08%) cases had MSS+GUS defects, 2(0.08%) patients had Conjoined twin and 5(2%)cases detected as Down syndrome. The value of z is 5.48. The value of p is <.00001. The result is significant at p<.05. In our study, 28(31.4%) cases were Anencephaly, 25(28.0%) cases were of Hydrocephalus, 21(23.59%) cases of Spina bifida, 4(4.5%) cases were of Encephalocele, 2(3.37%) cases were Microcephaly, 8(13.48%) cases of Spinabifida and hydrocephalus and 1(1.12%) case of Dandy Walker malformation. The value of z is 4.9616. The value of p is <.00001. The result is significant at p<.05. In our study, 5(38.46%) cases had Polycystic kidney disease, 4(30.76%) cases had Hydronephrosis and 4(30.76%) cases had Multi-cystic dysplasia of kidney. The value of z is 5.2061. The value of p is <.00001. The result is significant at p<.05. In above table showed that the mean Gestational age at weeks at the time of delivery (mean±s.d.) of patients was 34.4440±4.8295.

This Prospective Cross Sectional, Hospital Based Study was conducted at department of Obstetrics and Gynecology Eden Hospital, Medical College, Kolkata from 1st January 2020 to 30th June 2021.Total number of deliveries in that period was 26261. A total 250 cases of birth defect were detected during the study period. All antenatal patients with fetal anomalies attending Eden outdoor and who were admitted in the hospital who confound to the inclusion criteria were recruited for the study. We included in our study antenatal cases who delivered babies with fetal anomalies or underwent MTP or abortion due to congenital anomalies baby at Medical college and hospital Kolkata during the study period, only those cases of fetal anomalies which were detected at time of birth or during the immediate postpartum hospital stay were included, both live and stillborn babies with detected congenital anomalies were Included in the study. Total 250 patients were taken in our study. They are often a cause for worry and anxiety for expectant parents. Birth defects can manifest in many ways such as spontaneous abortion or perinatal death or even as unexplained stillbirth. It is estimated that 9 million infants (approximately 7% 6 of all births globally) annually are born with a serious birth defect. With advanced perinatal and neonatal care now days, pediatricians are now being able to control most of the: infectious diseases and other health conditions of childhood like nutritional deficiency diseases. For that reason and also for availability of better screening procedures it has been estimated that birth defects are going to be the leading cause for perinatal mortality in near future in the developing countries. Andrew F. Olshan[12], did a study on paternal age and the risk of congenital heart defects and a total of 4, 110 cases of congenital heart defects were identified from the British Columbia Health Surveillance Registry. Matched controls were obtained from the birth files of British Columbia for the years 1952-1973. An increasing risk with increasing age among cases (excluding chromosomal anomalies) relative to controls was found for ventricular sepal defects (VSD), atrial septal defects (ASD) and patent ductusarteriosus (PDA). In addition, an increased risk among men younger than 20 yr was found for VSD and ASD. They concluded that for cardiac defects such as VSD, approximately 5% of cases may be due to advanced paternal age of >35 years, possibly through dominant mutations. Nivedita[13] the pattern of congenital anomalies included were Central nervous system (49.60%), Urinary system (13.79%), musculoskeletal system (12.99%), GIT (7.16%), CVS (5.83%) etc. The overall incidence of congenital anomalies found was 1.85%. Higher incidence of anomalies was found in babies of mother between 26-30 years of age group (2.13%) and parity of 4 and above (3.65%). In relation to religion, frequency was more common in Muslims as compared to Hindus (2.8% versus 1.68%). They also found higher incidence of anomalies in non-cephalic presentation as compared to cephalic presentation (10.28% versus 1.51%). In our study showed that, 41(16.4%) patients were ≤20 years old, 193(77.2%) patients were 21-30 years old and 16(6.4%) patient were >30 years old. 153(61.2%) patients were ≤30 years old, 89(35.6%) patients were 31-40years old and 8(3.2%) patient were >40 years old. 144(57.6%) patients had Primi Parity, 59(23.6%) patients had Parity 2, 37(14.8%) patients had Parity 3 and 10(4%) patient had Parity 4th and above. Mohammad Zeeshan Raza[14], a large percentage of their subjects (38.7%) were born before 37 weeks. Maternal factors have been found to play an important role in the presentation of birth defects. Most mothers, in their study group, were over the age of 30. Maternal Education also had an indirect effect on the incidence of birth defects. In their study, 83.6% mothers were uneducated (including 18.2% who could just write their names). Present study showed that 7(2.8%) patients were Graduate, 36(14.4%) patients were HS pass, 10(4.0%) patients were IX pass, 4(1.6%) patients were Primary School pass, 117(46.8%) patients were Uneducated, 18(7.2%) patients were V pass, 3(1.2%) patients were VI pass, 26(10.4%) patients were VII pass, 4(1.6%) patients were Vll pass, 2(0.8%) patients were Vlll pass and 23(9.2%) patient were X pass. We found that 171(68.4%) patients had Lower Socio-economic Status, 34(13.6%) patients had Lower middle Socio-economic Status and 45(18.0%) patient had Upper lower Socio-economic Status. 124(49.6%)

patients had Presence of Maternal Anaemia, 25(10%) patients had Maternal Hypertension, 6(2.4%) patients had Maternal Hypothyroidism, 6(2.4%) patients had Maternal diabetes or GDM, 9(3.6%) patients had Febrile illness during pregnancy, 5(2.0%) patients had H/O consanguineous marriage, 2(0.8%) patients had Exposure to alcohol and 4(1.6%) patient had Family H/O birth defects. The value of z is 13.4609. The value of p is <.00001. The result is significant at p<.05. Miodovnik M. and Rosen[15], it is hypothesized that insulin-dependent diabetic patients attending a pre-conception program would have improved glycaemic control compared with insulin-dependent diabetic patients who enrolled after conception and may have better pregnancy outcome, with fewer spontaneous abortions and fewer major malformations. Ninety nine pregnant insulin dependent diabetic patients were recruited before reaching 9 weeks' gestation and were followed prospectively throughout pregnancy. Our study showed that 177(70.8%) patients had detection After delivery, 7(2.8%) patients had Antenatal USG before 20 weeks of detection and 66(26.4%) patient had Antenatal USG after 20weeks of detection. 71(27.6%) patients had H/o first trimester frolic acid intake. 6(3.2%) patients were Others, 97(38.0%) patients were Female and 147(58.8%) patient were Male. 169(67.6%) patients were Live born, 7(2.8%) patients had Medical termination of pregnancy, 64(25.6%) patients were Sill born and 10(4.0%) patient had Spontaneous abortion. Anjali VivekKanhere[16] they found highest incidence of birth defects of Central nervous system followed by musculoskeletal system. Out of all the birth defects, Anencephaly was the commonest malformation which was seen in 12 (27%) patients. Among chromosomal anomalies, Down syndrome was most frequently seen. Also we found that 89(35.6%) patients had CNS, 57(22.8%) patients had MSS, 33(13.2%) patients had GIT, 17(6.8%) patients had CVS, 21(8.4%) patients had GS, 13(5.2%) patients had US, 2(0.08%) patients had MCA, 2(0.08%) patients had GIT+GUS, 3(1.2%) patients had MSS+CNS, 3(1.2%) patients had GS+GIT, 1(0.4%) patients had GIT+MSS, 2(0.08%) patients had MSS+ GUS, 2(0.08%) patients had Conjoined twin and 5(2%) patient had Down syndrome. 28(31.4%) patients had Anencephaly, 25(28.0%) patients had Hydrocephalus, 21 (23.59%) patients had Spina bifida, 4(4.5%) patients had Encephalocele, 2(3.37%) patients had Microcephaly, 8(13.48%) patients had Spin a bifida and hydrocephalus and 1(1.12%) patient had Dandy Walker malformation. Our study showed that 24(42.11%) patients had CTEV, 14(24.56%) patients had Omphalocele, 4(7.02%) patients had Gastroschisis, 5(8.77%) patients had Congenital diaphragmatic hernia, 1(1.75%) patients had Congenital constriction band, 4(7.02%) patients had Polydactyly, 1(1.75%) patients had Congenital absence of right hand and finger, 1(1.75%) patients had Syndactyly, 1(1.75%) patients had Skeletal dysplasia, 1(1.75%) patients had Lobster claw hand and 1(1.75%) patient had Poland's Syndrome. 2(9.52%) patients were Live born, 11(52.38%) patients had Medical termination of pregnancy, 2(9.52%) patients were Sillborn and 6(28.57%) patient had Spontaneous abortion. Aziza[17], conducted a cleft palate was more common in 1.71 (56.8%) patients as an associated deformity, followed by cleft lip with cleft palate in 99 (32.9%) and cleft lip in 23 (7.6%) patients. A family history of anomalies was observed more in children born to parents of a consanguineous marriage than in those whose parents were unrelated (P=.01). Present study showed that 8(24.24%) patients had Cleft lip, 4(12.12%) patients had Cleft palate, 11(33.33%) patients had Cleft lip+cleft palate, 2(6.06%) patients had Tracheo-oesophageal fistula, 2(6.06%) patients had Anorectal Malformation, 2(6.06%) patients had Intestinal Atresia, 2(6.06%) patients had Duodenal Atresia and 2(6.06 %) patient had Imperforate anus. 4(23.53%) patients had TOF (tetralogy of falots), 2(11.76%) patients had Patent ductusarteriosus, 5(29.41%) patients had Congenital cyanotic heart disease, 3(17.65%) patients had Atrial Septal Defect, 2(11.76%) patients had Transposition of great arteries and 1(5.88%) patient had Hypoplastic left heart Syndrome. 5(38.46%) patients had Polycystic kidney disease, 4(30.76%) patients had Hydronephrosis and 4(30.76%) patient had Multi-cystic dysplasia of kidney. 71 patients had Folic acid intake. 250(100.0%) patients had NR Viral markers.

CONCLUSION

Thus they concluded that women with pre- gestational diabetes or gestational diabetes plus fasting hyperglycemia have three to four-fold increased risk of infant malformations, whereas women with mild gestational diabetes have malformation rates no different than the general non diabetic obstetric population. In above table showed that the mean Maternal age (in years) (mean±s.d.) of patients was 24.4520±3.9116. In above table showed that the mean Paternal age(in Years) (mean±s.d.) of patients was 30.1000±4.8315. In above table showed that the mean Gestational age at weeks at the time of delivery (mean±s.d.) of patients was 34.4440±4.8295. In above table showed that the mean Wt of baby in kg (mean±s.d.) of patients was 2.2827±.8072.

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