

Original Research Article

Birth defect surveillance from 21 weeks gestation onwards and its correlation with different maternal risk factors

Dr. Ashish kumar Bhattacharjee¹, Dr. Shaidul Islam Bora², Dr. Rituparna Baruah³

¹Professor, MD, FICOG, ²Assistant professor, MD, FICMCH, ³Postgraduate student, Department of Obstetrics & Gynaecology, Gauhati Medical College & Hospital, Bhangagarh, Guwahati-781032, Under Srimanta Sankaradeva University of Health Sciences, Guwahati, Assam

***Corresponding author**

Dr. Rituparna Baruah

Email: ritumamu5@gmail.com

Abstract: The study was aimed to find out the overall incidence of birth defects in newborns from 21 weeks gestation onwards and to study their patterns and distribution; and to study the relation with various maternal risk factors. Newborns of consecutive deliveries were examined at births for the presence of birth defects over a period of one year and system wise classification of birth defects was done. This was a descriptive, cross sectional, hospital based study carried out in the department of Obstetrics and Gynaecology of Gauhati medical college and hospital, Guwahati from 1st June, 2015 to 31st May 2016. Both live and stillborns were included in the study. The overall incidence of birth defects was 0.92%. Neural tube defects were the commonest birth defects followed by musculoskeletal system birth defects. The incidence of Birth defects was higher in still born, low birth weight, and preterm babies and among male newborns. Non intake of folic acid, low socioeconomic conditions, anaemia, liquor abnormalities etc were the associated maternal risk factors.

Keywords: birth defects, maternal risk factors, new-borns, neural tube defects

INTRODUCTION

Birth defects or Congenital anomaly is any abnormal structural or medical condition that is present at birth [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 the expectant parents.

It is estimated that 9 million infants (approximately 7% of all births globally) annually are born with a serious birth defect [3]. In India, it has been observed that they constitute 22% of all early neonatal deaths [8]. In spite of the frequency of birth defects, the underlying causes for most remain unknown. The causes of birth defects can be attributed to single gene defects, chromosomal disorders, multi factorial inheritance, environmental teratogens and micronutrient deficiencies etc. Maternal infectious diseases such as syphilis and rubella, maternal illnesses like diabetes mellitus, conditions such as iodine and folic acid deficiency, and exposure to medicines and recreational drugs including alcohol and tobacco, certain environmental chemicals, and high doses of radiation

are some of the significant causes of birth defects in low and middle income countries.

Prenatal timely diagnosis of anomalies prior to 20 weeks is the mainstay in preventing this problem for both parents and health care workers. In a country like India, termination of pregnancy can be possible only if diagnosis is done at right time. Delaying even one week for antenatal ultrasonography and detection of major birth defects would fail to provide enough time to act within the law.

AIMS AND OBJECTIVES

1. To determine the incidence of birth defects from 21 weeks gestation onwards at Gauhati Medical College & Hospital, Guwahati.
2. To study the various birth defects in newborns in relation to their patterns, distribution and associated perinatal factors.
3. To correlate various birth defects with their maternal risk factors.

MATERIALS AND METHODS

This was a descriptive, cross sectional, hospital based study carried out in the department of Obstetrics and Gynaecology of Gauhati medical college and hospital, Guwahati for a period of one year from 1st June, 2015 to 31st May 2016. Ethical approval was taken from the Clinical Research Ethics Committee of Gauhati Medical College and Hospital.

All antenatal cases of 21weeks gestation onwards who delivered babies with birth defects and which could be detected at time of birth or during the immediate postpartum hospital stay were included. The study included both live and stillborn babies. Only newborns delivered at Gauhati medical college and hospital were included in the study.

All newborns were examined systematically for the presence of birth defects immediately after delivery by the on duty doctors and registered in the congenital anomaly register. Birth defects were classified according to International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10), Chapter XVII (Q00-Q99) congenital malformations, deformations and chromosomal abnormalities. Data collection was performed by interviewing the cases after delivery by means of a predesigned proforma. Detailed antenatal history and labour room records were collected. Parity of the mother was taken as that prior to the delivery of the respective anomalous baby.

RESULTS AND OBSERVATIONS:

A total of 16,044 deliveries were conducted between 1st June 2015 to 31st May 2016 in Gauhati Medical College and Hospital and 149 cases with birth defects were detected during this period from 21 weeks gestation onwards accounting for an Incidence of birth defects of 0.92%. Majority of the patients belonged to age group 20-25 years (69.6%) followed by 25-30 years (30.40%) with mean maternal age of 24.9±4.4 SD.

Highest numbers of cases with birth defects were seen in Primigravidas (57.71%), lower socio-economic group of people (75.83%) and among rural population. Out of 149 cases, 92 cases (61.7%) were booked and (38.3%) were unbooked. Out of 149 cases, only 69 cases (46.30%) were detected in antenatal ultrasonography, and the rest 80 cases (53.69%) were detected after delivery.

47 cases (32.8%) had birth defects of nervous system out of which neural tube defects were most common. The next common anomaly was birth defects of musculoskeletal system which was found in 37 cases (22.50%). There were 19 cases of GIT(12.7%), 11 cases of genital system, 7 cases of urinary system, 11 cases of cardiovascular system(7.38)%, 1 case of conjoined twin, 3 cases of Down syndrome and 1 case of Head and Neck and the rest were involving more than one system.

Table 1: Showing Distribution of birth defects according to ICD-10

Types of Birth Defects	No. of cases	Percentage (%)
CNS	47	32.88
MSS	37	24.83
GIT	19	12.75
CVS	11	7.38
GS	11	7.38
US	7	5.36
MCA	5	3.35
Head & Neck	1	0.67
GIT+GUS	3	2.01
MSS+CNS	3	2.01
GS+MSS	1	0.67
Conjoined twin	1	0.67
Down Syndrome	3	2.01

Key: CNS: central nervous system, MSS: Musculoskeletal system, GIT: Gastrointestinal tract, MCA: Multiple congenital anomalies involving at least 3 systems, CVS: Cardiovascular system, US: Urinary System, GS: Genital system, GUS: Genitourinary system.

Out of 47 cases of central nervous system, most common were Anencephaly [31.91%] and Hydrocephalus [31.91%]. Out of 37 cases of musculoskeletal defects most common anomaly seen was CTEV. Combined cleft lip and palate were the commonest birth defect of gastrointestinal system.

Birth defect was seen to be more common in males (56.38%) than females (38.92%) with male: female ratio of 1.44. There were also 7 cases of ambiguous genitalia.

Table 3: Showing the distribution of sex among the detected cases

Sex of Baby	No. of cases	Percentage (%)
Male	84	56.38
Female	58	38.92
Ambiguous genitalia	7	4.7

Birth defects were seen to be significantly correlated with low birth weight babies, prematurity and stillbirth.

Table 2: Showing the correlation of still born babies with birth defects

Stillbirth	Birth defect present	Birth defect absent	Total	P<0.05
Yes	36 (4.05%)	852	888	
No	113 (0.75%)	15043	15156	
Total	149	15895	16044	

A significant correlation was found between prevalence of Neural Tube Defects with presence of maternal anaemia (P<0.015). Other related maternal risk factors were previous spontaneous abortion (14.8%), maternal hypertension (10.73%), consanguineous marriage (1.34%) etc. Maternal polyhydramnios was associated with 6.75% of total birth defects and maternal oligohydramnios with 9.39% of the cases. Maternal anaemia was another significant risk factor related to birth defects found in the present study accounting for 50.33%.

None of the cases had history of exposure to radiation, drug abuse or exposure to smoking. None of the cases consumed preconception folic acid tablets and only 18.7% cases took folic acid tablets during the first trimester of pregnancy.

DISCUSSION:

The Incidence of birth defects was 0.92% in the present study which is comparable to studies of Swain S *et al.*; [4], Grover N *et al.*; [5], and Perveen F *et al.*; [6], who found an incidence of 1.2%, 1.78% and 1.14% respectively. The most common birth defect found was of nervous system and among them; neural tube defects were the commonest.

Highest number of cases was in the age group of 20-25 years (59.4%) which is comparable to other studies like Perveen F and Tyyab S *et al.*; [6], Swati Singh *et al.*; [7], etc, who found birth defects to be commonest among 21-30 years and 21-34 years age group respectively. Birth defects were seen to be commonest among Primigravidas in the present study which was also finding of other similar studies like Perveen F and Tyyab S *et al.*; [6], Shatanik Sarkar *et al.*; [8].

The significant relationship found between stillbirth and birth defects in the present study could

also be found in other studies like Swain S *et al.*; [4], Singh Keerti *et al.*; [9], Taksande Amar *et al.*; [10], Vaishali J Prajapati *et al.*; [11]. Birth defects were seen to be predominant among male new-borns which were also comparable to other previous studies like Taksande Amar *et al.*; [10], Hossein *et al.*; [12], Bakare T *et al.*; [13]. The significant correlation of birth defects with prematurity and low birth weight found in the present study is in keeping with previous studies by Shatanik Sarkar *et al.*; [8], Vaishali J Prajapati *et al.*; [11].

Present study found maternal hypertension to be associated with 10.73% of cases. Kishimba RS *et al.*; (2015), stated that mothers with hypertension during pregnancy had four times increased risk of giving birth to defected child than the non hypertensive ones. They found 14% of the cases of birth defects to have hypertension [14]. Kanhere *et al.*; [15] found maternal hypertension to be associated with 15% cases of birth defects in a similar study.

In the present study, polyhydramnios (6.71%) and oligohydramnios (9.39%) were seen to be other associated risk factors. Taksande Amar *et al.*; [10] found 3.91% of cases of birth defects were associated with polyhydramnios and 7.26% cases of birth defects were associated with oligohydramnios. Sumit Gupta *et al.*; [16] did a similar study on incidence of various systemic congenital malformations and their association with maternal factors and found 5.12% cases of birth defects were associated with maternal oligohydramnios.

CONCLUSION

Birth defects play a major role in the society because of its impact on perinatal morbidity and mortality and future disabilities. The present study concluded that central nervous system constitutes the highest proportion of birth defects in the study area. Low birth weight, prematurity, stillbirth, male sex of newborns were the associated perinatal risk factors and

primigravidity, low socioeconomic status, maternal anaemia, hypertension, liquor abnormalities etc were found to be common associated maternal risk factors. Ignorance regarding need of periconceptional folic acid and early pregnancy anomaly scan among the population and related risk of birth defects was a significant finding of this study. Most of the cases which were detected by ultrasound were already late for termination as they were done in third trimester of pregnancy .

Raising awareness for antenatal care, health education, improving socioeconomic status, use of Folic acid, early diagnosis, antenatal ultrasonography, preconceptional counselling are the major requirements to prevent and reduce the incidence of this dreadful entity, birth defects among our society.



Spina Bifida



Lobster Claw Hand



Anencephaly



Congenital constriction band



Hydrocephalus



Penoscrotal transposition

REFERENCES

1. Sadler, TW. Congenital malformations. Langman's Medical Embryology. 8th ed. 2000. 95
2. Christianson A, Howson CP, Modell B. March of Dimes: global report on birth defects, the hidden toll of dying and disabled children. March of Dimes: global report on birth defects, the hidden toll of dying and disabled children. 2005.
3. Manji KP, Msemo GL. An audit of congenital malformations at the Neonatal unit in Dar Es Salaam, Tanzania. Postgraduate Doctor Africa. 2000; 22:16-9.
4. Swain S, Agrawal A, Bhatia BD. Congenital malformations at birth. Indian pediatrics. 1994 Oct;31(10):1187-91.
5. Grover, N. Congenital malformation in Shimla. Indian J Pediatr (2000) 67: 249.
6. Perveen F, Tyyab S. Frequency and pattern of distribution of congenital anomalies in the newborn and associated maternal risk factors. Journal of the College of Physicians and Surgeons--Pakistan: JCPSP. 2007 Jun; 17(6):340-3.
7. Singh S, Chukwunyere DN, Omembelede J, Onankpa B. Foetal congenital anomalies: An experience from a tertiary health institution in north-west nigerian (2011-2013). Nigerian Postgraduate Medical Journal. 2015 Jul 1; 22(3):174.
8. Sarkar S, Patra C, Dasgupta MK, Nayek K, Karmakar PR. Prevalence of congenital anomalies in neonates and associated risk factors in a tertiary care hospital in eastern India. Journal of clinical neonatology. 2013 Jul; 2(3):131.
9. Singh K, Krishnamurthy K, Greaves C, Kandamaran L, Nielsen AL, Kumar A. Major congenital malformations in barbados: the prevalence, the pattern, and the resulting morbidity and mortality. ISRN obstetrics and gynecology. 2014 Apr 6; 2014.
10. Singh K, Krishnamurthy K, Greaves C, Kandamaran L, Nielsen AL, Kumar A. Major congenital malformations in barbados: the prevalence, the pattern, and the resulting morbidity and mortality. ISRN obstetrics and gynecology. 2014 Apr 6; 2014.
11. Prajapati VJ, Kacha AR, Kakkad KM, Damor PB, Nandaniya AM. Study of Congenital Malformation in Neonates Born at Tertiary Care Hospital. National Journal of Community Medicine. 2015 Jan 1; 6(1):30-4.
12. Hossein MA, Kargar Maher MH, Afsharnia F, Dastgiri S. Prevalence of congenital anomalies: a community-based study in the Northwest of Iran. ISRN pediatrics. 2014 Mar 26; 2014.
13. Bakare TI, Sowande OA, Adejuyigbe OO, Chinda JY, Usang UE. Epidemiology of external birth defects in neonates in south western Nigeria. African Journal of Paediatric Surgery. 2009 Jan 1; 6(1):28.
14. Kishimba RS, Mpembeni R, Mghamba JM, Goodman D, Valencia D. Birth prevalence of selected external structural birth defects at four hospitals in Dar es Salaam, Tanzania, 2011–2012. Journal of global health. 2015 Dec; 5(2).
15. Kanhere AV, Jain M, Jain A. Study of congenital anomalies of fetus and its outcome in a tertiary care centre. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2015; 4(6):1692-5.
16. Gupta S, Gupta P, Soni JS. A study on incidence of various systemic congenital malformations and their association with maternal factors. NJMR. 2012; 2:19-21.