

Study of various antenatal factors associated with congenital anomalies in neonates born at tertiary health care center

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Abstract

Introduction: An anomaly is a structural feature that departs from normal. Congenital refers to an anomaly, which is present at birth but does not indicate whether the cause is genetic or non-genetic. It is suggested that the most of the common malformation in human have mixed genetic and environmental causation. It is clear that although the exact causology of the great majority of human congenital malformations is uncertain, the role of genetic and environmental factors cannot be doubted. **Aims and Objectives:** to study the various factors associated with congenital anomalies in neonates born at tertiary center. **Materials and Method:** All the live born and still born babies born in the GMC Latur were observed meticulously to diagnose congenital anomalies. Age and parity of the mother was recorded on a prestructured proforma. Also various factors such as history of folic acid tablets supplementation, anemia, abortion and hydrominos was recorded. History of fever, consumption of drugs and preeclampsia in the present pregnancy was also recorded. **Results:** Incidence of congenital anomalies was found to be 43.03 per 1000. Incidence was increasing as the age of mother and parity was increasing. Maximum numbers (13.9%) of anomalies were diagnosed in mother more than 30 years of age. Mother who had not taken folic acid supplementation in antenatal period had maximum chance of developing congenital anomalies (37%). Congenital anomalies were also common in anemic mothers (31%). Fever during first trimester was reported in 11.5% cases. 16% women reported to be suffering form polyhydrominos. **Conclusion:** Incidence of congenital anomalies was higher in stillborn as compared to live born neonate. Increasing maternal age and birth order is associated with increased incidence of congenital anomalies. Majority of mothers with congenital anomalous neonate did not receive regular folic acid supplements.

Keywords: congenital anomalies, neonatal.

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INTRODUCTION

An anomaly is a structural feature that departs from normal. Congenital refers to an anomaly, which is present

at birth but does not indicate whether the cause is genetic or non-genetic. Dysmorphism describes a body part that has not followed a normal pattern of growth or formation and is disproportionate compared to normal. Anomalies may further be distinguished by terms that describe the abnormality in the developmental process. These terms include malformation, deformation, disruption, and dysplasia.¹ Incidence of congenital anomalies differs from country to country and from region to region within same country. This could be due to different environmental factors and also due to variability in the nature of study, in the selection of population samples and inclusion and exclusion of certain defects.² The valid determination of incidence requires the collection of data not only on live-born neonates, but also on still births and on spontaneous

and induced abortions. The frequency of malformations is higher in later groups and their exclusion therefore lead to an artefactually low estimated prevalence of malformations (selection bias).³ While the great volume of recorded research has led to the identification of a large number of causal agents, the detailed mechanisms by which these produce abnormalities are for the most obscure. Connors (1975) has emphasized the complex array of variable parameters which help to determine whether an agent acts as a teratogen or not.⁴ Sullivan (1975) reviewed the literature concerning teratogenic drugs taken by pregnant mothers, classifying them on their sites of action.⁵ The genetic factors are important in potentiating or suppressing the action of these environmental factors. Twin studies in man, suggested that the most of the common malformation in human have mixed genetic and environmental causation. It is clear that although the exact causology of the great majority of human congenital malformations is uncertain, the role of genetic and environmental factors cannot be doubted. Whenever adequate familial studies can be established there is frequently an indication of genetic mechanism. However an increased frequency of certain abnormalities may be equally associated with depressed socio-economic status, climate or geographical regions and maternal age.⁵ Thus the present study was undertaken to study the various antenatal factors associated with the congenital anomalies.

AIMS AND OBJECTIVE

To study the various factors associated with congenital anomalies in neonates born at tertiary center.

RESULTS

Table 1: Incidence of congenital anomalies

Congenital Anomalies	Live births (n=9861)	Still births (n=433)	Total births (n=10294)
Present	398 (4.04%)	45(10.39%)	443 (4.30%)
Absent	9463(95.96%)	388 (89.6%)	9851 (95.69%)
Incidence / 1000	40.4	103.9	43.03

The incidence of congenital anomalies in the present study was 43.03per 1000 births. The incidence was more in still births (103.9) as compeered to live births (40.4).

Table 2: Association of maternal age and parity with congenital anomalies

Variable	Congenital anomalies		Significance
	Present	Absent	
Maternal Age (yrs)	<20	98 (3.93%)	2398 (96.07%)
	21-25	233 (3.52%)	6386 (96.48%)
	26-30	73 (8.12%)	826 (91.88%)
	>30	39 (13.93%)	241 (86.07%)
Parity of Mother	1	138 (2.99%)	4476 (97.01%)
	2	58 (1.90%)	3002 (98.10%)
	3	44 (2.59%)	1655 (97.41%)

MATERIAL AND METHODS

Study Design

The present observational study was conducted to study the association of various antenatal factors with congenital anomalies. The study was conducted at government medical college and hospital, Latur during the year 2011 to 2013. Following inclusion and exclusion criteria was used to select the study subjects.

Inclusion Criteria

- All the Live born or still born babies born in the GMC Latur.

Exclusion Criteria

- All babies born outside and referred to NICU of medical college.
- Abortions (Gestational age <28wks)

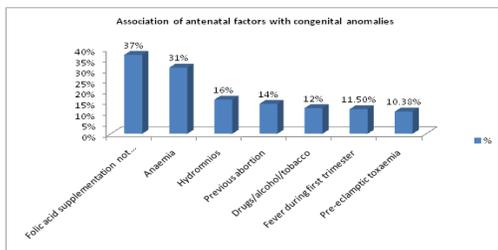
All babies were examined within 24hrs of birth and followed up for 72hrs. Data collection was done on a prestructured proforma. Information was collected from mother about the age, gravida and parity. History of chronic illness, drug ingestion, exposure to x-ray, history of congenital malformations in other offspring, parental consanguinity, nutritional status of mother, history of smoking, tobacco chewing and alcohol consumption, paternal and maternal occupation were obtained. Examination of babies was performed in good light with complete exposure from top to bottom and sex of baby was noted. General and systematic examination of babies was conducted in detail to diagnose the congenital anomaly. Investigation like X-ray, ECGs, biochemical tests, CT, MRI was performed to confirm the diagnosis where ever required. The cases of congenital anomalies were compared with various demographic characters of the newborn.

4	20 (4.80%)	397 (95.20%)
≥ 5	10 (5.00%)	190 (95.00%)

It was observed that incidence of congenital anomalies was increasing with age of mother. And maximum numbers (13.9%) of anomalies were diagnosed in mother more than 30 years of age. The difference in occurrence of congenital anomalies and age of mother was also statistically significant. It was observed that as the parity increases the chances of congenital anomalies increases. Out of total 4614 primiparous women congenital anomalies were observed in 138 deliveries i.e. incidence in primiparous was only 3%.

Table 3: Association of antenatal factors with congenital anomalies

Maternal factors	No. of Anomalies	Percentage
Folic acid supplementation not taken	165	37
Anaemia	140	31
Hydromnios	71	16
Previous abortion	62	14
Drugs/alcohol/tobacco	53	12
Fever during first trimester	51	11.5
Pre-eclamptic toxemia	46	10.38



Various antenatal factors were studied to see their association with congenital anomalies. It was observed that mother who had not taken folic acid supplementation in antenatal period had maximum chance of developing congenital anomalies (37%). Congenital anomalies were also common in anemic mothers (31%). Fever during first trimester was reported in 11.5% cases. 16% women reported to be suffering form polyhydrominos.

DISCUSSION

Thus the incidence of congenital anomalies in the present study was 43.03 per 1000 births i.e. 4.3%. Similar finding were reported by Verma M *et al*⁶ (3.6%), Bhat V *et al*⁷ (3.7%) and Singh M *et al*⁸ (5.5%). It was observed that out of total 433 stillbirths, 45 cases had congenital anomalies, giving the total incidence of anomalies in still births to be 10.39% which is statistically very significant.

Our findings are in consistent with studies of Mital VK *et al*⁹ which mentioned the incidence of congenital anomaly in still birth as 9.09%, study of VermaM *et al*⁶ also showed incidence of 12.6% in stillbirths; Chaturvedi P *et al*¹⁰ mentioned incidence of 9.8% in still births, whereas Parmar A *et al*³², Swain S *et al*¹¹, Datta V *et al*¹² showed incidence of 13.30%, 6.9% and 6.06% respectively. It was observed that incidence of congenital anomalies was increasing with age of mother. And maximum numbers (13.9%) of anomalies were diagnosed in mother more than 30 years of age followed by 26 to 30 years age group (8.12%) and 20 to 25 years (3.52%). The difference in occurrence of congenital anomalies and age of mother was also statistically significant. Similar observations recorded in study reported by Parmar A *et al*¹⁸, Grover N¹⁴, Swain S *et al*¹⁵. This could be due to advanced maternal age associated with increased risk of some chromosomal abnormalities including Down syndrome. It was observed that as the parity increases the chances of congenital anomalies increases. Out of total 4614 primiparous women congenital anomalies were observed in 138 deliveries i.e. incidence in primiparous was only 3%. Whereas out of 200 women in 5th para 10 cases (5%) were of congenital malformation. Our findings are consistent with studies of Grover N¹⁴, Swain S *et al*¹⁵. It is seen that as per the most of the studies congenital malformations are more prevalent in multipara mothers, this can be explained by the evidence that the risk of mutations in women with 3rd gravida and higher gravida is higher than women with primi or second gravida. We can also say as parity increases age of mother is also increasing and it is indirectly increasing the incidence of congenital anomalies. Our study showed that out of total 443 neonates, 165 (37%) mothers did not receive folic acid supplementation in antenatal period. Study conducted by Rabah m Shawky *et al*¹⁶ also mentioned that 27.5% of mothers with congenital anomalous neonates did not receive antenatal folic acid and vitamin supplementation. Mothers of 140 (31%) congenital anomalous neonates had history of anaemia during antenatal period. Similar risk factors were noted in study of Gupta S *et al*¹⁷ with 31 (50%) anomalous neonates had maternal history of anaemia. 71 (16%) mothers had reported history of hydromnios. 62 (14%) mothers had history of previous abortions, 53 (12%) mothers had history of drug ingestion other than multivitamins, 51 (11.5%) mother had fever in antenatal period and 46 (10.38%) mother had history of pre-eclamptic toxemia. Our study results were consistent with Verma M *et al*⁷ which mentioned that in 24% mothers had history of hydromnios, history of previous abortion was present in

16.7% mothers and history of some drug intake (other than vitamins and folic acid) in antenatal period in 6.7% of mothers with congenital anomalous neonates. Bhat V *et al*¹³ and Padma S *et al*¹⁸ could not mention any significant association between maternal risk factor and congenital anomalies. To relate association between maternal risk factors and congenital anomalies require extensive population based epidemiological study which is beyond the scope of present study.

CONCLUSION

The present study concluded that incidence of congenital anomalies was higher in stillborn as compared to live born neonate. Increasing maternal age and birth order is associated with increased incidence of congenital anomalies. Majority of mothers with congenital anomalous neonate did not receive regular folic acid supplements.

REFERENCES

1. Kumar V, Abbas Abul, Fausto N. Disease of infancy and childhood In: Robbins and Cotran *Pathologic Basis of Disease* 17th (edn) Philadelphia: Saunders; 2004pp469-510.
2. Mosayebi Z, Movahedian AH. Pattern of congenital malformations in consanguineous versus non consanguineous marriages in Kashan, Islamic Republic of Iran. *East Mediterr Health J.* 2007; 13(4):868-75.
3. Kurinczuk JJ, Hollowell J, Boyd AP, Oakley L, Brocklehurst P, Gray R. *The contribution of congenital anomalies to infant mortality*. Inequalities in infant mortality project briefing paper 4. Oxford: National Perinatal Epidemiology Unit, 2010
4. Deshpande SS. Carcinogenesis, mutagenesis, teratogenesis *Handbook of Food Toxicology* New York 2002; 69-70.
5. McIntosh N, Helms PJ, Rosalind L, Smyth Forfar and Arneil's Textbook of Pediatrics vol 1, 7th ed Churchill Livingstone/Elsevier, longman group limited 2008
6. Mital VK, Grewal RS. Congenital Anomalies In Neonates *Indian J. Pediatr.* 1969; 36:356.
7. Verma M, Chhatwai J, Singh D. Congenital Malformations-A Retrospective Study of 10,000 Cases. *Indian J Pediatr* 1991; 58: 245-252.
8. Karbasi SA, Golestan M, Fallah R, Mirnaser F, Barkhordari K, Bafghee MS. Prevalence of Congenital Malformations in Yazd (Iran) *ActaMedicaIranica* 2009; 47(2)
9. Introduction. In: Kenneth Lyon Jones. Smith's Recognisable patterns Of Human malformation. 4th (edn) Philadelphia: Saunders, pg1-9.
10. Chaturvedi P, Banerjee KS. Spectrum of Congenital Malformations in the Newborns from Rural Maharashtra. *Indian J Pediatr* 1989; 56 : 501-507
11. Dutta H K, Bhattacharyya N C, Sarma J N, Kusre G. Congenital malformations in Assam. *J Indian Assoc Pediatr Surg* 2010; 15(2).
12. Tootoonchi P. Easily Identifiable Congenital Anomalies: Prevalence and Risk Factors. *ActaMedicaIranica* 2003; 41(1)
13. Bhat V, Babu L. Congenital Malformations at Birth - A Prospective Study from South India. *Indian J Pediatr* 1998; 65 : 873-881
14. Padma S, Ramakrishna D, Jijiya P, Ramana PV. Pattern of distribution of congenital anomalies in stillborn: a hospital based prospective study. *International journal of pharma and bio sciences* 2011; 2(2).
15. Dutta H K, Bhattacharyya N C, Sarma J N, Kusre G. Congenital malformations in Assam. *J Indian Assoc Pediatr Surg* 2010; 15(2).
16. Mohamed A, Koumi E, Ehab A, Banna A, Ibrahim L. Pattern of congenital anomalies in newborn: a hospital-based study. *Pediatric Reports* 2013; 5(5):20-25
17. Swain A, Agrawal A, Bhatia BD. Congenital malformations at birth. *Indian pediatrics* 1994; 31:1187-1191
18. Parmar A, Rathod SP, Patel SV, Patel SM. A Study of Congenital Anomalies in Newborn. *NJIRM.* 2010; 1(1): 13-17.

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