International Journal of Contemporary Pediatrics
Rasheed SM et al. Int J Contemp Pediatr. 2016 Aug;3(3):819-822
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: http://dx.doi.org/10.18203/2349-3291.ijcp20161489

Research Article

Descriptive study of congenital malformations and related maternal and foetal factors

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Received: 18 May 2016
Accepted: 20 May 2016

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ABSTRACT

Background: The significance of congenital malformations lies not only in their contribution to mortality but also in causing disability and handicaps. Congenital malformations may be due to genetic factors, environmental factors or a combination of these two factors in some cases. Awareness of local prevalence and pattern of malformations with associated maternal and foetal factors can help the doctors rendering medical care to identify 'at risk' cases early and plan appropriate and effective intervention. Present study describes the associated maternal and foetal factors of congenital malformations in newborns during the study period at Government Medical College and Hospital, Aurangabad, Maharashtra, India.
Methods: This study was a hospital based cross sectional study. Seven thousand and twelve (7012) babies born over a period extending from 1 March 1994 to 31 April 1995 at Government Medical College and Hospital, Aurangabad, Maharashtra, India were studied for congenital malformations diagnosed clinically within 3 days of life. Both major and minor malformations were recorded. Minor variations such as capillary haemangioma, Mongolian spots, superficial sacral dimples, small umbilical hernias, saddle nose, mild bowing of tibia and hydrocele of the testis were not considered as malformation. Out of 7012 subjects, 66 newborns (0.94%) were found to be affected with congenital malformations. Maternal age, religion, birth order of baby, gestational age, birth weight and risk factors like consanguinity, fever in first trimester, polyhydramnios, ante partum haemorrhage, toxaemia and teratogens like infections (TORCH), drugs and radiation were analyzed in relation to the incidence of congenital malformations.
Results: Highest incidence of congenital malformations noted in maternal age group of 31 years and above followed by maternal age group of 15 to 20 years. There was not much difference in congenital malformations among babies of mothers belonging to different religions. Birth order of six and above showed highest incidence of congenital malformations followed by birth order of one. Incidence of congenital malformations was more in low birth weight babies (<2500 grams) as compared to normal birth weight babies and the difference was statistically significant. Incidence of congenital malformations was more in preterm babies as compared to full term babies and the difference was statistically significant. There was a history of antenatal risk factors among 11 cases out of 66 cases of congenital malformations. Five mothers had history of polyhydramnios; history of first-degree consanguinity was present in three cases, toxaemia of pregnancy was present in two cases and one mother had history of high-grade fever in first trimester of pregnancy.
Conclusions: Based on our observations and available literature, we observed that maternal age, birth order, birth weight, gestational age have an influence on frequency of congenital malformations whereas there was no influence of maternal religion on frequency of congenital malformations.

Keywords: Congenital malformations, Low birth weight baby, Prematurity, Maternal age

INTRODUCTION

The significance of congenital malformations lies not only in their contribution to mortality but also in causing disability and handicaps. Congenital malformations may be due to genetic factors, environmental factors or a combination of these two factors in some cases. Awareness of local prevalence and pattern of malformations with associated maternal and foetal factors can help the doctors rendering medical care to identify 'at risk' cases early and plan appropriate and effective intervention.[1,2] We have published data regarding prevalence and distribution of congenital malformations in newborns during the study period at our institute. Present study describes the associated maternal and foetal factors of congenital malformations in newborns during the study period at Government Medical College and Hospital, Aurangabad, Maharashtra, India.

METHODS

This study was a hospital based cross sectional study. Seven thousand and twelve (7012) babies born over a period extending from 1st March 1994 to 31st April 1995 at Government Medical College and Hospital, Aurangabad, Maharashtra were studied for congenital malformations diagnosed clinically within 3 days of life. Both major and minor malformations were recorded. Minor variations such as capillary haemangioma, Mongolian spots, superficial sacral dimples, small umbilical hernias, saddle nose, mild bowing of tibia and hydrocele of the testis were not considered as malformation.[3,4] Study was restricted to 3 days of life only as a large majority of our newborns were discharged from the hospital at the end of 3 days and follow up was not possible in all cases. Autopsies were performed on stillbirths and on those who succumbed, whenever consent for the same could be obtained. During the clinical examination of the newborn, particular attention was paid to the presence of breathlessness, cyanosis, feeding difficulties, persistent vomiting, failure to pass the meconium, distension of abdomen, presence of cardiac murmurs and anthropometric measurements of the infants, as the pointer to the possibility of a congenital malformation. Radiology, ultrasonography and other relevant investigations were performed whenever possible. Informed consent was taken from the parents prior to enrolment in the study.

Out of 7012 subjects, 66 newborns (0.94%) were found to be affected with congenital malformations. Maternal age, religion, birth order of baby, gestational age, birth weight and risk factors like consanguinity, fever in first trimester, polyhydramnios, ante partum haemorrhage, toxaemia and teratogens like infections (TORCH), drugs and radiation were analysed in relation to the incidence of congenital malformations.

RESULTS

Table 1-6 describes the study results. Highest incidence of congenital malformations noted in maternal age group of 31 years and above followed by maternal age group of 15 to 20 years.

Table 1: Maternal age and congenital malformations.

Group	Maternal age (years)	Total no. of newborns	Babies with malformation	Incidence of babies with malformation per 100
I	15-20	2008	22	1.09
II	21-25	3280	24	0.73
III	26-30	1241	10	0.81
IV	31 and above	483	10	2.07
Total		7012	66	0.94

Maternal age group of 21 to 30 years showed comparatively lesser incidence of congenital malformations in babies. There was not much difference in congenital malformations among babies of mothers belonging to different religions. Birth order of six and above showed highest incidence of congenital malformations followed by birth order of one. Incidence of congenital malformations was highest among babies with birth weight of 1000 grams and less and lowest in babies with birth weight of 2500 grams and above.

Incidence of congenital malformations was more in low birth weight babies (<2500 grams) as compared to normal birth weight babies and the difference was statistically significant. Incidence of congenital malformations was more in preterm babies as compared to full term babies and the difference was statistically significant. There was a history of antenatal risk factors among 11 cases out of 66 cases of congenital malformations. Five mothers had history of polyhydramnios, of which, four babies had central nervous system malformations and one had oesophageal atresia. History of first-degree consanguinity was present in three cases. Toxaemia of pregnancy was present in two cases and one mother had history of high-grade fever in first trimester of pregnancy.

Table 2: Maternal religion and congenital malformations.

Religion	Total No. of newborns	Number of babies with malformation	Incidence of babies with malformation per 100
Hindu	4006	43	1.07
Muslim	1431	11	0.77
Budh	1365	12	0.87
Others (Sikh/ Christian)	210	--	--
Total	7012	66	0.94

Table 3: Birth order and congenital malformations.

Birth order	Total Number of newborns	Number of babies with malformation	Incidence of babies with malformation per 100
I	2204	27	1.22
II	2099	22	1.05
III	1346	07	0.52
IV	755	03	0.4
V	397	04	1.01
VI and above	211	03	1.42
Total	7012	66	0.94

Table 4: Birth weight and congenital malformations.

Group	Birth weight (grams)	Total Number of newborns	Number of babies with malformation	Incidence of babies with malformation per 100
I	1000 and less	32	07	21.87
II	1001-1500	249	10	04.02
III	1501-2000	521	11	02.11
IV	2001-2500	1913	12	0.63
V	2501 and above	4297	26	0.61
Total		7012	66	0.94

Table 5: Low birth weight and congenital malformations.

Group	Birth weight (grams)	Number of babies with malformation	Incidence of babies with malformation per 100	p-value
Normal weight	2500 and above	26	0.61	<0.05 (S)
Low birth weight	< 2500	40	1.47	
Total		66	0.94	

S: Statistically significant

Table 6: Gestational age and congenital malformations.

Gestational age	Total number of newborns	Number of babies with malformation	Incidence of babies with malformation per 100	p value
Full Term	5609	41	0.74	<0.05 (S)
Preterm	1403	25	1.78	
Total	7012	66	0.94	

S: Statistically significant

Incidence of congenital malformations was more in low birth weight babies (<2500 grams) as compared to normal birth weight babies and the difference was statistically significant. Incidence of congenital malformations was more in preterm babies as compared to full term babies and the difference was statistically significant. There was a history of antenatal risk factors among 11 cases out of 66 cases of congenital malformations. Five mothers had history of polyhydramnios, of which, four babies had central nervous system malformations and one had oesophageal atresia. History of first-degree consanguinity was present in three cases. Toxaemia of pregnancy was present in two cases and one mother had history of high-grade fever in first trimester of pregnancy.

DISCUSSION

In our study, highest incidence of congenital malformations noted in maternal age group of 31 years and above followed by maternal age group of 15 to 20 years. Maternal age group of 21 to 30 years showed comparatively lesser incidence of congenital malformations in babies. Study by Khanna et al reported similar observations.[5] Taksande et al have studied incidence of congenital anomalies and the associated risk

factors at a rural medical college hospital in central Maharashtra and reported that maternal age of above 30 years had highest incidence of congenital malformations.[6] Grover N study on congenital malformations in Shimla reported that maternal age of above 35 years had highest incidence of congenital malformations.[7] In our study, there was not much difference in congenital malformations among babies of mothers belonging to different religions. Chaturvedi et al studied epidemiology of congenital malformations in 3000 consecutively delivered newborns and found no significant difference in the frequency of congenital malformation in different religion and caste subjects.[8] We found that birth order of six and above showed highest incidence of congenital malformations followed by birth order of one. Chaturvedi et al have reported higher incidence of congenital malformations in primigravida and fourth gravida mothers.[8] In addition, Taksande et al have reported highest incidence of congenital malformations in mothers with parity 4 or more.[6] We observed that incidence of congenital malformations was highest among babies with birth weight of 1000 grams and less and lowest in babies with birth weight of 2500 grams and above. Incidence of congenital malformations was more in low birth weight babies (<2500 grams) as compared to normal birth weight babies and the difference was statistically significant. Many authors like Verma M et al, Taksande et al, Grover N, Saifullah et al made similar observations.[1,6,7,9] Incidence of congenital malformations was more in preterm babies as compared to full term babies and the difference was statistically significant. Verma M et al, Taksande et al have also found that prematurity has a higher risk of congenital anomalies.[1-6]

Our study had many limitations like hospital-based design and observations for congenital malformations in newborns restricted to 3 days of life only as a large majority of our newborns were discharged from the hospital at the end of 3 days and follow up was not possible in all cases. Sample size was small and study design cannot comment upon cause-effect relationship or odds ratio of risk factors. Further studies with more robust design and larger sample over diverse geographical area needs to be done to further our understanding of the subject.

CONCLUSION

Based on our observations and available literature, we observed that maternal age, birth order, birth weight, gestational age have an influence on frequency of congenital malformations whereas there was no influence of maternal religion on frequency of congenital malformations.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Rasheed SM, Mohd H. Descriptive study of congenital malformations and related maternal and foetal factors. Int J Contemp Pediatr 2016;3:819-22.