

Relation of Stress during Pregnancy with Congenital Malformations in Children Admitted in Various Clinical Settings in Lahore

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Abstract

Objectives: To study relation of stress in pregnancy and congenital malformations in newborns delivered at various hospitals of public sector in Lahore.

Materials and Methodology: Descriptive cross sectional study design was used. The study was conducted at various clinical settings of Lahore for one month. Mothers of 40 malformed neonates were taken as sample. A data collection tool (a questionnaire) was developed and the mothers were interviewed regarding various type of stress such as poor socio-economic conditions, divorce and separation, death of a close relative, post dramatic stress disorders, serious illness, catastrophic events and pregnancy related stress including history of multiple miscarriages. Questionnaire was pretested before the data. SPSS computer software was used for entry, compilation and analysis of data.

Results: Out of 40 subjects, 14 (35%) of mothers suffered from stress while 26 (65%) did not suffer from stress during pregnancy. Out of 14, 12.5% were having

facial defects (cleft lip, cleft palate), 10% had neural tube defects while those with cvs, git, and urogenital defects were 7.5%, 2.5% and 2.5% respectively.

Conclusion: This study suggests that prevalence of congenital malformations has a significant association with the events causing stress in life during pregnancy. Therefore it is one of the overlooked but important aggravating factor in the development of malfunctions. Out of 40 subjects 35% of mothers suffered from stresses like poor socioeconomic conditions, separation and deaths in the family. The number of conotruncal, orofacial and neural tube defects was significantly higher in our subjects having stress.

Key Words: Congenital Malformations, Stressful Life Events, Corticosteroids.

Introduction

Congenital anomaly is a birth defect that occurs in approximately 5% of babies.¹ It is categorized in two groups. One is malformation which is a defect of an organ or a developmental error in forming tissue or the embryo and the other is deformation which is damage of previously normal tissues from the external factors. Deformations and malformations occur in a ratio of 2:3. They cause neonatal and prenatal mortality accounting for about 40% of deaths.² Birth defects comprise of about 15 – 30% of all pediatric hospitalization and account for higher health cost than other hospitalization resulting in significant socio-economic burden upon families and society.³ A large number of malformations are incompatible with life and they also cause mental trauma to the parents since it puts entire life of children in jeopardy. There are several factors that are known to be associated with genetic factors such as achondroplasia, cystic fibrosis, hemophilia,

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neural tube defects and other common abnormalities are caused by a combination of defective genes and environmental factors, maternal infections drugs, smoking, irradiation, maternal age, stress during pregnancy and dietary factors. Recently it is assumed that health effects of maternal stress which includes poor socio-economic conditions, divorce and separation, death of a close relative, post dramatic stress disorders, serious illness, catastrophic events and pregnancy related stress including history of multiple miscarriages might be a major risk factor for certain birth defects.⁴

Several theories explain the mechanism by which stress can lead to birth anomalies. The relationship between prenatal psychological state and pregnancy outcome is considered to be governed by the mediators such as neurohormonal and placental changes in pregnancy.⁵ One of the mechanisms includes increased corticosteroid production during maternal stress leading to birth defects. Several theories explain the teratogenic effects of corticosteroids on different animal organs.⁶ Stressful life events have been shown to be associated with elevated maternal corticotrophin-releasing hormone and corticosteroid levels during pregnancy. An-other possible explanation by which birth defects are linked to stress is failure to cope with stress leading to adoption of negative behaviors such as smoking or alcohol intake or reduced nutrient intake and multi-vitamins. The present study was carried out to find the connection between stress and birth anomalies so that prophylactic measures can be taken in time, which will prevent handicaps resulting out of congenital anomalies, which will help our developing country to become healthier.

Objectives

To study relation of stress and congenital malformations in newborns delivered at various hospitals of public sector in Lahore.

Materials and Methodology

Descriptive cross sectional study design was used. The study was conducted at various clinical settings of Lahore for one month. Mothers of 40 malformed neonates were taken as sample. A data collection tool (a questionnaire) was developed and the mothers were interviewed regarding various type of stress such as poor socio-economic conditions, divorce and separation, death of a close relative, post dramatic stress dis-

orders, serious illness, catastrophic events and pregnancy related stress including history of multiple miscarriages. Written permission from higher authorities of the settings and informed consent from the respondents obtained. A data collection tool (a questionnaire) was developed in keeping with study objectives, dependent and independent variables. Questionnaire was pretested before the data. SPSS computer software was used for entry, compilation and analysis of data. Mothers of malformed neonates were included in the study. Non willing mothers and those who were too sick to give interview were excluded. The duration of study was short and sample size was small. The study also did not specify that the stress was either acute or chronic. It was conducted only in few hospitals so variation from these results can occur.

Results

Out of 40 subjects, 14 (35%) of mothers suffered from stress while 26 (65%) did not suffer from stress during pregnancy.

Out of 14, 12.5% were having facial defects (cleft lip, cleft palate), 10% had neural tube defects while those with cvs, git, and urogenital defects were 7.5%. 2.5% and 2.5% respectively.

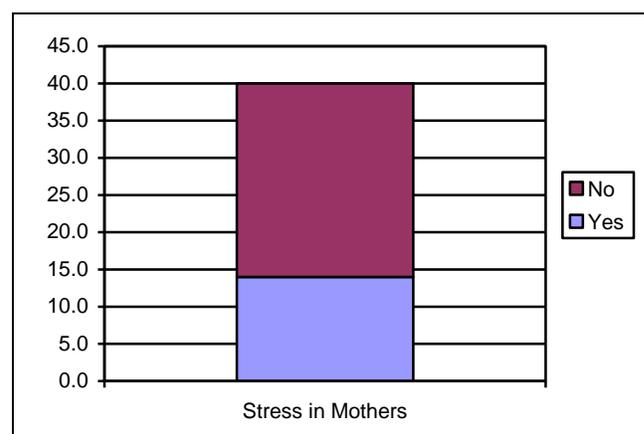


Fig. 1: Frequency Distribution of Stress in Mothers of Malformed Babies.

Discussion

In our research out of 40 subjects, 14 (35%) of mothers suffered from stress while 26 (65%) did not suffer from stress during pregnancy which is in concordance with the research carried out by Suzan L.

Carmichael, Gary M. Shaw, Wei Yang, Barbara Abrams, and Edward J. Lammeron 26 Nov 2007 which showed “greater incidence of cleft palate, cleft lip with transposition of the great arteries, and tetralogy of Fallot with an increase in stressful life events, after adjusting other factors such as maternal race, age, obesity, drinking, intake of folic acid, educational status, smoking, socioeconomic conditions or any criminal event”.⁶

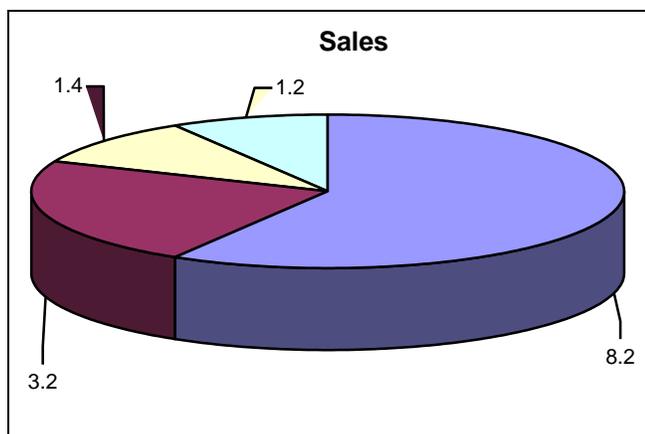


Fig. 2: Percent Distribution of type of Congenital Anomalies.

Various studies support the authenticity of our result. During stress catecholamine is raised, which consequently causes reduction in uterine blood flow and increase in fetal hypoxia. This was illustrated by the results of a study carried out by Wadhwa PD, Dunkel-Schetter C, Chicz-DeMet A, Porto M, Sandman CA stating that “neuroendocrine changes were related to stress, personality disorders and social support by two mechanisms. One of them is a significant increase in plasma levels of ACTH, beta E, and cortisol, and second is impairment of the normal relationship between the precursor pro-opiomelanocortin (POMC) and its derivatives, ACTH and beta E.”⁵

Another supportive evidence of our study is the research done by Montenegro MA¹, Palomino H, Palomino HM on the influence of earthquake-induced stress on human facial clefting and its simulation in mice following an earthquake in Santiago in September 1985 and its aftershocks in Chile. Out of 22000 registered births, the rate of facial clefts was increased from 2.01 per 1000 births in contrast to 1.6 per 1000 births in previous years. The number of such births were increased in September: 3.8 per 1000 births. This

outcome of increased clefting could be due to stress induced by earthquake.⁷

The present findings are consistent with the study carried out by Carmichael SL,¹ Shaw GM suggesting that “If a mother experiences a stressful life event during the prenatal period, it was associated with a prevalence odds ratio of 1.4 – 1.5 for the delivery of infants with cleft palate, cleft lip, heart defects and neural tube defects.”⁸

Conclusion

This study suggests that prevalence of congenital malformations has a significant association to the stressful life events in early pregnancy or prenatal time period. Out of 40 subjects 35% of mothers suffered from stresses such as poor socio-economic conditions, divorce and separation, death of a close relative, post dramatic stress disorders, serious illness, catastrophic events and pregnancy related stress including history of multiple miscarriages. The number of conotruncal, orofacial and neural tube defects was significantly higher in our subjects having stress. Therefore stress either directly or indirectly can serve as an aggravating factor in developing congenital malformation. Therefore particular attention should be given to deal with stresses by cognitive behavioral therapy of pregnant mothers having chronic stress, depression and post-traumatic stress disorder and encouraging her to adopt healthy lifestyle.

Keywords: Congenital malformation, congenital anomalies, stress during pregnancy, corticosteroids, neuroendocrine parameters.

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