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Original Research Article

Congenital heart disease: factor affecting it and role of RBSK in dealing with situation

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ABSTRACT

Background: Congenital heart diseases (CHD) is the second leading cause of death in infancy and childhood. So the purpose of this study to know socio-demographic profile and the maternal risk factors affecting CHD, and the role of RBSK in screening with respect to CHD.
Methods: A cross-sectional study was conducted during June to October 2016 in Ahmedabad city. Parents of 169 children with CHD who were beneficiaries of RBSK during the previous 3 months were interviewed.
Results: The majority of children were in the age group of 0-3 years 49.7% (mean±SD= 4.26±4). Majority of families belonged to the lower middle class IV (41.4%). 44% of mothers had primary education. Mothers with age >30 yrs were 55.6%. Only 30.9% of mothers had taken folic acid during the periconceptional period. Mothers with previous adverse pregnancy outcome were 40.2%. Maternal stress and high blood pressure were present in 33.7% and 24.8% of the mothers respectively. 48% of children were diagnosed through Rashtriya Bal Swasthya Karyakram (RBSK).
Conclusions: Lower middle class, lower maternal education, advanced maternal age, low folic acid intake, previous adverse pregnancy outcome, maternal stress and high blood pressure were the leading risk factors for CHD. RBSK is playing important role in screening and diagnosing of patients.

Keywords: Congenital heart disease, Risk factors, RBSK

INTRODUCTION

Heart defects are among the most common congenital defects in neonates.[1,2] The incidence of congenital heart defects is estimated at 4-8 per 1000 births.[3–5] CHD is usually the result of the abnormal embryonic development of a normal structure during the early stage of embryonic or fetal development.[6] Lack of information about the risk factors, especially modifiable environmental and behavioral factors having adverse effects on fetal cardiac development; act as an obstacle in the prevention of CHDs.[1] CHDs require medical and sometimes surgical intervention early in life, and early detection and quality care can improve health outcomes.[2]

Assessment of the potential impact of socioeconomic status (SES) as a risk factor for the occurrence of different types of birth defects, but few studies have included SES as a risk factor for CHD-related mortality.[2] If there is a child in the family with CHD, the chance of a second child being born with CHDs is 3-4 times more.[7] Periconceptional intake of multivitamin supplements containing folic acid may reduce the risk in offspring. Maternal lifestyle factors, including cigarette smoking, passive smoking alcohol consumption, smokeless tobacco, drinking strong tea or coffee have also been associated with risk of CHDs.[1,8] Available information about the association of maternal chronic diseases with CHDs is limited.[1] Maternal chronic diseases, including diabetes mellitus, hypertension, connective tissue disorders and CHD, were associated with an increased risk of CHDs in the offspring.[1,7] The occurrence of CHD in developing country like ours would be much higher despite the fact that most of the cases in our setup are

missed due to lack of proper facilities, detection modalities, and diagnostic techniques.[4]

Rashtriya Bal Swasthya Karyakram (RBSK), a Screening and Early Intervention Services Programme to all the children in the community. The objective RBSK is to improve the quality of life of children through early detection of birth defects, diseases, deficiencies, development delays and disability. The high burden of these ill health contributes significantly to child mortality, morbidity and out of pocket expenditure of the poor families. This initiative ensures covers of all expenditures of the eligible families related to child health right from the birth.[9]

Therefore, the objectives of this study were: (1) to study the socio-demographic profile and the maternal risk factors in children with congenital heart disease (CHD). (2) to study the role of RBSK in screening with respect to CHD.

METHODS

A cross-sectional study was conducted during June to October 2016 in Ahmedabad city. The list of 196 children with CHD who were beneficiaries of RBSK during March-May 2016 was obtained from the RBSK office, Gandhinagar. Parents of 169 children were interviewed after taking consent (27 parents could not be interviewed because of various reasons like house locked, no consent given).

House to house visit was done for data collection. A pre-tested, pre-designed and semi-structural questionnaire was used for data collection. Informed verbal consent was taken before asking questions. All the questions were asked orally in local language Gujarati or Hindi according to the convenience of the parents and were interviewed for about 20-30 minutes. Questions regarding socio-demographic characteristics; the age of children, ethnicity, socio-economic class and education of mother was asked. Regarding maternal risk factors; maternal age, an adverse outcome in previous pregnancies, the term of delivery, folic acid had taken during periconceptional period, siblings history, family history, maternal diseases during pregnancy, unhealthy lifestyle, who diagnose the disease, parents satisfaction with the treatment were checked.

Data were analyzed and presented in suitable tables and appropriate statistical tests were applied to test significance where ever necessary. Data were collected and entered in Microsoft Office Excel 2016, and Epi Info 7 was used for statistical analysis for applying a Chi-square test. $P<0.05$ was considered to be significant.

RESULTS

Socio-demographic characteristics

Parents of 169 children were interviewed. A total of 27 parents could not be interviewed because of various reasons like house locked, no consent given and were not available during data collection; so were excluded.

Table 1: Socio-demographic characteristics of children with congenital heart disease (n=169).

Age in years	Total (%)	Male	Female
0 to 3	84 (49.70)	40	44
3 to 6	40 (23.67)	24	16
6 to 9	17 (10.05)	9	8
9 to 12	15 (8.88)	8	7
12 to 15	13 (7.69)	7	6
Total	169	88 (52.07%)	81 (47.92%)
Mean (SD) = 4.26 (4)			
	Frequency	**Percentage (%)**	
Ethnicity			
Hindu	140	82.84	
Muslim	23	13.60	
Others	6	3.55	
Socio-economic class*			
Upper class	12	7.10	
Upper middle class	23	13.60	
Middle class	39	23.08	
Lower middle class	70	41.42	
Lower class	25	14.79	
*Modified Prasad Classification May- 2016			
Maternal education level			
Illiterate	23	13.60	
Primary	74	43.79	
Secondary	63	37.28	
Graduate	9	5.32	

Maximum 84 (49.70%) children belong to age group 0 to 3 years, followed by 40 (23.67%) children from 3 to 6 years of age. The mean age of the children was 4.26±4 (SD). There were 88 (52.07%) male and 81(47.92%) female. The majority 140 (82.84%) of the respondents were Hindus. CHD patients were more in Lower Middle Class 70 (41.42%). 74 (43.79%) mothers were educated up to primary school followed by 63 (37.28%) were up to secondary school. 23 (13.60%) were illiterate (Table 1).

Maternal risk factors

Majority 94 (55.62%) of the mothers were more than 30 years of age. 68 (40.23%) of mothers gave a history of previous adverse pregnancy outcome; among them, 41(24.26%) had a miscarriage. 15 (8.8%) of the siblings had a history of CHD. Full-term delivery was 110 (65.08%) and pre-term delivery was 55 (32.54%). Mothers drinking strong tea or coffee were 67 (39.6%), followed by mother exposed to passive smoking 33 (19.53%). 29 (17.16%) mothers were taking smokeless tobacco (Table 2).

Mothers taking folic acid during the periconceptional period was 52 (30.76%). Our study showed a significant positive association between maternal education and intake of periconceptional folic acid (X^2=7.937) (Table 3).

Table 2: Maternal risk factors.

	Frequency	Percentage (%)
Maternal age (in years)		
<30	75	44.38
>30	94	55.62
Adverse outcome in previous pregnancies*		
Abortion	10	5.91
Miscarriage	41	24.26
Stillbirth	8	4.73
Preterm delivery	16	9.47
Total	68	40.23
Maternal diseases*		
High B. P	42	24.85
Diabetes	16	9.47
Obesity	20	11.83
Epilepsy	14	8.28
Anemia	23	13.60
Thyroid	4	2.37
Maternal stress	57	33.73
Unhealthy lifestyle*		
Drinking alcohol	3	1.76
Drinking strong tea or coffee	67	39.64
Smokeless tobacco	29	17.16
Smoking	4	2.37
Passive smoking	33	19.53

*Multiple responses.

Table 3: Association between maternal education and periconceptional folic acid.

Maternal education	Periconceptional folic acid was taken (%)	Periconceptional folic acid not taken (%)	Total (%)
Illiterate	5 (21.7)	18 (78.3)	23 (13.6)
Primary	17 (23.0)	57 (77.0)	74 (43.7)
Secondary	25 (39.7)	38 (60.3)	63 (37.2)
Graduate	5 (55.6)	4 (44.4)	9 (5.3)
Total	52 (30.8)	117 (69.2)	169 (100)

chi square =7.937; p=0.047; df=3.

Role of RBSK in screening

81 (47.9%) of the children were diagnosed through Rashtriya Bal Swasthya Karyakram (RBSK). 69 (40.82%) children were diagnosed at less than one month of age. Around 151 (~90%) of parents were satisfied with the treatment. Most common CHD seen was Ventricular Septal Defect in 84 (49.7%) children. 89 (52.66%) children were operated while 54 (31.95%) were given drug therapy. Treatment provided including surgical procedures were free of cost at U.N. Mehta institute of cardiology.

DISCUSSION

In our study majority of the patient were from lower middle class, one possible explanation could be the affordability of government hospital. Other possible explanation could be an early screening of mothers of higher socio-economic class, during the antenatal period, due to the utilization of fetal echocardiography during the antenatal period can lead to early detection and termination of pregnancy. In the study done by Germanakis and Sifakis, it was shown that 1.4-fold increase in the probability of termination because of early diagnosis.[1]

Most of the patient came to know about diagnosis during the postnatal period and only very few were diagnosed during the antenatal period. Even though they were diagnosed in the antenatal period it was after 20 weeks of pregnancy because of that termination of pregnancy could not be done. In our study, only 5.32% mothers were graduate. In India, full antenatal coverage is only 21% (NFHS-4) which may be due to low education among mothers.[10]

In our study, more than half of mothers were above 30 years of age, so advance maternal age can be one of the risk factors. We should be alert when women become pregnant above 30 years of age. One-third of mothers gave the history of adverse outcome in a previous pregnancy. Antenatal screening of mother for subsequent pregnancies is most warranted. Maternal stress and high blood pressure were found to be the important risk factors among mothers. Preconception counseling, optimum antenatal care and treatment of the women appropriately are most desired.

Lifestyle plays important role in the development of the fetus. Many mothers gave the history of drinking strong tea and coffee, passive smoking and smokeless tobacco; these three lifestyles were most important lifestyle-related risk factors in our study. Unhealthy lifestyle is risk factors for many diseases and if any woman follows unhealthy lifestyle during reproductive years can lead to birth defects.

In our study association found between no folic acid supplementation in the periconceptional period and maternal education. In other study done by Peyvandi et al it was shown that at-risk mothers with lower education are less likely to take peri-conceptional folic acid supplementation or receive recurrence risk counseling.[3] No folic acid supplementation in the periconceptional period may be one of the risk factors although the causal association is controversial.

Since many of the risk factors were modifiable risk factors, to solve this problem we must give education to adolescent girls and soon to be pregnant females to adopt the lifestyle free of risk factors. Then we have to increase our full antenatal coverage and for that, we have to create awareness to educate mothers and have to make provision for fetal echocardiography especially in mothers with high-risk factors. Full Antenatal coverage including periconceptional folic acid consumption should be made mandatory. Stress relieving activities such as yoga and group meetings of mothers should be practiced to remove stress and anxiety. Mothers with a medical condition should treat with proper medication to the extent possible before conception to minimize the risk of congenital heart diseases to the children. RBSK is playing an important role in screening which commendable.

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