

ORIGINAL ARTICLE

EFFECT OF SOCIOECONOMIC STATUS ON CLEFTS OF LIP, ALVEOLUS AND PALATE IN POPULATION BELONGING TO THE EASTERN PART OF INDIA

Prerana Aggarwal¹, Biswarup Banerjee², Parthapratim Gupta³, Asis Kumar Datta⁴

¹Assistant Professor, Department of Anatomy, IPGME&R, Kolkata; ²Attending Consultant, Dept. of Neurology, Medica Superspeciality Hospital, Mukundpur, Kolkata; ³Professor & Head of the Dept, Dept. of Paediatric Surgery, ICH, Kolkata; ⁴Professor & ex-head of the dept., Dept. of Anatomy, IPGME&R, Kolkata

Correspondence: Prerana Aggarwal Email: dr_prerana@yahoo.com

ABSTRACT

Objective: The socioeconomic status of parents, specially the one in which the mother is brought up, affects her general health. This in turn can lead to the birth of a child with congenital abnormalities. A non-syndromic cleft of the lip, alveolus or palate (CLAP) is one of the common possibilities. Our objective was to explore association between socioeconomic status and occurrence of CLAP.

Methods: A total of 250 cases of non-syndromic CLAP in children of both sexes were studied over a period of one year at the pediatric surgery department of a tertiary care children's hospital in Kolkata. The rural and urban residential status of the respective families was carefully ascertained. Descriptive analysis was done.

Results: Of 250 cases, 47 (18.80%) were affected with cleft lip, 139 (55.60%) with cleft lip and palate and 64 (25.60%) with cleft palate alone. Of the studied cases, 171 (68.40%) came from rural areas. The affected rural families were socioeconomically weaker than their urban counterparts. The distribution of CLAP types differed significantly between rural and urban population with the frequency of cleft lip being higher in urban but that of cleft lip and palate higher in the rural population ($p < 0.05$).

Conclusion: Rural children predominate in the hospital population studied and tend to have greater frequency of complete clefting rather than cleft lip alone. The socioeconomic status may be a contributor towards this difference.

Key words: CLAP (clefts of lip, alveolus and palate), cleft lip, cleft palate, complete cleft, incomplete cleft, socioeconomic status

INTRODUCTION

Clefts of lip, alveolus and palate (CLAP) are common birth defects that have challenged medical professionals for centuries. Hippocrates first mentioned it in 400 BC. It has been stated that approximately 1 case of orofacial cleft occurs in every 500-550 births. Nonsyndromic cleft lip and palate occurs in the range of 1.5-2.5 cases per 1000 live births.¹ In India the incidence of cleft lip and palate seems to range from 0.25-2.29 per 1000 live births.² According to Smile Train records, every year around 35,000 new cleft patients are born in India and 1 million are present with unrepaired cleft.³ Epidemiological factors play a major role in causation of these clefts in genetically predisposed individuals. Among the epidemiological factors, the socioeconomic status of the parents is possibly important in influencing the appearance of clefts. We conducted a descriptive study with the objective of exploring the association between socioeconomic status, in terms of rural urban divide, and the occurrence of CLAP types in children

attending a tertiary care children's hospital in Eastern India.

METHODS

This observational study was conducted over a period of one year in the pediatric surgery department of a tertiary care children's hospital in Kolkata. The ethics committee of the principal investigator's institution approved the study protocol and written informed consent was obtained from one of the parents prior to history taking, physical examination and review of records of any past treatment when available.

Children attending the concerned hospital for surgical correction belonged to families residing in West Bengal or the neighboring states of Bihar, Jharkhand and Odisha. The age range was up to 12 years and children of both sexes were included. Those children who presented with clefts as part of other congenital syndromes

and those deemed unfit for surgery for some reasons were excluded. Cases from families who had migrated from their original place of residence within 3 years before the birth of the affected child were also excluded. Recruitment was stopped once satisfactory details were available from 250 cases.

The socioeconomic status of the affected families was carefully ascertained on the basis of family size, number of family members working in regularly paid jobs, average monthly family income, sources of income apart from paid jobs, number of dependent children and any special circumstances affecting the families. The socioeconomic and health status of the families in which the mother was brought up prior to marriage was also ascertained. Physical examination was done to classify the cleft defect in one of three subgroups – cleft lip alone (CL), cleft lip and palate including alveolar cleft (CLP) and cleft palate alone (CP).

Data have been summarized by counts and percentages. Categorical variables have been compared between subgroups by Chi-square test or Fisher's exact test as appropriate; $p < 0.05$ has been considered statistically significant. Statistica version 6 [Tulsa, Oklahoma: StatSoft Inc., 2001] software was used for analysis.

RESULTS

Of 250 cases recruited, 47 (18.80%) were affected with CL, 139 (55.60%) with CLP and 64 (25.60%) with CP alone. The majority (171, 68.40%) of the affected children belonged to rural families. The rest 79 children came from urban families, including slum dwellers. In general it was found that, qualitatively on the basis of the parameters specified above, the majority of affected rural children were socioeconomically weaker than their urban counterparts. Subgroup analysis was therefore done on the basis of rural-urban status. The distribution of the different types of CLAP defects between rural and urban children has been depicted in **Table 1**. It is evident from this table that the distribution of CLAP is significantly different between children coming from the rural and urban background. The frequency of CLP and CP is significantly higher in rural than in urban children ($p < 0.001$).

Table 1: Distribution of cleft defects between rural and urban subgroups

Residence	CL	CLP	CP
Rural (n=171)	21 (12.28)	106 (61.99)	44 (25.73)
Urban (n=79)	26 (32.91)	33 (41.77)	20 (25.32)

Figure in parenthesis indicate percentage

Chi-square test p value < 0.001 ; Fisher's exact test two-tailed p value for CL < 0.001 ; Fisher's exact test two-tailed p value for CPL = 0.004; Fisher's exact test two-tailed p value for CP = 1.000.

Abbreviations: CL = cleft lip alone, CLP = cleft lip and palate including alveolar cleft and CP = cleft palate alone.

Further comparison between the subgroups using Fisher's exact test as shown in **Table 1** shows that the frequency of CL compared to other clefts (CLP & CP) was significantly higher in urban compared to the rural population whereas the frequency of CLP compared to CP alone or CL alone was significantly higher in rural population. The frequency of CP alone was however comparable between the rural and urban children.

DISCUSSION

In the present study, 171 out of 250 cases came from rural areas whereas only 79 cases came from urban areas of the Eastern states of India. Although this can be a chance finding, this possibility is reduced since the recruitment was spread out over 1 year. For definitive conclusion of whether frequency of CLAP defects is higher in the rural setting in India, population based studies are required as have been done in the United States⁴ and China.⁵ The study done in Texas, USA,⁴ across urban-rural residence from 1999 to 2003 stated that living in more rural areas was associated with an increased adjusted risk of CLP. But CP was not found to have similar association, whereas in a continuous monitoring done between 1988-1991 in China,⁵ no difference in occurrence of CLP was observed between the urban and rural areas.

In the present study the distribution of the oral clefts is seen to differ significantly between rural and urban population. The overall pattern of clefts is also different between the two populations. The frequency of CL in comparison to other clefts is higher in cases from urban areas whereas that of CLP is higher in cases from rural areas.

The socioeconomic status of a family determines the nutritional status of the children of the family that in turn determines their general health. As early as 1966, it has been suggested that the social class in which a woman is brought up (i.e. that of her father) is of more importance as regards her general health and the state of nutrition than the social class into which she marries (i.e. that of her husband).⁶ Female children are neglected since birth in poor families belonging to rural areas of the eastern part of India. This leads to the poor general health of these future mothers. In spite of the best efforts by our government rural people still live under unhygienic conditions which leads to repeated childhood infections and poor growth and general health of the females. Living in unhygienic conditions increases the risk of antenatal infections most of which go unnoticed and remain untreated due to ignorance as well as social discrimination shown towards the girl child. In the present study many of the mothers of the affected children gave history of antenatal gastrointestinal and upper airways infection, which they ignored and left untreated. In absence of definite diagnosis it is plausible that some of these women (who gave history of antenatal upper airway symptoms) may have been affected by rubella, which is an upper airway infection mentioned to have a causal relation with CLAP.

Some of the mothers also gave history of drinking alcohol (country liquor) and smoking bidis during antenatal period. Alcohol and smoking are also mentioned to have a direct effect in causation of CLAP in the offspring.⁷⁻⁹

Therefore, the possibility of higher occurrence of clefts and more severe types of cleft defects in rural population due to unhygienic conditions, ignorance, familial and social discrimination towards females, undiagnosed upper respiratory tract infection, drinking alcohol and smoking during antenatal period cannot be ignored. The higher frequency of cleft lip alone in urban population suggests influence of non-socioeconomic factors (e.g. family history of clefts, number of siblings affected with clefts or genetics) in the causation of facial clefts. However unlike socio-economic condition, these factors are difficult to modify. Therefore, in the prevention of CLAP defects there must be emphasis on improvement of socioeconomic milieu with particular attention to the health and well being of mothers.

ACKNOWLEDGMENT

Authors extend sincere thanks to Dr. Asis Kumar Datta, Professor and Ex- Head of the Dept., Dept. of Anatomy, IPGME&R, Kolkata, Dr. Parthapratim Gupta, Professor and Head of the Dept., Dept. of Paediatric Surgery, ICH, Kolkata for their constant guidance and motivation. Special thanks to the Smile train Express (from where most of the cases were taken), the world's largest cleft lip and palate charity working with the local

doctors. Since 2000, it has sponsored over 250,000 surgeries across India, totally free of cost.

REFERENCES

1. Marie M Tolarova, Paediatric cleft lip and palate, *emedicine.medscape.com/article/995535*; sept 11 2013
2. M. Banerjee, A. S. Dakhar. Epidemiology- clinical profile of cleft lip and palate among children in India and its surgical consideration, *CIB Tech Journal of Surgery* ISSN: 2319-3875 (Online) 2013 Vol. 2 (1) January-April, pp.45-51.
3. www.smiletrainindia.org accessed on Aug 15, 2014.
4. Messer LC, Luben TJ, Mendola P, Carozza SE, Horel SA, Langlois PH. Urban-rural residence and the occurrence of cleft lip and cleft palate in Texas, 1999-2003. *Ann Epidemiol* 2010;20:32-9.
5. Wu Y, Zeng M, Xu C, Liang J, Wang Y, Miao L, Xiao K. Analyses of the prevalences for neural tube defects and cleft lip and palate in China from 1988 to 1991 [in Chinese]. *Hua Xi Yi Ke Da XueXueBao* 1995;26:215-9.
6. Ingram TTS, Drillien CM, Wilkinson EM. The causes and natural history of cleft lip and palate. Baltimore; Williams & Wilkins; 1966.
7. Wyszynski DF, Duffy DL, Beaty TH. Maternal cigarette smoking and oral clefts: a meta-analysis. *Cleft Palate Craniofac J* 1997; 34:206-10.
8. Chung KC, Kowalski CP, Kim HM, Buchman SR. Maternal cigarette smoking during pregnancy and the risk of having a child with cleft lip/palate. *Plast Reconstr Surg* 2000;105:485-91.
9. Grewal J, Carmichael SL, Ma C, Lammer EJ, Shaw GM. Maternal periconceptional smoking and alcohol consumption and risk for select congenital anomalies. *Birth Defects Res A Clin Mol Teratol* 2008; 82:519-26.