



RESEARCH ARTICLE

ASSOCIATION OF AGE OF PARENTS AND SOCIOECONOMIC STATUS WITH NON SYNDROMIC OROFACIAL CLEFT

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ABSTRACT

Orofacial clefting is a significant birth defect involving improper fusion of palatal shelves and/or the nasal process. Clefting is complex and known to have multifactorial risk factors. Aim of the study is to find out the association of age and socioeconomic status of the parents. Highest frequency of clefts were found in subjects with mother's age between 25-29 years, which was significant ($p=0.002$). Highest frequency of orofacial were found to be more in subjects with father's age between 30-34 years which was significant ($p=0.046$).

Key words:

Clefts, Orofacial Clefts, Paternal Age, Maternal Age, Socioeconomic Status.

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INTRODUCTION

Orofacial clefting is a significant birth defect involving improper fusion of palatal shelves and/or the nasal process (Carinci *et al.*, 2003). Cleft lip and palate, cleft palate alone and cleft lip alone are the varieties of oral clefts with wide range of geographic, ethnic and socioeconomic variation (Krapels *et al.*, 2004). Clefting is complex and known to have multifactorial risk factors. The cleft can be unilateral or bilateral. An extensive literature survey has revealed clefting to be caused by environmental factors, social factors and genetic factors (Natsume and Tolarová, 2006). Various social factors leading to cleft includes maternal age, socioeconomic status, paternal occupation. The association of clefting with high maternal age and low socioeconomic status have been found and clefting is largely epidemiologic in nature. Genetic factors leading to cleft include maternal and fetal genes and their products that may be responsible for increasing the risk of cleft

(Prescott and Malcolm, 2002). While genes cannot be modified directly, genetic counselling can offset their effects, which includes supplements and reduce exposure of risk factors that propagate the increased risk of certain genes. Lastly, environmental exposures include cigarette smoking, alcohol, consumption, prescription drugs, and biocides. Children born with clefts require multidisciplinary care into late adulthood and also have higher morbidity and mortality rates when compared to unafflicted individuals (Mossey *et al.*, 2009). Prevention is important as OFC creates a lifelong burden on the subject, family, and society. Thus, the aim of the study is to find out the association of age of parents, socioeconomic status with orofacial clefts.

MATERIALS AND METHODS

This study was performed in department of oral and maxillofacial surgery, A.B Shetty Memorial Institute of Dental sciences. 1000 subjects with orofacial clefts from karnataka and kerala population were selected for the study and parents age at the birth of their child with orofacial cleft defect were

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recorded. Only non syndromic cleft subjects were included. They were questioned about demographic characteristics and reproductive history. The collected data was sent for statistical analysis. Mean, standard deviation & p values were calculated and statistical analysis was performed using chi square test.

RESULTS

Among 1000 subjects, frequency of cleft lip and palate was 531, cleft lip was 291 and cleft palate was 178 with a percentage of 53.1, 29.1 and 17.8 respectively.

were found to born when their mother's age were between 25-29 years. (Table 1) Highest frequency of orofacial clefts were found to be more in subjects with fathers age between 30-34 which is significant ($p= 0.046$). Percentage distribution of orofacial clefts in subjects when their fathers age was between 30-34, 25-29 and 35-39 were 46.4%, 25% and 20.6% respectively. (Table 2) The Socioeconomic status frequency was found to be lower middle class 34.0%, upper lower class 59.2% and upper middle class 6.8%. (Table 3)

Table 1. Distribution of orofacial clefts based on mothers age at the time of their birth

			Diagnosis			Total
			CL	CLP	CP	
Mother age	<19	Frequency	11	26	10	47
		%	3.8%	4.9%	5.6%	4.7%
	20-24	Frequency	63	164	37	264
		%	21.6%	30.9%	20.8%	26.4%
	25-29	Frequency	147	233	95	475
		%	50.5%	43.9%	53.4%	47.5%
	30-34	Frequency	66	89	26	181
		%	22.7%	16.8%	14.6%	18.1%
	35-39	Frequency	4	19	10	33
		%	1.4%	3.6%	5.6%	3.3%
Total		Frequency	291	531	178	1000
		%	100.0%	100.0%	100.0%	100.0%

$\chi^2=24.25$, $p=0.002$ highly significant

Table 2. Distribution of orofacial clefts based on fathers age at the time of their birth

			Diagnosis			Total
			CL	CLP	CP	
Father Age	20-24	Frequency	4	15	2	21
		%	1.4%	2.8%	1.1%	2.1%
	25-29	Frequency	78	137	35	250
		%	26.8%	25.8%	19.7%	25.0%
	30-34	Frequency	119	249	96	464
		%	40.9%	46.9%	53.9%	46.4%
	35-39	Frequency	77	96	33	206
		%	26.5%	18.1%	18.5%	20.6%
	40-44	Frequency	12	31	10	53
		%	4.1%	5.8%	5.6%	5.3%
	>45	Frequency	1	3	2	6
		%	0.3%	0.6%	1.1%	0.6%
Total		Frequency	291	531	178	1000
		%	100.0%	100.0%	100.0%	100.0%

$\chi^2=18.598$ $p=0.046$ Significant

Table 3. Distribution of orofacial clefts based on Socioeconomic status

			Socioeconomic Status			Total
			Diagnosis			
			CL	CLP	CP	
SES	lower middle class	Frequency	94	217	29	340
		%	32.3%	40.9%	16.3%	34.0%
	upper lower class	Frequency	182	269	141	592
		%	62.5%	50.7%	79.2%	59.2%
	upper middle class	Frequency	15	45	8	68
		%	5.2%	8.5%	4.5%	6.8%
Total		Frequency	291	531	178	1000
		%	100.0%	100.0%	100.0%	100.0%

$\chi^2=47.901$ $p < .001$ vhs

Highest frequency of clefts were found in subjects with mothers age between 25-29 (475) which was significant ($p=0.002$) followed by subject with mothers age between 20-24 (264). Out of 531 cleft lip and palate subjects, 233 subjects

DISCUSSION

In our study, increase incidence of orofacial clefts was found in subjects with mother's age 25-29 years followed by 30-34 and

then 20-24 years of mother's age. The association between mother's age and clefting in child was found significant. Maternal age is considered a risk factor for numerous chromosomal alterations. This could be the reason in clefting too. In accordance to our study, Gilmore *et al.* (1966) found maternal age 20-24 produced 34 percent of all cleft children. According to Vieira *et al.* (2002) and Golalipour *et al.* (2012) there was no association between the type of cleft and maternal age. Other researchers reported that maternal age increased the risk of syndromic clefts but not non syndromic oral clefts (Chung *et al.*, 1987; Baird *et al.*, 1994; Vallino-Napoli *et al.* (2006). DeRoo *et al.* (2003) found that mothers younger than 20 years were twice as likely to have an infant with non syndromic CL/P than those aged 25 to 29 years. Robert *et al.* (1996) reported a U-shaped association between maternal-age and oral clefts in a large study with data from three congenital anomaly registries.

According to our results, the highest risk for cleft occurrence was with fathers age 30-35 which is in accordance to the study conducted by Sami Salihu *et al.* (2014) Materna-Kirylyuk *et al.* (2009) found a positive association between advanced paternal age and hypospadias, cleft palate, and cleft lip (with or without cleft palate). The reason could be genetic changes in sperm associated with advanced paternal age which could lead to an increased risk for birth defects in offspring. Parental age is considered a risk factor for CLP and numerous chromosomal alterations. Currently, available data on the relationship between the prevalence of isolated congenital malformations and parental age are inconsistent and frequently divergent. Also, there are conflicting reports on whether increased maternal or paternal ages are associated with risk of orofacial increasing maternal age for CLP, whereas others found no association with increased maternal age.

It has also been documented that mothers older than 35 and 39 years old had two and three times the risk, respectively, of having a child with CLP Kalaskar *et al.* (2013). The study using data from the Polish Registry of Congenital Malformations reported a positive association between advanced paternal age and CLP. It is difficult to comment about whether CLP's abnormalities are due to increased maternal age or age-related chromosomal alteration. Association of increased parental and orofacial cleft is not only of interest for clarifying the etiology of CLP, but also is important from a biologic and public health point of view. Therefore, further studies involving an Indian setting need to be conducted.

The association of clefts with the low socioeconomic class has also been corroborated by Irma and Puho *et al.* (2005) in the mothers of cases with orofacial cleft. Parents below the poverty line are naturally deprived of nutritious diet, periconceptional folic acid and multivitamin supplementation during the antenatal period. This could be a contributory factor for occurrence of clefts in poor families. Soltani *et al.* (2014) found an association between socioeconomic status and the incidence of oral clefts. We found 592 cases among 1000 cases belong to upper lower class followed by 340 cases belonging to lower middle class. Thus significant relation was found

among socioeconomic status and occurrence of clefts. In the study by Olasoji *et al.* (2005) majority of study subjects belonged to lower SES class. There might exist a correlation between SES of family and risk of having a child with CL/palate in Indian population, even though they are not directly related but probably due to maternal nutrition status.

Conclusion

Increase incidence of oral cleft was found in subjects with mother's age 25-29 years followed by 30-34 and 20-24 years of mother's age. Highest risk for cleft occurrence was with father's age 30-35. Significant relation was found among socioeconomic status and occurrence of clefts. Thus studies should be carried out further to come to a conclusion so as to prevent oral clefts.

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