

Comparison of incidence of cleft lip between two populations in private hospital setting

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Abstract

The most frequent major congenital craniofacial defect is clefts of the upper lip and palate, which occur in one out of every 700 babies. Despite the fact that inheritance may play a role, cleft lip and palate is a multifactorial aetiology with potential contributing factors such as chemical exposures, radiation, maternal hypoxia, teratogenic drugs, nutritional deficiencies, particularly folic acid, physical obstruction, or genetic influences. According to one popular explanation, clefting occurs when many etiological causes combine to raise one individual above the point where the fusion mechanism fails. This study focuses on comparing the incidence of unilateral cleft lip between two populations among patients of saveetha dental college. The study population involves patients from two populations, patients from Tamil nadu and Andhra Pradesh. The data of the patients were extracted from patient records from DIAS. From the current study we infer that 75% of the cleft lip patients are below the age of 1 year, 54% of the patients were males and 46% were females, 67% of the patients were from Tamil Nadu and 37% were from Andhra Pradesh. The findings suggest a higher incidence of cleft lip population in Tamil Nadu than Andhra pradesh. It was also found that prevalence of cleft lip was seen more in males than in females.

Keywords: Cleft lip, development, congenital, innovative

Introduction

Orofacial clefts are a group of congenital malformations that most usually manifest as a cleft lip with or without a cleft palate, or a cleft palate on its own. In the United States, cleft lip is the second most prevalent congenital birth abnormality, after Down syndrome(1). Cleft lip has substantial psychological and socioeconomic repercussions on both the patient and the family, including disruption of psychosocial functioning and lower quality of life, in addition to the physical effects on the patient. It's linked to a higher risk of death from a variety of causes, as well as

higher healthcare costs. Cleft lips can be unilateral or bilateral, and the alveolus or palate may be involved. Affected individuals may present with other congenital anomalies and may be part of a genetic syndrome(2).

The lip and palate's embryological development has been well studied. Lip development is normal between weeks 4 and 8 of pregnancy. The frontonasal prominence arises at the end of week 4 from migrating neural crest cells of the first pharyngeal arch. At the caudal end of this structure, nasal placodes, which indicate ectodermal thickening, form and split the paired medial and lateral nasal processes(3). By week 6, the paired medial nasal processes have fused, forming the premaxilla, which includes the central upper lip, maxillary alveolar arch, and four incisor teeth, as well as the hard palate anterior to the incisive foramen(4).

During weeks 6–12, the secondary palate develops following the primary palate. The palatal shelves are formed by the medial extensions of the maxillary processes, which rise above the tongue, merging medially at the midline, anteriorly with the primary palate, and superiorly with the septum(3,5). The anterior extent of the secondary palate is marked by the incisive foramen. The separation of the nasal and oral compartments is completed by the formation of the primary and secondary palates, allowing for simultaneous inhalation and mastication.

Because normal development happens in stages, cleft lip and palate may or may not be linked. Similarly, an isolated cleft palate can develop without a cleft lip(6). The disturbance of normal development causes deformities of the lip, palate, and nose. The time, severity, and amount of disturbance determine the severity. The lateral nasal process undergoes a burst of mitotic development just before the creation of the primary palate and central lip, which is a key time. Development is extremely sensitive to genetic and teratogenic factors at this time(6,7).

The syndromic and non-syndromic variants of Cleft lip have different epidemiologic and etiologic aspects. Non-syndromic types are the most well-studied and account for 70% of all cases. Genetics, environmental variables, and teratogens all have a role in the reasons.

Cleft lip has long been thought to be mostly caused by genetic predisposition. Genetics may account for 40–60% of orofacial clefting, according to monozygotic twin studies. However, variability, non-Mendelian inheritance patterns, and small sample sizes make identifying candidate genes difficult(8). Multiple studies have linked the interferon regulatory factor 6 (IRF6) gene to non-syndromic cleft lip, and it is also the causative agent of van der Woude syndrome, the most prevalent syndromic cause of cleft lip. Several new genetic loci have been discovered thanks to the recent availability of genome-wide association studies, including a "gene desert" region on chromosome 8q24. Epidemiologic research has looked into a variety of environmental factors. Smoking by mothers increases the incidence of Cleft lip by up to 30%, with a dose-response impact consistently observed. Exposure to passive smoke does not appear to raise risk. Although excessive drinking may raise risk, maternal alcohol use is debatable. Confounding between cigarette and alcohol consumption is common, and the effects of both should be investigated separately(9). Non-cardiac abnormalities like orofacial clefts have been associated with pregestational diabetes and, to a lesser extent, gestational diabetes. According to a recent meta-analysis, maternal age >40 years raised the risk of Cleft lip by 56% when compared to maternal age 20–29 years. Supplementing with folate during the first trimester of pregnancy has been shown to reduce risk by one-third to three-quarters, while not all studies have established statistical significance(6). The protective effect differs by population, which could indicate that the folate metabolism route has a major hereditary component. Zinc deficiency, a crucial component of neuronal migration, results in clefting in animals and may increase the risk of clefting in humans. In general, daily intake of multivitamins is recommended for all pregnant women due to potential benefits and minimal risks if taken properly(10).

The deformation of several anatomical features, which can occur with varying degrees of severity, complicates cleft lip healing. As previously noted, the problems of reconstruction can be as varied as the patient presentations of clefts: unilateral vs. bilateral, narrow vs. large clefts, syndromic vs. non-syndromic patients. The surgeon attempting to repair the cleft faces a fresh difficulty with each patient(11). Despite this, the purpose of surgery remains the same: to correct the cleft lip's functional and cosmetic abnormalities. The repair should include the creation of an intact and appropriately sized upper lip to compensate for the loss of philtral height on the cleft side, repair of the underlying muscular structure for normal oral competence and function, and primary repair of nasal deformity in order to achieve this goal(12).

This study focuses on comparing the prevalence of cleft lip in two communities- we have taken study populations from tamil nadu and andhra pradesh.

Our team has extensive knowledge and research experience that has translate into high quality publications(13),(14),(15),(16),(17–26) (27),(28–30).(31,32)

MATERIALS AND METHODS

This is a retrospective study conducted in a university setting. The case records were reviewed from June 2019 to April 2021 and the patient data who underwent cleft lip repair surgery was collected and evaluated. An institutional committee approval was obtained to access the personal data of the patients. A total of 80 records of patients who

underwent cleft lip repair surgery was retrieved and both photographic and radiographic evaluation was done. Cross verification was done by two reviewers to minimise bias, and patients from two communities (tamil nadu and andhra pradesh) were only included in the study. All cleft lip patients who underwent repair surgery were recorded. The samples were divided into 5 groups based on their age: less than 1 year, 1 year, 2 years, 4 years and more than 4 years. The data was tabulated and analysed using IBM SPSS software version 20. Descriptive statistics was done to determine the frequency percentage of age, gender, and place of residence and Chi square test was done to find the association between the patients community with the age and gender of the patients. The level of significance was set at 0.05. The results were presented in the form of graphs.

Results and discussions:

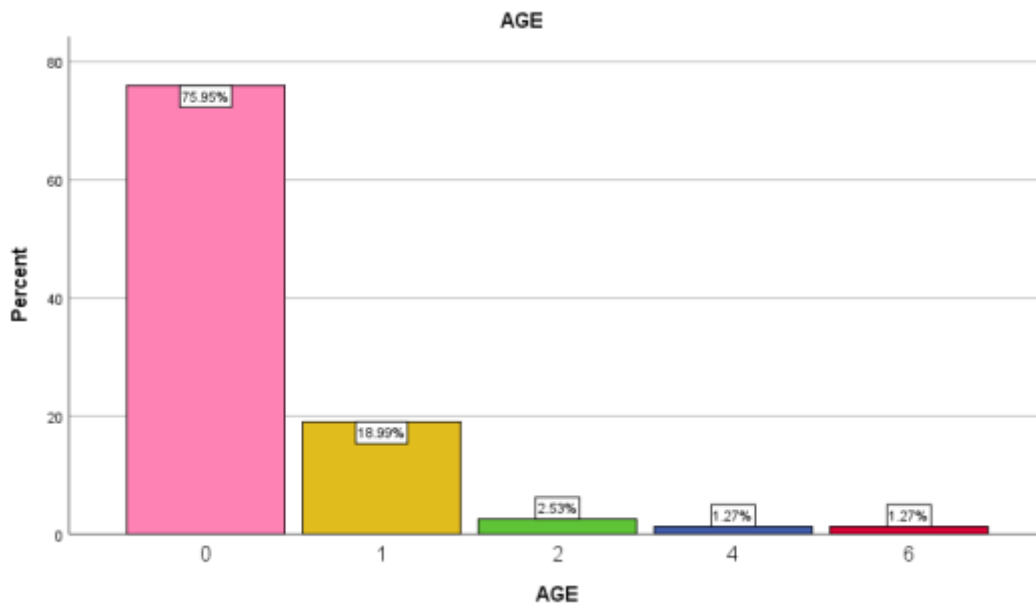


Figure 1

Bar diagram representing the distribution of cleft lip surgery done in different age groups of patients. X-axis represents the different age groups and Y-axis represents the frequency of cleft lip repair done.

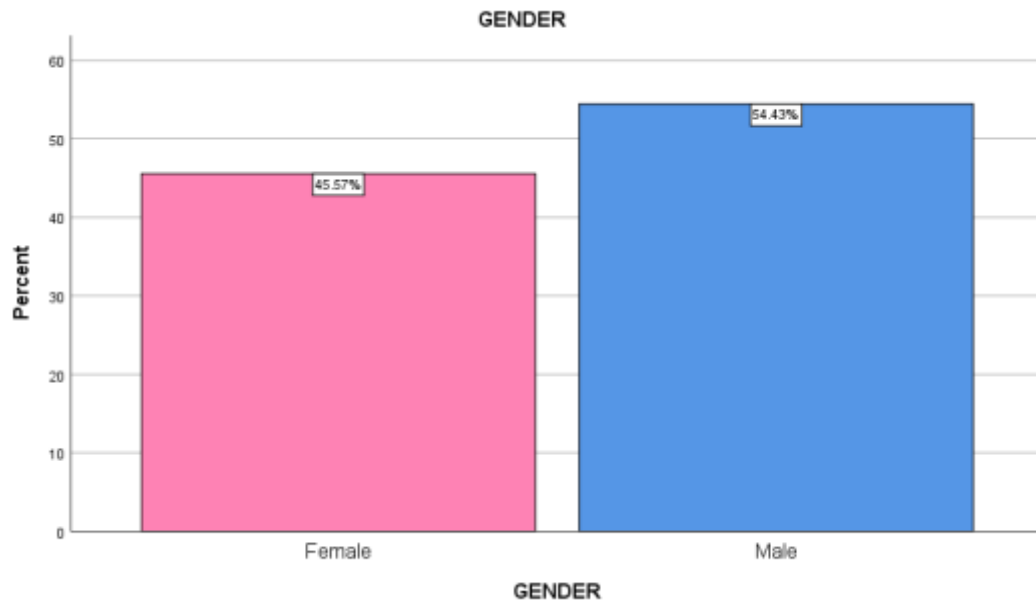


Figure 2

Bar diagram representing the distribution of cleft lip surgery done in different age groups of patients. X-axis represents the gender of the patients and Y-axis represents the frequency of cleft lip repair done.

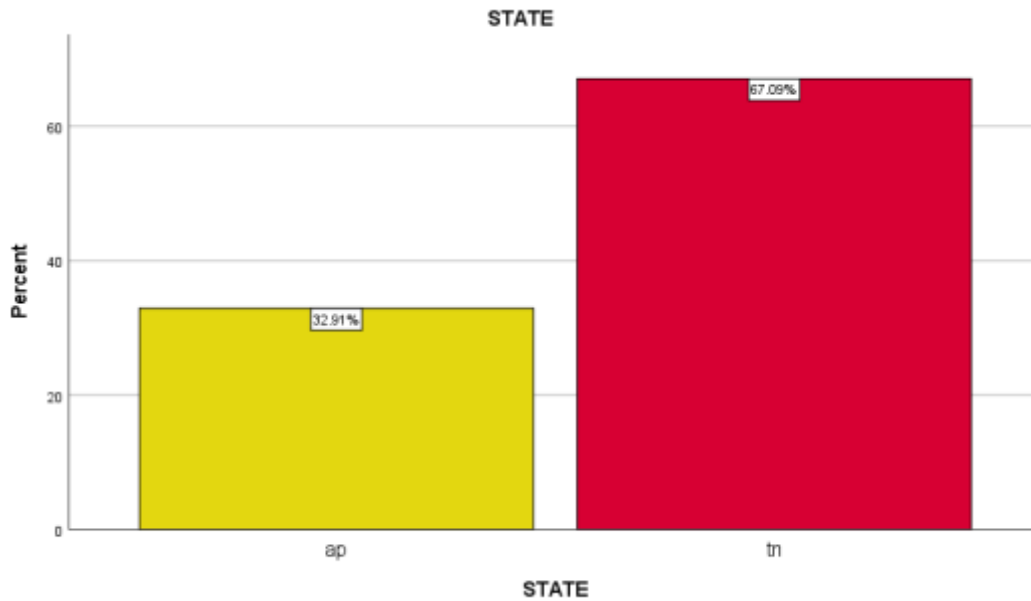


Figure: 3

Bar diagram representing the distribution of cleft lip surgery done based on the geographical location of the patients. X-axis represents the different communities of the patients and Y-axis represents the frequency of cleft lip repair done.

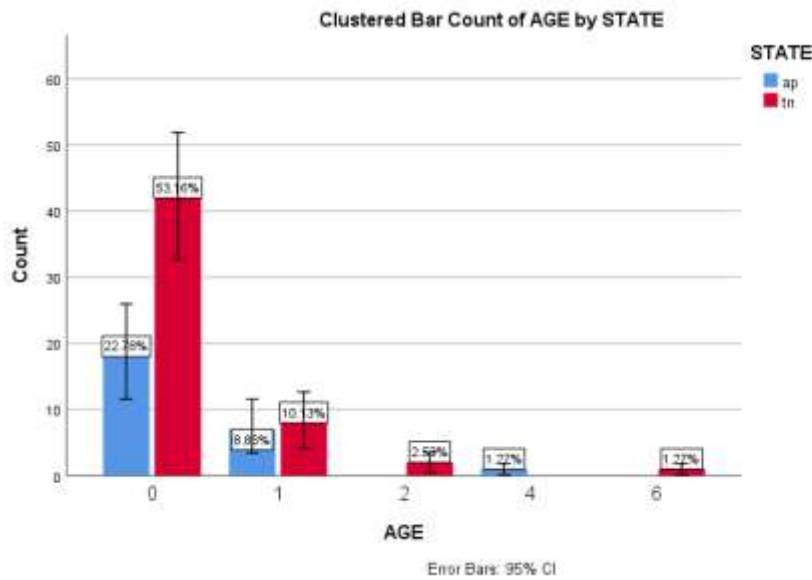


Figure: 4

Bar diagram representing the association between cleft lip patients community and different age groups. X-axis represents the state of the patient and Y-axis represents the number of patients treated.

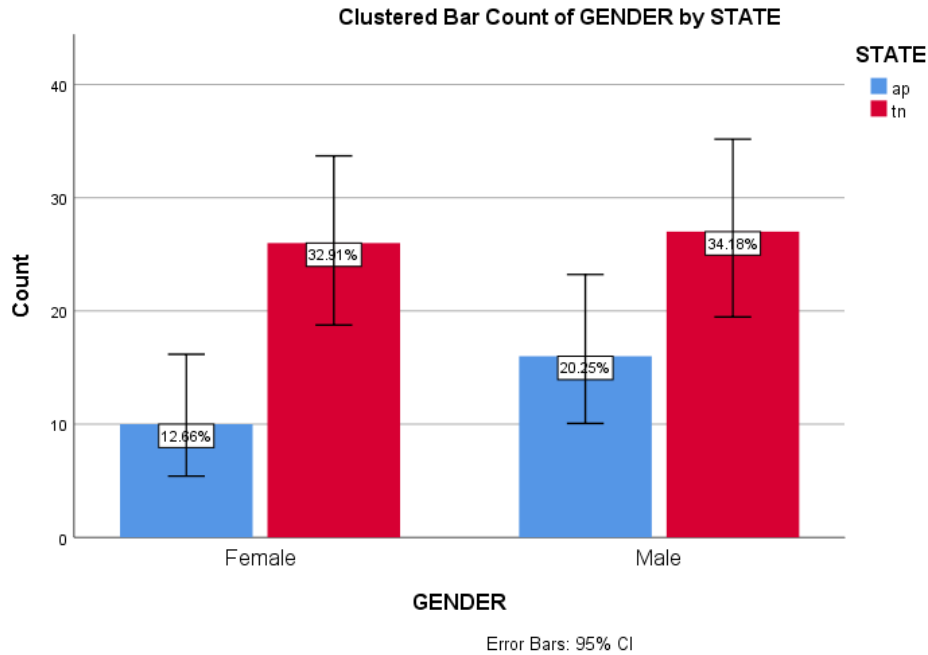


Figure: 5

Bar diagram representing the association between cleft lip patients community and gender of the cleft patients. X-axis represents the gender of the patient and Y-axis represents the community of the patient.

Following are the results obtained from the analysis. Out of 80 cleft lip patients, the maximum number of patients who were under the age of 1 has undergone cleft lip repair surgery more than any other age group (75.95%), followed by 1 year old patients (18.99%) - figure 1. What determines the optimal timing of surgical repair can vary based on surgeon preference, anesthetic risks, comorbid congenital anomalies, and perceived psychological impact on the family. Most surgeons repair the cleft lip around 10–12 weeks of age. The rule of 10's is still applicable. It was Mallard who proposed the commonly used "rule of order 10" for the timing of repair stated as weight over 10 lbs, hemoglobin over 10 g, age over 10 weeks (33).

From the given sample size it was observed that 55% of the males are affected by cleft lip whereas it is comparatively lesser in case of female patients which was found to be 45.57% (figure-2). Cleft lip is consistently more common in males at a 2:1 ratio, in contrast to cleft palate which has a similar ratio in favor of females. Some have postulated that common maternal hormones may be involved in both sex determination and orofacial clefting (33,34).

Among all the cleft patients that reported to saveetha dental college it was found that the most affected population were seen in tamil nadu community (67%) whereas this was more than patients from andhra pradesh (33%) - figure - 3.

From the obtained data it was found that there is no significant association found between age and community of the patient since the p value is not lesser than 0.05. Figure: 4

From figure: 5 that shows the correlation between age of the patient and gender it was found that there is no significant association found between age and gender of the patient since the p value is not lesser than 0.05. Figure: 5

Conclusion

Our study showed an incidence of cleft lip comparison between two communities. Being a community-based study, our report shows the true incidence of cleft lip in the university setting. The findings suggest higher incidence in Tamil Nadu than Andhra pradesh. It was also found that prevalence of cleft lip was seen more in males than in females, amongst them majority of the patients are below the age of 1. Therefore the study concludes that there is no

significant association found between age or gender of the patients with the community where they belong to (since the p value is not lesser than 0.05).

Acknowledgement

Current study is supported and funded by Saveetha institute of medical and technical science

Conflict of interest

Authors declare no conflict of interest.

Source of funding

- The present project is supported by
- Saveetha Dental College and Hospitals
- Saveetha Medical Institute Of Medical and Technical Science
- Saveetha university
- 4 U Pharma

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