

Prevalence of Isolated Incomplete Cleft Lip among the Patients of Private Dental College

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ABSTRACT

Cleft lip and/ or palate are the most common facial congenital anomaly. Approximately 50% of cases born with cleft lip and palate occur due to a known genetic syndrome or with another malformation (e.g., congenital heart defects) and the other 50% occur as solitary defects, referred to often as non-syndromic clefts. Etiology for cleft lip or palate is multifactorial. Several in vitro studies have shown that the molecular pathways are responsible for proper closure of the palate, including the BMP, TGF- β , and SHH signaling pathways. Any disturbance in these pathways can cause clefting of lips or palate. In terms of environmental exposures, maternal tobacco smoke has been found to be strongly associated with cleft lips and palate. Some studies have suggested that maternal glucocorticoid exposure may also play a vital role. Isolated incomplete form of cleft lip is a rare form of cleft lip. There is a need for more epidemiologic studies to further investigate both etiology and treatment for isolated incomplete cleft lips as well as other types of cleft lips and palate. The objective of the study is to evaluate the prevalence of isolated incomplete cleft lip in patients reported to a private dental college. The patients with the diagnosis of cleft lip were randomly selected for the study. From the total sample size 86000 patients after implementing inclusion and exclusion criteria, a sample size of 27 patients were considered for this study. Compiled data was statistically analysed. In our study, isolated incomplete cleft lip was prevalent for only 33.3%. Whereas the other cleft lip which includes unilateral and bilateral cleft 66.7% together. Within the limitations, this study shows that there was only minimal prevalence of isolated incomplete cleft lip. Even though the prevalence of complete and incomplete cleft lip and palate are more common all over the world, we felt that the incidence of isolated incomplete cleft lip is not least common, its prevalence of 33.3% is an indicator for performing further studies regarding its embryological and genetic basis.

Keywords : Cleft lip and palate; isolated cleft lip; teratogens; orofacial clefts.

INTRODUCTION

Orofacial clefts are the most predominant congenital and developmental anomaly. Various factors have been reported to contribute in cleft formation. Most common is cleft lip with or without cleft palate. Cleft lips can be unilateral or bilateral, and may involve alveolus and or palate [(Parker, Mai and Canfield, 2010)]. About one in every 2800 babies are born with cleft lip without cleft palate in the United States [(Mai *et al.*, 2019)]. Causes of oral facial cleft among infants are unknown. However CDC reported few findings related to aetiology that increases the chance of having cleft. Smoking is reported that can be a factor for cleft lip/palate. Women who smoke during pregnancy are more likely to have a baby with or of facial cleft [(Little, Cardy and Munger, 2004; Honein *et al.*, 2007)]. Few lifestyle diseases can also have an effect on babies. Women with diabetes diagnosed before pregnancy have an increased chance of having a child with clefts [(Correa *et al.*, 2008)]. Certain Teratogenic drugs also cause cleft lip or palate. Unilateral cleft lip has clefting of lip on one side only. Cleft lips can take on a variety of appearances. There may be just a small gap left in the vermilion or it may slightly extend into the skin above the lip or extend almost to the nostril, if it only occupies vermilion and little skin without extending up to nostril, it is called as Incomplete Cleft Lip.

Clefting has important psychological and social economic effects on patients quality of life and multidisciplinary approach for management. Repairing the cleft should address the functional

and cosmetic deformity of the cleft lip. It should include the creation of an intact closure of soft tissues of the orofacial region and has important psychological and social economic effects on patients quality of life which requires multidisciplinary approach for management. Repairing the cleft should address the functional and cosmetic deformity of the cleft lip. It should include the creation of an intact and appropriately sized upper lip to compensate for the loss of filtral height on the cleft side, repair for normal oral competence and function [(De La Pedraja *et al.*, 2000)].

Our team has rich experience in research and we have collaborated with numerous authors over various topics in the past decade (Ariga *et al.*, 2018; Basha, Ganapathy and Venugopalan, 2018; Hannah *et al.*, 2018; Hussainy *et al.*, 2018; Jeevanandan and Govindaraju, 2018; Kannan and Venugopalan, 2018; Kumar and Antony, 2018; Manohar and Sharma, 2018; Menon *et al.*, 2018; Nandakumar and Nasim, 2018; Nandhini, Babu and Mohanraj, 2018; Ravintha and Jayalakshmi, 2018; Seppan *et al.*, 2018; Teja, Ramesh and Priya, 2018; Duraisamy *et al.*, 2019; Gheena and Ezhilarasan, 2019; Hema Shree *et al.*, 2019; Rajakeerthi and Ms, 2019; Rajendran *et al.*, 2019; Sekar *et al.*, 2019; Sharma *et al.*, 2019; Siddique *et al.*, 2019; Janani, Palanivelu and Sandhya, 2020; Johnson *et al.*, 2020; Jose, Ajitha and Subbaiyan, 2020).

The aim of the present study is to evaluate the prevalence of isolated incomplete cleft lip in patients reported to a private dental college.

MATERIALS AND METHODS

Study Selection: This is a university setting study, conducted in Saveetha dental College. The pros of the study includes flexibility of the study and less time consumption. The cons of the study includes, it is limited to a certain population. Cleft lip patients were randomly included for the study. Approval was obtained from the institutional ethical committee. two examiners were involved in the study.

Sampling: It is a retrospective study. Data was collected from June 2019 to March 2020 and a total of 27 cases were reviewed. Cross verification of data for error was done by the presence of additional reviewers, and by photographic evaluation. Simple random sampling was done to minimise sampling bias. It was generalised to the South Indian population.

Data Collection /Tabulation: From the total sample size 86,000 patients after implementing inclusion and exclusion criteria and final sample size of 27 patients were considered for this study. Data entered in excel and was imported to SPSS. Incomplete Data was excluded from the study.

Statistical analysis: IBM SPSS 2.0 software was used for data analysis. Independent variables include age, gender and dependent variable include isolated incomplete cleft lip. Descriptive and inferential statistics were used. Descriptive statistics include the frequency of distribution of patients' age and gender. Inferential tests include the chi- square test.

Results:

Out of 27 patients, only 9 (33.3%) were Isolated Incomplete cleft lip and the remaining 18 (66.7%) consists of both bilateral and unilateral cleft lip. Age distribution of cleft lip showed maximum number of patients reported to the hospital for the treatment at less than one year old with frequency of 15 (55.6%). At the age of 1, 9 patients (33.3%) reported for treatment and only three patients (11.1%) who reported to the clinic at the age of two and above (Figure 1). The gender distribution of cleft lip show high prevalence of 55.6% in males compared to females

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(44.4%)(Figure 2).The association of age with isolated cleft lip shows that 6 patients reported with isolated incomplete cleft lip were less than one year old .Whereas only one patient reported with isolated in complete cleft lip at the age of one and two patients reported at the age of 2 and above.So the Chi square analysis revealed p value > 0.05 (Figure 3).On analysing the association of gender with isolated incomplete cleft lip, Isolated incomplete cleft lips were more prevalent in male patients with 7 patients and only 2 patients were females. In contrast, other cleft lips showed female predominance with frequency of 8 patients (Figure 4).

DISCUSSION

In the study, we observed that 33.3% of isolated in complete cleft lip was repellent. While all other types of cleft lips together constitute 66.7%. This includes both bilateral and unilateral cleft lip. a Similar pre study also showed that isolated cleft lip alone accounts for about 10 to 30%. Combination of primary and secondary palate involvement comprises 35 to 55 percent of cases; involvement of secondary palate alone accounts for 30 to 45% of cases [(Drillien, Jameson and Wilkinson, 1966)].

Ethnicity has also shown significant differences in different populations.Highest rates for clefts have been reported in Asian and native Americans(one in 500 words). Least prevalent in Africans (1 and 2500 births) [(Parada and Chai, 2012)].In this present study, we observed more male prevalence by 55.6% population. In concordance with our study, another article also reported for male predominance at the ratio of 2:1.To substantiate this gender prevalence, many have postulated that maternal hormones determine the sex in oral facial clipping . Coming to aetiological factors which have been controversial for ages ,the aetiology for orofacial clefting is multifactorial and involves genetics, environmental factors, and teratogens [(Dixon *et al.*, 2011)] [(Murray, 2002)] . Genetics has been a major factor in cleft lip and palate that determines the sex in oral facial clefting. The interferon regulatory factor 6 (IRF6) gene is consistently associated with non syndromic CLP [(Dixon *et al.*, 2011)] [(Murray, 2002)] . Apart from IRF6, there are many studies which also identified both IRF six and CH8Q 24 genes distribution in Europe and Asia. VAX7, FGFR2 and BMP four genes are common among other populations [(Osoegawa *et al.*, 2008; Suzuki *et al.*, 2009; Beaty, 2016)].

Environmental factors have also been attributed to the cause of clefts, maternal smoking increases the risk of cleft lip and palate by 30% [(Shi, Wehby and Murray, 2008)]. Maternal alcohol consumption has no pre-dominant difference but may increase the incidence [(DeRoo, Wilcox and Drewnowski, 2008)]. Maternal age also influences cleft lip and palate formation. A recent study showed maternal age about 40 years old has increased risk of CLP by 56% ,compared to maternal age between 20 to 29 years old [(Herkrath *et al.*, 2012)]. Nutritional deficiencies such as zinc and folate which are important in neuronal migration can cause clefts compared to maternal age between 20 to 29 years old [(Herkrath *et al.*, 2012)]. Nutritional deficiencies such as zinc and folate which are important in neuronal migration can cause clefts [(Wilcox *et al.*, 2007; Kelly, O'Dowd and Reulbach, 2012)].Teratogens are also reported to have influence in cleft lip and palate formation. Teratogens are the factors that cause malformation in embryos. Teratogenic drugs such as retinoic acid , valproic acid and phenytoin are reported to cause clefting [(Jentink *et al.*, 2010)].

Previously our university conducted various studies in knowledge, awareness and attitude regarding human immunodeficiency virus [(Rahman and Mp, 2017)], antibiotic prophylaxis [(Kumar and Sneha, 2016)] ,basic dental procedures [(Patturaja and Pradeep, 2016)] and

biomedical wastes [(Kumar and Rahman, 2017)]. There are studies related to lefort one osteotomy and maxillofacial trauma [(Christabel *et al.*, 2016; Abhinav *et al.*, 2019; Jain *et al.*, 2019)] and treatment and management of oral carcinomas [(Marimuthu *et al.*, 2018)], alveolar osteitis [(Jesudasan, Abdul Wahab and Muthu Sekhar, 2015)], oral ranula [(Packiri, Gurunathan and Selvarasu, 2017)], oral submucous fibrosis [(Patil *et al.*, 2017)], dental pain or extractions [(Kumar, 2017a; Rao and Santhosh Kumar, 2018)] Botulinum toxin for orofacial disorders [(Kumar, 2017b)] and virtual reality in pain perception [34]. Now we have conducted the study regarding isolated incomplete cleft lips.

Our institution is passionate about high quality evidence based research and has excelled in various fields ((Pc, Marimuthu and Devadoss, 2018; Ramesh *et al.*, 2018; VijayashreePriyadharsini, SmilineGirija and Paramasivam, 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai *et al.*, 2019; Sridharan *et al.*, 2019; VijayashreePriyadharsini, 2019; Chandrasekar *et al.*, 2020; Mathew *et al.*, 2020; R *et al.*, 2020; Samuel, 2021)

Limitation of this study is minimum sample size and constricted to a small population. In future, we can conduct studies to assess the management of cleft lip and palate patients.

CONCLUSION

Within the limitations of our study, we can contemplate that there are 33.3% of incomplete isolated cleft lip which is less when compared to other types of cleft lip. Even though the prevalence of complete and incomplete cleft lip and palate are more common all over the world, we felt that the incidence of isolated incomplete cleft lip is not least common, its prevalence of 33.3% is an indicator for performing further studies regarding its embryological and genetic basis.

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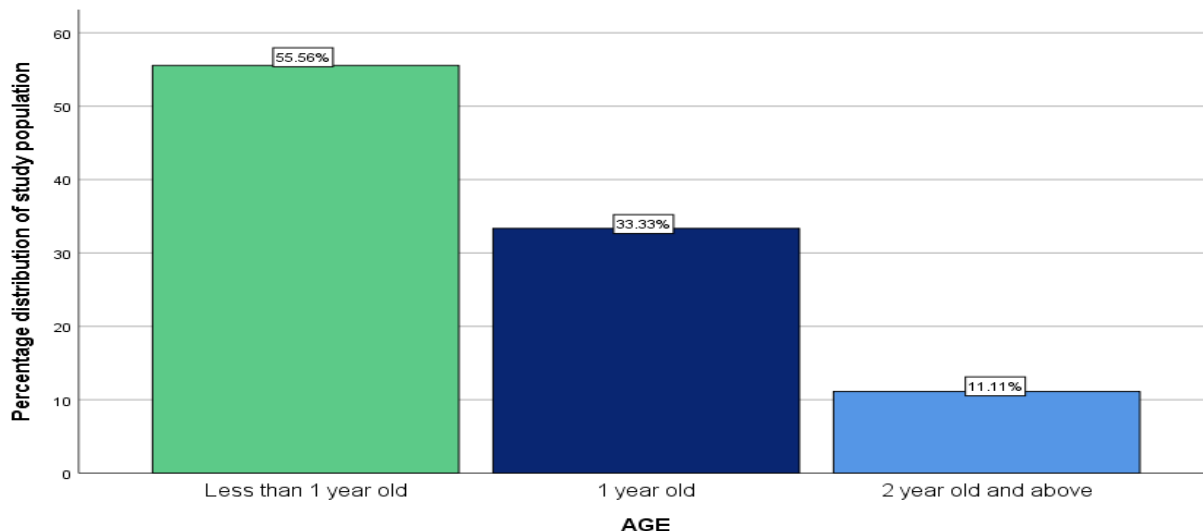


Figure 1: Bar graph shows the age distribution among the samples chosen. The X axis represents the age and the Y axis represents the percentage of samples. Green represents age less than 1 year old, dark blue represents 1 year old patients and light blue represents age group 2 year old and above. It can be inferred that most number of patients reported to the Hospital for treatment are less than 1 year old. This may be due to increasing awareness among parents of cleft patients.

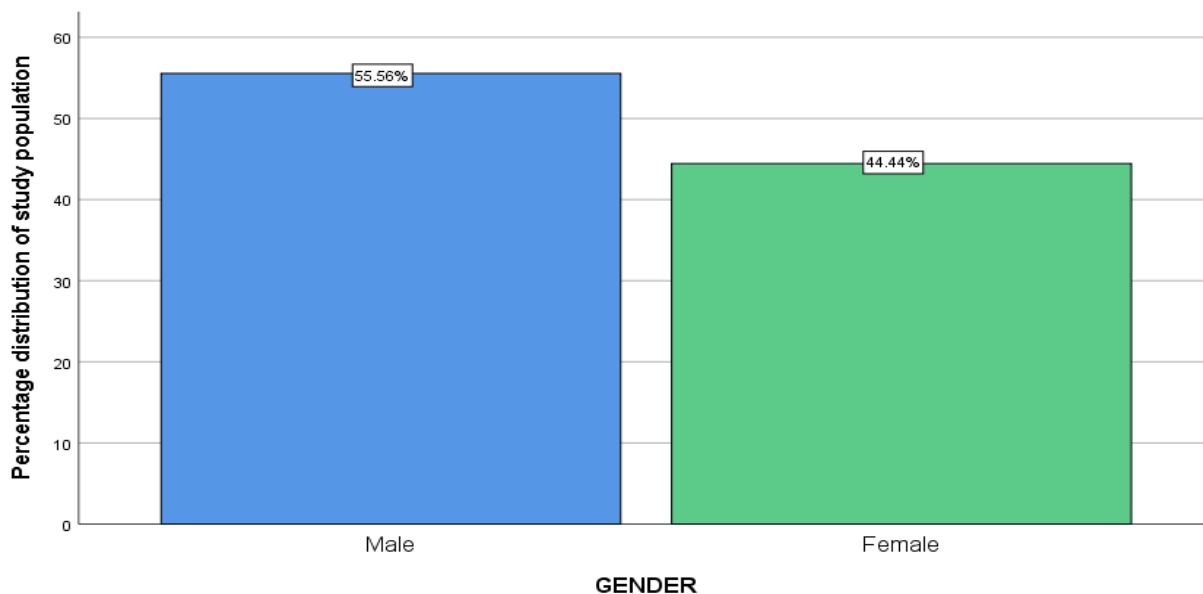


Figure 2: Bar Graph shows the patients distribution on the basis of gender. The X axis represents the gender and the Y axis represents the percentage of patients in each group (green-female) (blue-male). It can be inferred from the graph that there is more male prevalence compared to females.

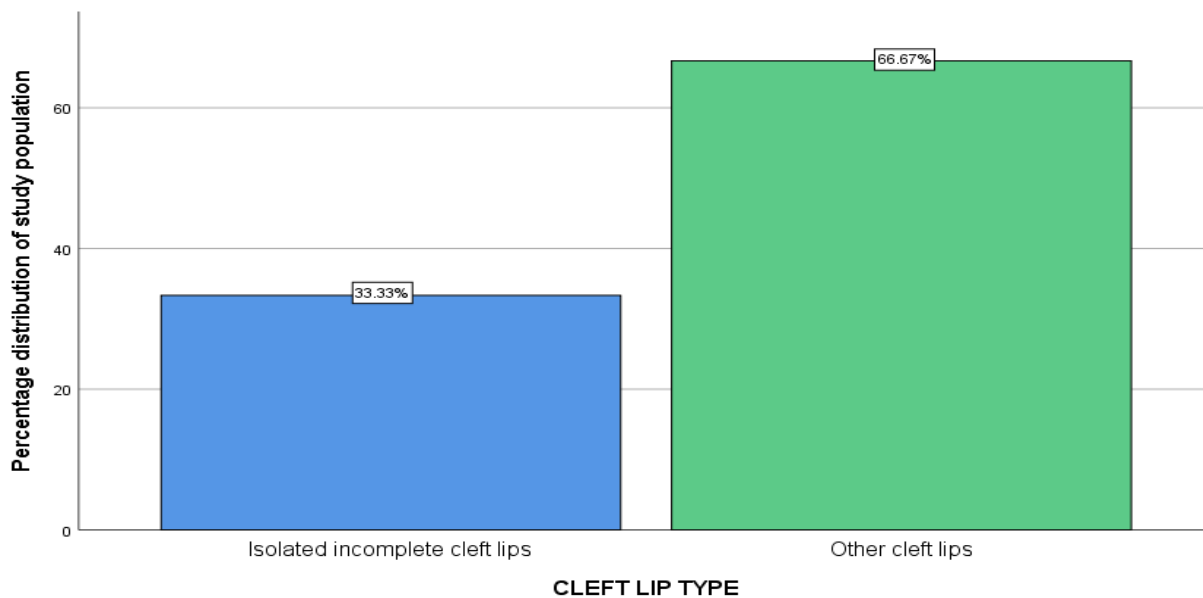


Figure 3: Bar Graph shows the patients distribution on the type of cleft lip. The X axis represents the Groups based on type of cleft lips and the Y axis represents the percentage of patients in each group (green-other cleft lips) (blue-isolated incomplete cleft lips). It can be inferred from the graph that the incidence of isolated cleft lip is less when compared to other types like complete unilateral /bilateral cleft lip.

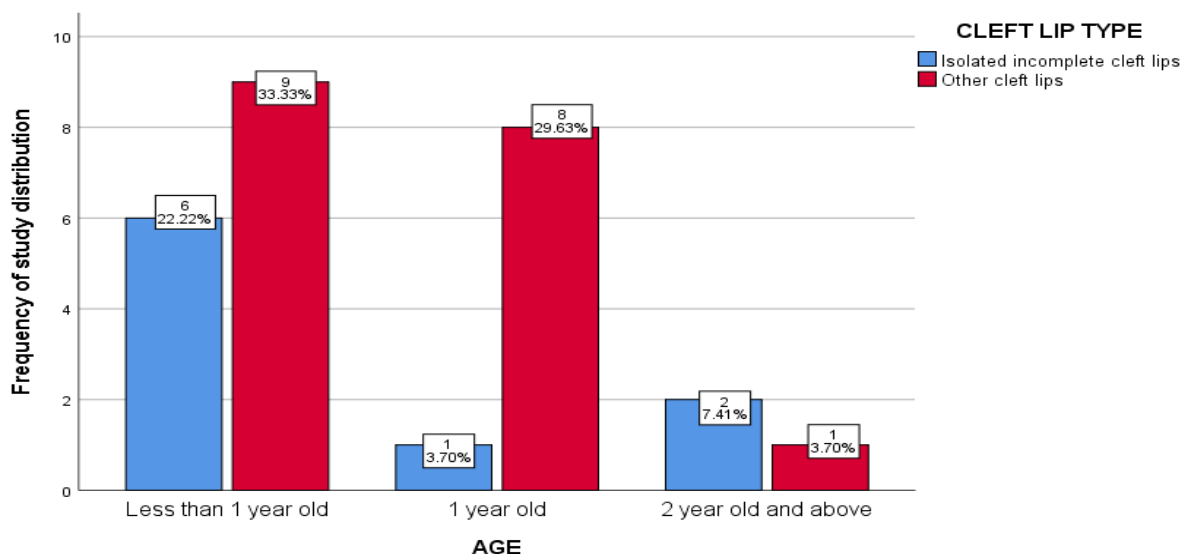


Figure 4: This bar graph compares the distribution of isolated incomplete cleft lip and other types of cleft lips reporting to the clinic for treatment among different age groups. The X-axis represents the age of the patients while the Y-axis represents the frequency of study population. Other types of cleft lips (red colour) were more common than isolated incomplete cleft lips (blue colour). Most of the patients reported to the clinic for cleft lip treatment were less than 1 year old. However, there was no significant difference in type of cleft lips patients reporting to the clinic and age (chi-square test, p value: 0.150 (p value >0.05 statistically insignificant))

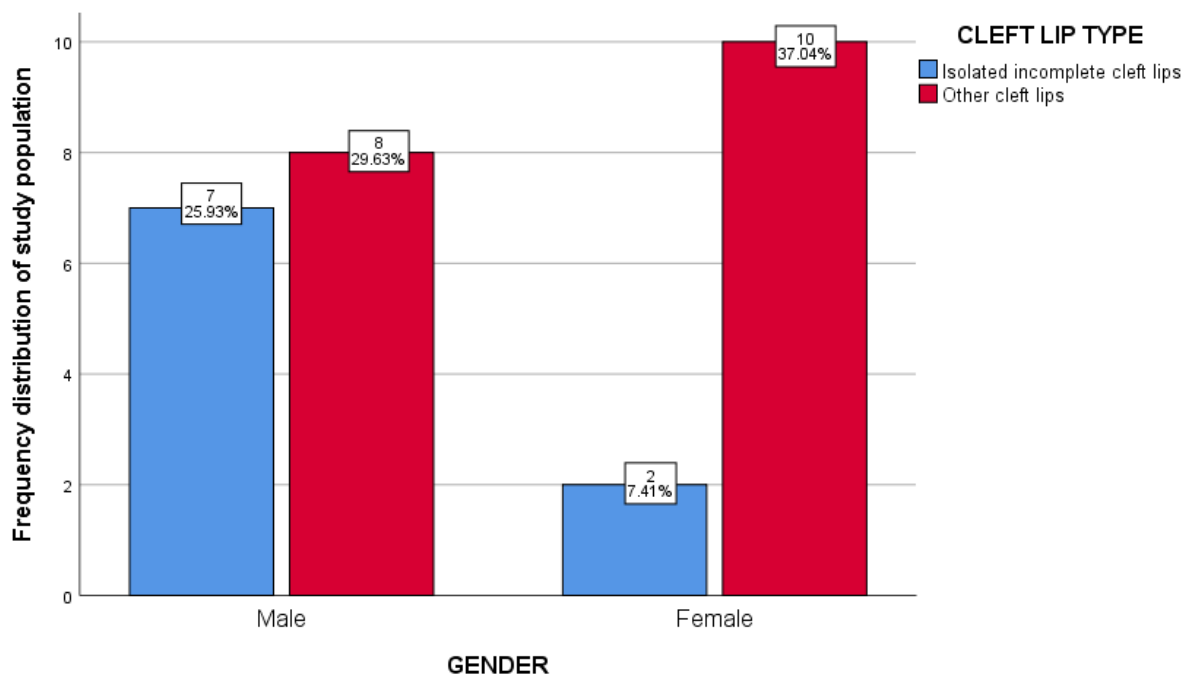


Figure 5: This bar graph compares the distribution of isolated incomplete cleft lip and other types of cleft lips reporting to the clinic for treatment among male and female patients. The X axis represents the gender of the patients while the Y axis represents the frequency of study population. Other types of cleft lips (red colour) were more common than isolated incomplete cleft lips (blue colour). Most of patients with other type of cleft lips were seen in females and isolated incomplete cleft lip patients were commonly seen in males. However, there was no significant difference in type of cleft lips patients reporting to the clinic and gender (chi-square test, p value: 0.100 (p value >0.05 statistically insignificant))