

ORIGINAL ARTICLE

Patterns of Cleft Lip and Cleft Palate in Southern Pakistani Population

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ABSTRACT

Objectives: To determine various types of cleft lip and palate, its geographical distribution and its association with cousin marriages, family history and other craniofacial syndromes in the Southern Pakistani population.

Study design: Cross-sectional study

Place and Duration of Study: Plastic Surgery Department of Sheikh Zayed Medical College / Hospital, Rahim Yar Khan and Hamza Medicare, Rahim Yar Khan from January 2020 to March 2021.

Methodology: All patients who presented to the outpatients department with cleft deformities of lip and palate, irrespective of their age and gender were included in the study. Patients who were operated previously and those who were not agree with the study protocol were excluded from the study. The data were collected through a structured proforma as well as history and physical examination. The data were organized and analyzed through Statistical Package for Social Sciences version 23.

Results: Total of 403 patients with cleft lip and palate deformities were included in this study, with an average age of 39±62 months. Out of total 239 59.3% were males with male to females ratio of 1.4:1. Cleft lip with cleft palate, cleft palate only and isolated cleft lip were found in 56.8%, 13.4% and 29.20% of cases respectively and 2 (0.5%) cases of median cleft. Out of total, 155 (38.5%) were from Southern Punjab, 50.6% from Sindh and 10.9% were from Baluchistan Province. In 386 (95.8%) cases parent had a History of cousin marriage, and family history of Cleft Lip & Cleft Palate was positive in 67 (16.6%) cases. Other congenital anomalies were found in 12.5% of cases.

Conclusion: Cleft lip and palate deformities affected the male population more than females. Cleft lip in association with cleft palate is the commonest deformity. Isolated cleft palate mainly affected females. The high incidence of these anomalies in cousin marriages emphasizes educating the people to avoid cousin marriages.

Key Words: Cleft Lip, Cleft Palate, Consanguinity, Family history, Congenital deformities

INTRODUCTION

Cleft lip and cleft palate are the commonest oral-maxillofacial congenital deformities affecting 1/500-1000 new born worldwide.¹ Every year more than 160,000 new patients with cleft lip and palate are born in the whole world.² Pakistan ranks fourth in the world (after China, India, and Indonesia) having the highest number of cleft children born every year.³ Cleft lip and palate require long-term, complex treatment that has lifelong social, psychological and physical implications on the affected individuals.⁴ The cleft of the primary palate (anterior hard palate, alveolus, lip and nose) results from the failure of fusion of medial nasal, lateral nasal and maxillary processes around 30-37 days of embryonic life. The cleft of the secondary palate (posterior hard palate and soft palate) results from the failure of fusion of the maxillary palatal shelves due to the impeding tongue position in the 7th week of gestation.⁵

On the basis of embryonic and genetic bases, the isolated cleft palate is differentiated from the cleft lip with cleft palate. About 2/3 of the cases are consistent of a cleft lip in association with a cleft palate, while 1/3 cases are affected by the isolated cleft palate deformity. Cleft of lip with cleft of palate deformity is more common in male children; while females are mostly affected by a cleft palate only.⁶ Epidemiological data suggest that the cleft lip in

association with the cleft palate mostly consists of a bilateral cleft lip. The relatives of the cleft lip with cleft palate patients have increased risk for developing a cleft lip and cleft palate, while the relatives of the cleft palate have the same risk as a general population.⁷ A fraction of the cleft deformities is found in association with syndromes. The isolated cleft palate is mostly associated with the syndromes.⁸

The purpose of the study is to find-out various types of cleft lip and cleft palate, geographical distribution and its association with cousin marriages, family history and other syndromes in the Southern Pakistani population (Punjab, Sind and Baluchistan).

METHODOLOGY

This cross-sectional study was conducted in the Plastic Surgery department of Sheikh Zayed Medical College / Hospital, Rahim Yar Khan and Hamza Medicare, Rahim Yar Khan from January 2020 to March 2021. The study was approved by the Institutional Review Board. The records of all the patients with cleft lip and/or palate deformities, irrespective of their age and gender, who were surgically managed at our tertiary care hospitals, were retrieved and included in the study. After getting permission from hospital administration, patient's data were collected through a proforma including history, clinical findings, information on consanguinity, family history and information on other malformations. The records of the patients which were incomplete, and those who were previously operated

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were excluded from the study due to the possibility of bias in the determination of the type of cleft deformity. The data were organized through special proforma constructed with the help of a statistician and analyzed via Statistical Package for Social Sciences version 23. The exclusion criteria were strictly observed to exclude the bias from the study results.

RESULTS

Total of 403 patients with cleft deformities of lip and palate were included in the study (Fig. 1). The age ranged from 2.5 months to 45 years with the mean age of 39 ± 62 months. Out of total 239 (59.3%) were males and 164 (40.7%) females, with a ratio of 1.4:1. In male patients with only cleft lip, the left side was the most commonly affected side, 80 (33.5%) as compared to females, 40 (24.4%) A cleft palate only deformity was more common in females, 34 (20.7%) as compared to male patients, 20 (8.4%). An isolated cleft palate affects the secondary hard palate or soft palate in which they can not be specified as right or left, having 54 out of 403 cases (13.4%) in this group. For male patients, the cleft lip in combination with the cleft palate was the most common type, including 139 (58.2%) patients as compared to females, 90 (54.9%) cases (Table-1).

Out of total, 155 (38.5%) were from Southern Punjab, 204 (50.6%) were from Sindh and 44 (10.9%) were from Baluchistan Province. Out of total 314 (77.9%) were from Rural areas. the highest number of patients presented from Rahim Yar Khan 111 (27.54%), Rajanpur 27 (6.7%) and Muzafargarh 19 (4.72%) districts of Southern Punjab. From Sind the highest number came from Khairpur 23 (5.7%), Kashmore 17 (4.2%), Shahdad kot 18 (4.4%), and Larkana 14 (3.47%) districts. From Baluchistan more patients came from Jafarabad 15 (3.7%), Dera Bughti 15 (3.7%) and Naseerabad 13 (3.2%) districts.

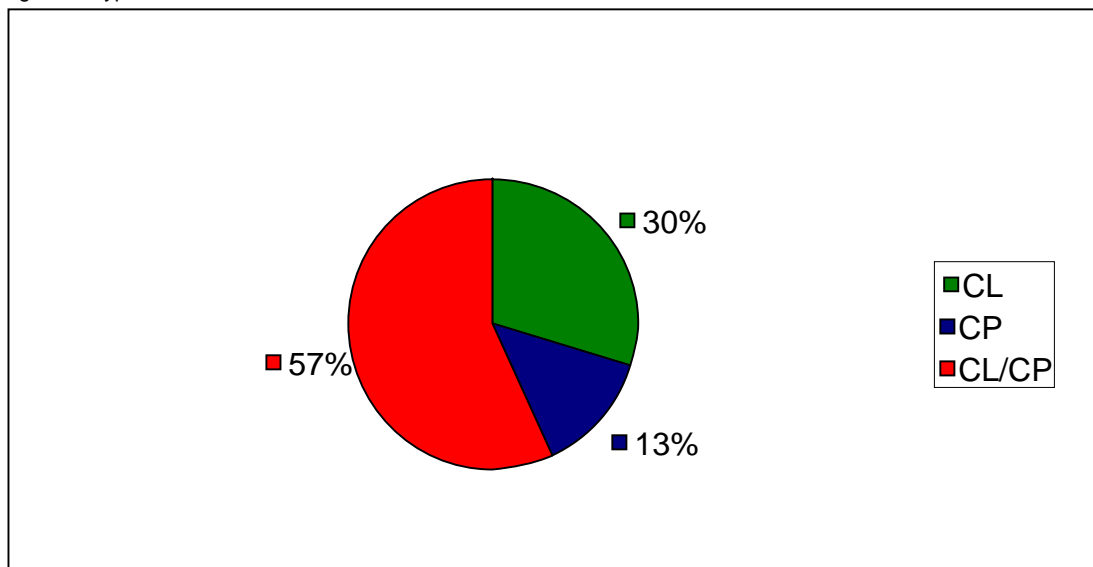
Out of the total study population, 386 (95.8%) patients' parents had cousin marriages. Regarding cousin

marriage and family history of Cleft Lip and/or Cleft Palate, 62 (16.1%) were having family history of Cleft Lip and/or Cleft Palate out of 386 patients of positive cousin marriage ($P=0.1$). Regarding sex distribution and cousin marriage 228 (95.4%) were having cousin marriage in males vs 158 (96.3%) having cousin marriage among females ($P=0.6$). The overall ratio of consanguineous to nonconsanguineous marriages in the parents of the current study group of cleft patients was 22.7:1. Regarding disease category vs cousin marriage, 115 (95.8%) were having Cleft Lip, 52 (96.3%) were having Cleft Palate and 219 (95.6%) were having Cleft Lip with Cleft Palate ($P=0.9$). Among male, cousin marriage was positive in 77 (96.3%) of Cleft Lip cases, 19 (95%) of Cleft Palate cases and 132 (95%) of Cleft Lip and/or Cleft Palate cases. Whereas, among females cousin marriage was positive in 38 (95%) of Cleft Lip, 33 (97.1%) of Cleft Palate and 87 (96.7%) of Cleft lip and/or Cleft Palate Patients.

In 67 (16.6%) cases out of the total study population, a positive family history of cleft deformities was present. Regarding sex vs history of Clefts, 44 (18.4%) among male and 23 (14%) among females were having family history of Cleft Lip & Cleft Palate ($P=0.2$). Regarding family history vs disease, 21 (17.5%), among Cleft Lip, 4 (7.4%) among Cleft Palate and 42 (18.3) among Cleft Lip and/or Cleft Palate were having history of Cleft Lip and/or Cleft Palate in family ($P=0.14$)

Out of the total study population, 51 (12.5%) cases were associated with other congenital anomalies. The most common congenital anomalies associated with cleft deformities were Ankyloglossia ($n=43$, 10.7%), Pierre Robin Sequence ($n=5$, 1.2%), Congenital heart disease in 1(0.2%), Goldenhar Syndrome in 1(0.2%) and coloboma right eye in 1 (0.2%) patient. The cleft palate was the most common anomaly associated with the syndromes in 12.2 % of cases.

Figure 1: Types of Cleft Deformities



CL- Cleft Lip, CP- Cleft Palate, CL/CP- Cleft Lip and Cleft Palate

Table 1: Gender Distribution and Various Types of Cleft Deformities

| Type of Clefts | | Gender | | Total | Percentage |
|-----------------------------|-----------|--------|--------|-------|------------|
| | | Male | Female | | |
| Cleft Lip | Right | 24 | 12 | 36 | 8.93 |
| | Left | 49 | 22 | 71 | 17.61 |
| | Bilateral | 05 | 06 | 11 | 2.73 |
| | Median | 0 | 02 | 02 | 0.50 |
| Cleft Palate | | 22 | 32 | 54 | 13.40 |
| Cleft Lip with Cleft Palate | Right | 30 | 22 | 52 | 12.90 |
| | Left | 51 | 43 | 94 | 23.33 |
| | Bilateral | 58 | 25 | 83 | 20.60 |
| Total | | 239 | 164 | 403 | 100.0 |

DISCUSSION

In the present study, a total of 403 cases of different types of cleft lip and palate patients were studied for their presentation, consanguinity, family history, and geographical distribution in southern Pakistani population. Age of cleft patients varied from 03 months to 45-year, and mean age of 39 ± 62 months, which is consistent with another local study, Khan M et al.⁹ from Peshawar, Pakistan in which they reported it to be 3.5+6.59 years, which shows that cleft patients from remote districts/areas of Pakistani are unable to reach healthcare facilities at an early age for their treatment due to lack of resources. The treatment of these patients is funded by an international NGO through our two health care facilities at Rahim Yar Khan. We reach to their remote home town/cities through our outreach programs and brought these patients to our healthcare facilities in Rahim Yar Khan. Despite the free-of-charge treatment, most of the patients presented late which is, in our opinion, due to the inaccessibility of these facilities, lack of resources, poverty and illiteracy in the distant parts of the southern Pakistan.

In present study 77.9% of patients were from rural areas. Regarding disease vs residence, 76.7% among Cleft Lip, 72.2% among cleft palate and 79.9% among Cleft Lip and/or Cleft Palate Patients were from rural areas (P=0.4). Regarding occupation 65.3% of patients' parents were laborers / farmers, with an average income of 15,000/- per month. The results of our study suggest that cleft lip and palate is a disease of low and middle class population who do not have enough resources to get treatment of their cleft patients at an early age. Government healthcare facilities and expertise usually are not available in these remote areas that can provide a highly specified treatment to these cleft patients. No other study is available to compare our results.

In our study the overall male to female ratio was 1.4:1, which is consistent with Khan M et al.⁹ in their study from Peshawar, Pakistan where they reported it to be 1.4:1 and Aljohar A et al.¹⁰ from the Kingdom of Saudi Arabia; they reported it to be 1.3:1. Similar observations were made by Shahid S et al.¹¹ in their series from Karachi, Pakistan with a male to female ratio of 1.8:1 in the cases of cleft lip and palate. Contrary to our study, Kianifar H, et al.¹² from Iran reported a high male to female ratio of 2.3:1.

In our series, the cleft lip associated with Cleft palate was more common in male patients, while the isolated cleft palate was dominant in female patients. which is consistent with Khan M et al.⁹ Kianifar H, et al.¹² and Prabakaran S et al.¹³ In a local study, Elahi MM et al.² reported male to female ratio of 1.3:1, including a male dominant cleft lip,

cleft lip associated with palate, while the isolated cleft palate was mainly female predominant. Similar results were shown in other international studies.^{6,14}

In our series, 95.8% of patients' parents had cousin marriages and the ratio of the consanguineous to nonconsanguineous relationship was 22.7:1 These results of our study are different from other local and regional studies. Khan M et al.⁹ from Peshawar, Pakistan observed 61.6%, Elahi MM et al.² 32% and Aljohar A et al.¹⁰ from Riyadh, Kingdom of Saudi Arabia observed a consanguineous relationship in 56.8% of cleft patients. The consanguinity relationship with cleft deformities is highest (99%) in studied population of Sind districts. In contradiction to our study Jajja MRN et al.¹⁵ observed consanguinity only in 17.1% cases, a significantly low rate of cousin marriages in their study that was based in Karachi city. It could be due to urban population who, being well educated discourage cousin marriages.

This high degree of association of consanguinity with the cleft deformities in our study emphasizes the importance of education of families about anticipated genetic consequences of cousin marriages and families should be counseled to discourage cousin marriages in our society with high ratio of consanguinity.

In this study, 16.6% of cases had a positive family history for cleft deformities. In the cleft lip 31.3%, cleft lip in association with cleft palate, 62.7% had a positive family history, while only 6.0% of patients of the isolated cleft palate had a positive family history for cleft deformity. Khan M et al.⁹ also observed similar results. They reported 21.4% cases of positive family history, 67.6% cleft lip with cleft palate and only 8.0% of isolated cleft palate had a positive family history for cleft deformities. Jajja MRN et al.¹⁵ observed positive family history in 12.3% of cases that is similar to our results. Other international studies also produced comparable results of positive family history for cleft deformities.^{16,17} However in contradiction to our study Shahid S et al.¹¹ observed positive family history in 61% cases of cleft deformities.

In our study population, 12.5% patients with cleft deformities had other associated congenital anomalies. Ankyloglossia was the most common associated congenital anomaly, 10.7% followed by Pierre Robin Sequence, 1.2%. Cleft palate was most commonly associated with other congenital anomalies. Our results are consistent with another study by Khan M et al.⁹ that showed 17% of cases associated with other congenital anomalies. In another study from India Kumar PSP et al.¹⁶ observed 13.9% of clefts associated with various syndromes. Similarly Shahid S et al.¹¹ observed 13% patients with cleft deformities had

other medical anomalies. Bekele et al.⁶ from Ethiopia showed 11% of cases associated with other congenital anomalies. In contrast to our results and other studies Kianifar H et al.¹² observed a high rate, 37%, of associated congenital anomalies in cleft lip and palate newborns. In all these studies Pierre Robin Sequence was the most commonly associated congenital anomaly in contrast to our result in which it was seen in only 1.2 % of cleft lip and palate cases. None of the above local and international studies showed association of ankyloglossia with clefts of lip and palate in contrast to our study in which it was present in 10.7% of cleft patients. This could be the reason that it was overlooked in younger children but we particularly examined the tongue to find this abnormality.

According to different types of clefts in the current study (Table- 1), the cleft lip in association with cleft palate (56.8%) was the most common deformity, out of which the left side was most commonly affected side in 41% cases. The second common variety was isolated cleft lip (29.8%) and left side was commonly affected. Isolated cleft palate affected only 13.4% population that was the secondary palate in almost all patients and central in position. It was more common (59.3%) in female patients. Kianifar H et al.¹² Shahid S et al.¹¹ Sharif F et al.¹⁸ and Bekele et al.⁶ showed exactly the similar results in their studies. Two local studies conducted by Khan M et al.⁹ and Jajja MRN et al.¹⁵ differ from our results. They observed cleft palate the second most common deformity 31.4% and 42.5% respectively. In all the studies isolated cleft lip, and cleft lip associated with cleft palate, the left side was the most commonly involved side that is consistent with our results.

CONCLUSION

Cleft lip and cleft palate are one of the most common birth defects seen in the pediatric population. Cleft lip associated with cleft palate is the commonest anomaly. Cleft deformities affect males more than the females and left side is the most commonly affected side. Isolated cleft palate is more common in females. These deformities are more commonly seen in children born to parents with cousin marriages. Family history of clefts is mainly positive in cleft lip with cleft palate patients. In our study, cousin marriages were observed among majority of the patients' parents which clearly indicates a strong relationship between family history and the anomaly. This emphasizes the importance of educating people about the consequences of consanguineous marriages. Majority of the study population presented from remote areas of southern Pakistan and there were many adults who have not been treated at younger age. Population of these districts is mainly dependant on national and international organizations for treatment of cleft deformities. Governments of each province should pay special attention to the remote rural areas to provide specialized healthcare facilities so that these orofacial cleft deformities can be corrected at an early age. There is a need of national registry of children born with cleft defects, to make it easy to assess the full scale of the problem.

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