



Patterns of Cleft Lip and Cleft Palate in Northern Pakistan

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Abstract

Objectives: To determine the frequency of different types of cleft lip and palate, geographical distribution and its association with consanguinity, family history and other syndromes in the Northern Pakistani population.

Study design: Descriptive cross-sectional study.

Settings: This study was performed in Plastic and Reconstructive units of Hayat Medical Complex Peshawar Pakistan, Aman Hospital Peshawar Pakistan and Abasin Hospital Peshawar, Pakistan from November 2010 to December 2011.

Material and Methods: All the patients, irrespective of their gender, presenting with cleft lip/palate deformities were included in the study. Previously operated cases and those who did not agree with the study protocol were excluded from the study. The data were collected through questionnaires as well as history and physical examination. The data were organized and analyzed through Statistical Package for Social Sciences version 17 (SPSS 17). The results were expressed in the form of tables and figures.

Results: A total of 159 patients of cleft lip and cleft palate deformities were included in the study, having a mean age of 3.5+6.59 years and containing 59.1% males and 40.9% females with a ratio of 1.4:1. A cleft lip with palate, cleft palate and cleft lip were found in 51.6%, 31.4% and 17% of cases, respectively. Left-sided clefts were most common in the cleft lip with palate and the isolated cleft lip deformity. A cleft lip with palate was a male dominant variety (62.8% of cases), while in the cleft palate variety, the dominant gender was female. In 61.6% of cases, the parent had a consanguineous relationship. In 21.4% of cases, family history was positive for the cleft lip/palate. Other congenital anomalies were associated in 10.7% of cases.

Conclusion: Cleft deformities of the lip and palate affect the male population more than females with cleft lips, in association with a cleft palate being the most common anomaly. Females are mainly affected by an isolated cleft palate. The high prevalence of these deformities in consanguineous marriages emphasizes educating people. The lower number of patients from distant districts of Northern Pakistan calls for the attention of the health department.

Key words: Cleft lip, cleft palate, consanguinity

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Introduction

The cleft lip and palate are the most common oral-maxillofacial congenital anomalies affecting 1/500-1000 new borns worldwide [1]. The cleft lip and palate require long-term, complex treatment that has lifelong social,

psychological and physical implications on the affected unfortunate individuals [2].

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

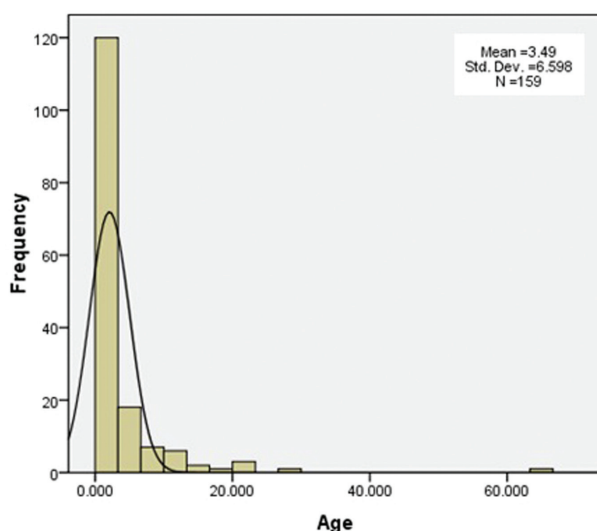


Figure 1. Age distribution of the study population

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 [3].

On the basis of epidemiological, embryonic, and genetic bases, the isolated cleft palate is distinguished from the cleft lip in association with the 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 cleft palate deformity. Males predominate in the cleft lip in association with the cleft palate deformity, while females are mostly affected by an isolated cleft palate. Epidemiological data suggest 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 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. A fraction of the cleft deformities is found in association with syndromes. The isolated cleft palate is mostly associated with the syndromes [4].

This study is aimed to determine the frequency of different types of cleft lip and palate, geographical distribution and its association with consanguinity, family history and other syndromes in the Northern Pakistani population.

Material and Methods

This descriptive cross-sectional study was conducted in the Plastic & Reconstructive units of Hayatabad

Medical Complex Peshawar, Aman Hospital Peshawar and Abasin Hospital Peshawar, Pakistan from November 2010 to December 2011. All patients presenting to the outpatients department with cleft lip and palate deformities, irrespective of their age and gender, were included in the study. All the patients who did not agree with the study protocol or who were previously operated on for cleft lip or palate deformity were excluded due to the possibility of bias in the determination of the type of cleft deformity. After informed consent, all the patients' data were recorded through a questionnaire, history and thorough physical examination to determine the type of cleft deformity and associated congenital craniofacial deformities. The data were organized through special proforma constructed with the help of a statistician and analyzed via Statistical Package for Social Sciences version 17 (SPSS 17). The results were presented in the form of tables and figures. The exclusion criteria were strictly observed to exclude the bias from the study results.

Results

A total of 159 patients with congenital cleft lip and cleft palate deformities were included in the study. The age ranged from 10 days to 64 years with the mean age of 3.5±6.59 years (Figure 1).



Figure 2. Geographical distribution of the study population

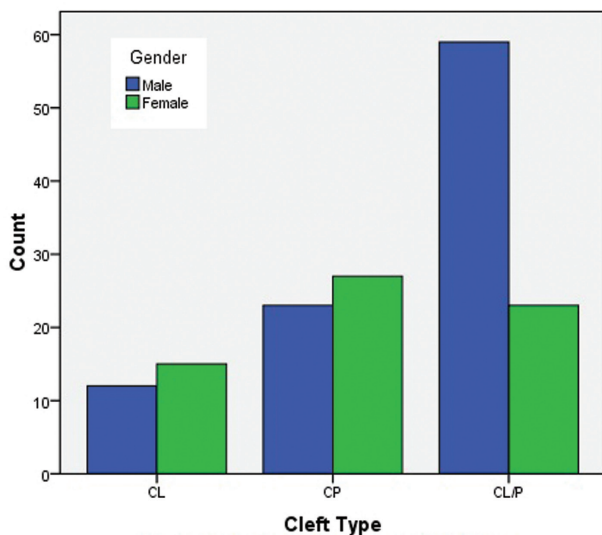


Figure 3. Gender distribution of cleft types

Geographical distribution

The study population presented from the Khyber Pakhtunkhwa province, Federally Administered Tribal Area (FATA), and the Northern districts of the Punjab province of Pakistan and Afghanistan. The highest number of patients presented from Peshawar ($n=32$, 20.1%), Mardan ($n=17$, 10.7%) and Kohat ($n=10$, 6.3%) districts of Khyber Pakhtunkhwa. From FATA, the highest number of patients presented from Bajawar Agency ($n=7$, 4.4%) and Khyber Agency ($n=7$, 4.4%). A total of 10 (6.3%) presented from Afghanistan (7 from Jalaabad, 2 from Kabul and 1 from the Khost province). Two patients presented from the Northern Punjab Province of Pakistan. The details of geographical distribution of the study population are given in Table 1 and Figure 2.

Gender distribution of cleft lip and palate

The total number of male and female patients was 94 (59.1%) and 65 (40.9%), respectively, with a male to female ratio of 1.4:1 (Figure 3, Table 2).

In male patients, the left side was the most commonly affected side with 39.4% ($n=37$) of cases, while in females the most common clefts were of the secondary hard palate or soft palate in which they cannot be specified as right or left, having 41.5% ($n=27$) of patients in this group. In females, the second most common affected side was left, including 23.1% ($n=15$) of patients. The details of the affected side distribution are given in Table 3.

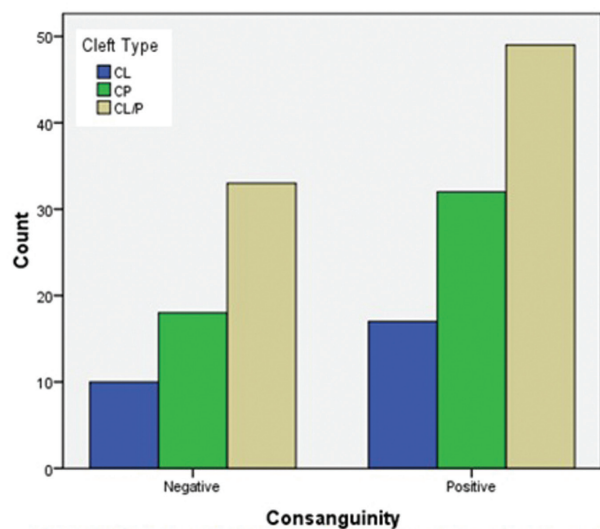


Figure 4. Cleft type distribution for consanguineous marriages

For male patients, the cleft lip in combination with the cleft palate was the most common type, including 59 (62.8%) patients, while the isolated cleft palate was the most common cleft type in the female group, having 27 (41.5%) patients (Figure 3, Table 2), which was found to be statistically significant with a p -value of 0.0031 (calculated by the chi-square test).

Consanguinity and cleft lip and palate deformities: Out of the total study population, 98 (61.6%) patients' parents had consanguineous marriages. In the

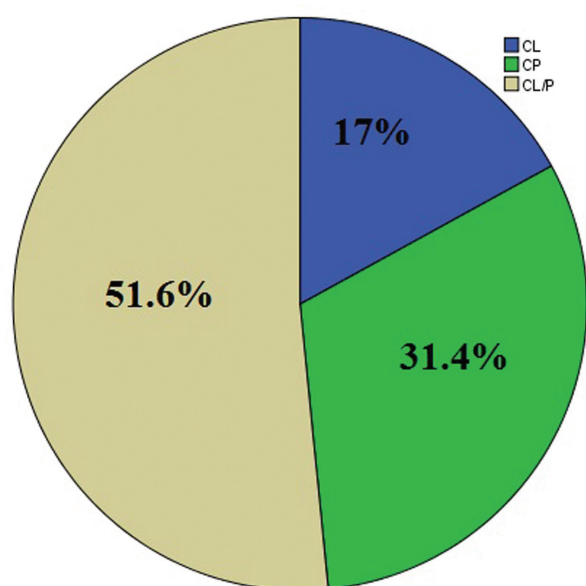


Figure 5: Types of cleft deformities

Figure 5. Types of cleft deformities

Table 1. Geographical Distribution of the Study Population in Northern Pakistan

Districts	Frequency	Percent
Peshawar	32	20.1
Bannu	1	0.6
DI Khan	1	0.6
Waziristan	2	1.3
Khyber Agency	7	4.4
Mohmand Agency	1	0.6
Dara Adam Khel	1	0.6
Abbottabad	1	0.6
Mardan	17	10.7
Kuram Agency	6	3.8
Dir	9	5.7
Malakand Agency	5	3.1
Jalalabad	7	4.4
Bajawar Agency	7	4.4
Hangu	2	1.3
Laki Marwat	7	4.4
Kabul	2	1.3
Swabi	6	3.8
Khost	1	0.6
Gujranwala	1	0.6
Attock	1	0.6
Swat	7	4.4
Bunir	5	3.1
Nowshera	6	3.8
Charsada	7	4.4
Kohat	10	6.3
Karak	7	4.4
Total	159	100.0

male group, 56 (59.6%) patients', and 42 female (64.6%) patients' parents had consanguineous marriages. The overall ratio of consanguineous to nonconsanguineous marriages in the parents of the current study group of cleft patients was 1.6:1, which was consistent for almost all cleft types (Figure 4).

Associated congenital anomalies

Out of the total study population, 17 (10.7%) cases were associated with other congenital anomalies (Table 4). The most common congenital anomalies associated with cleft deformities were Pierre Robin Sequence in 6 (3.8%) patients and Tessier "0-14" Craniofacial Cleft in 3 (1.9%) cases. The cleft palate was the most common anomaly associated with the syndromes in 16% of cases (Table 5).

Family history for cleft lip and palate deformities

In 34 (21.4%) cases out of the total study population, they had a positive family history of cleft deformities. The positive family history for Swabi, Mardan and Dir districts of Khyber Pakhtunkhwa was 100%, 54.5% and 50%, respectively. The cleft deformities with a positive family history were mostly bilateral (44.1%, n=15), and left-sided (32.4%, n=11). Out of the total 34 cases having a positive family history, 23 (67.64%) cases had both lip and palate cleft deformities. Out of the total 50 cases (Table 6) with an isolated cleft palate, only 4 (8%) cases had a positive family history of a cleft palate or lip (p-value of 0.020 calculated by the chi-square test with a confidence interval of 95%).

Table 2. Gender distribution of cleft types

Gender	Type of cleft deformity			Total
	Cleft lip (n)	Cleft palate (n)	Cleft lip & palate (n)	
Male	12	23	59	94
Female	15	27	23	65
Total	27	50	82	159

p-value=0.0031, calculated with chi-square test with confidence interval of 95%

Table 3. Affected Side Versus Gender Crosstabulation

Side	Gender		Total
	Male	Female	
Right	11 (11.7%)	12 (18.5%)	23
Left	37 (39.4%)	15 (23.1%)	52
Bilateral	23 (24.5%)	11 (16.9%)	34
Side Can not be Specified	23 (24.5%)	27 (41.5%)	50
Total	94	65	159

Table 4. Associated Congenital Anomalies with the cleft lip and palate deformities

Congenital Anomaly	Frequency	Percent
No associated anomalies	142	89.3%
Pierre Robin Sequence	6	3.8%
Right hemifacial microsomia/Microtia/Bilateral congenital Pteregium	1	0.6%
Tessier "0-14" Craniofacial Cleft	3	1.9%
Pierre Robin Sequence/Scaphocephaly/Adducted thumbs	1	0.6%
Brachycephaly	1	0.6%
Congenital Tongue Growth	1	0.6%
Prominent Ear/Inguinal Hernia/Congenital Heart Disease	1	0.6%
Talipes Equinovarus	1	0.6%
Congenital Left Facial Nerve Palsy/Hydrocephalus	2	1.3%
Total	159	100.0

Table 5. Association of different types of clefts with other syndromes

Type	Association with syndromes	Not associated with syndromes	Total	Percentage
Cleft palate	8	42	50	16%
Cleft lip & palate	9	73	82	10.97%
Cleft lip	0	27	27	0%
Total	17	142	159	10.7%

Table 6 Family history vs cleft types

Family History	Type of cleft deformity			Total
	Cleft lip (n)	Cleft palate (n)	Cleft lip & palate (n)	
Negative	20	46	59	125
Positive	7	4	23	34
Total	27	50	82	159

p-value=0.020, calculated with chi-square test with confidence interval of 95%

Classification of cleft lip and palate deformities

Out of the total study population, the cleft lip in combination with cleft palate was the most common deformity accounting for 51.6% (n=82) of cases, followed by the isolated cleft palate at 31.4% (n=50) and cleft lip at 17% (n=27) of deformities (Figure 5). In the cleft lip in combination with cleft palate group, 50% (n=41) were left-sided and 34.15% were bilateral. For the isolated cleft palate, all of the cases were of the secondary palate in which the side cannot be specified. For the isolated cleft lip group, the left-sided variety was in 40.7% (n=11) of cases and 37.% were right-sided.

Discussion

In the present study, a total of 159 cases of different types of cleft lip and palate patients were studied for their presentation, consanguinity, and family history. The age of presentation ranged from 10 days to 64 years with a mean age of 3.5+6.59 years, which shows the inaccessibility of the healthcare facilities to the population in Pakistan. In the current series, the overall male to female ratio was 1.4:1, which is consistent with Aljohar A et al. [5] in their study from the Kingdom of Saudi Arabia; they reported it to be 1.3:1. Similar observations were made by Martelli DR et al. [6] in their series from Brazil, with a male to female ratio of 1.7:1 in the cases of a cleft lip and palate. Contrary to our study, McLeod NM et al. [7] from the United Kingdom reported a male to female ratio of 2.4:1. Pavri S et al. [8] from Canada and Goenjian HA et al. [9] from the USA also showed an increased incidence of the cleft lip and palate in male patients. In this series, the cleft lip in association with palate was mainly dominated by male patients, while the isolated cleft palate was of a female dominant variety, which is consistent with Pavri S et al. [8], Goenjian HA et al. [9] and Dai L et al. [10]. The female gender also predominated the cleft lip deformity, which is different from most of the observations made in other studies [8-10]. In a local study, Elahi MM et al. [11] reported a 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.

To get a representative study population, this study was conducted in all facilities of Northern Pakistan (Khyber Pakhtunkhwa province), which are funded for free treatment by an international organization. Most of the cleft lip and palate patients of Northern Pakistan (Khyber Pakhtunkhwa province) present to these facilities as these are only Peshawar, based in this region. We could not find studies determining the geographical distribution of the cleft lip and palate in Pakistan to compare our study results. Despite the free-of-charge treatment, most of the patients presented from the Peshawar district and the adjacent districts, which is, in our opinion, due to the inaccessibility of these facilities and illiteracy in the distant parts of Northern Pakistan.

In the current series, 61.6% of patients' parents had consanguineous marriages and the ratio of the consanguineous to nonconsanguineous relationship was similar for all types of cleft deformities. These results were found to be consistent with other regional studies from Riyadh (Kingdom of Saudi Arabia), who observed a consanguineous relationship in 56.8% and 55% of cleft patients [12,13]. This high degree of association of consanguinity with the cleft deformities emphasizes the importance of education about anticipated genetic consequences of consanguinity in our society of high consanguineous marriages.

In this study, 21.4% of cases had a positive family history for cleft deformities. In the cleft lip in association with cleft palate, 67.64% had a positive family history, while only 8% of patients of the cleft palate variety had a positive family history for cleft deformity. Aziza et al. [13] observed more than a quarter of their study population associated with a positive family history. Ravichandran K et al. [12] produced similar results with 1/3 of their study population having a positive family history and the family history being mainly positive for a cleft lip in association with cleft palate. In another series from Spain, 21.94% of patients of cleft deformities were reported with a positive family history [14]. In contrast to our observations, Buyu Y et al. [15] showed a positive family history in 15% of cases for cleft deformities in their study from Tanzania. Similarly, a lower family history of 4.8% was noted in another African study from Ethiopia [16].

Out of the total study population, 17% of patients with a cleft lip and palate had other associated congenital

anomalies. The isolated cleft palate was the most common anomaly associated with other congenital anomalies. The most common associated congenital anomaly was Pierre Robin Sequence. These results are consistent with another study by Eshete M et al. [16], who showed associated congenital anomalies in 15.62% of cases. In contrast to our results, Manyama M et al. [17] reported associated congenital anomalies with cleft deformity patients in 2.8%. Sekhon PS et al. [18] observed associated congenital anomalies in 14.8% of cases and these anomalies were mainly associated in the male population, which is similar to our observations.

On classification of the cleft deformity in the current study, the cleft lip associated with cleft palate (51.6%) was the most common out of which the left side was the most commonly affected in half of the cases. The second most common variety was the isolated cleft palate, which was mostly of the secondary palate in which the side cannot be assigned. Similar observations were made by Nagase Y et al. [19], who showed the cleft lip and palate (40.8%) as the most common variety, followed by the cleft palate with the lateral side affected predominantly in both varieties. In contrast to our results, Wilson J et al. [20] reported the cleft lip followed by the cleft lip and palate to be the most common anomaly in their study with left side predominance, which is consistent with our results.

Conclusion

Cleft deformities of the lip and palate affect the male population more than females, with the cleft lip in association with cleft palate being the most common anomaly. Females are mainly affected by the isolated cleft palate. Family history is mainly positive in the cleft palate population. The left side is the most commonly affected side by these deformities. These deformities are mainly common in children born to parents with consanguineous marriages, which emphasizes the importance of educating people about the consequences of consanguineous marriages, which are common in Northern Pakistan. The greater study population presenting from the adjacent districts of Peshawar calls for the attention of the health department and international organizations to

the ignored distant districts of Northern Pakistan and Afghanistan.

Conflict of interest statement

The authors report no financial or other conflict of interest relevant to the subject of this article.

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