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Descriptive Epidemiology of Cleft Lip and Palate in a Tertiary Hospital in Kabul, Afghanistan

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ABSTRACT

Background: Cleft lip and palate (CL/P) are frequent congenital anomalies with different characteristics globally. We aimed to describe the epidemiological patterns of CL/P in a tertiary hospital.

Methods: This descriptive, cross-sectional study was conducted among patients with CL/P in 2023 at Cure Hospital, Kabul, Afghanistan. We collected demographic characteristics, CL/P types, and potential risk factors, and analyzed them by IBM SPSS. Males made up (55.8%) and women (44.2%) of the total study population, indicating a slight male predominance.

Results: Regarding types of CL; left-sided unilateral CLs were most common (33.0%), followed by bilateral (23.6%), and right-sided unilateral clefts (15.7%). Complete CLs were more recurrent (58.8%) than incomplete clefts (13.5%). Regarding CP, complete clefts were frequent (60.7%), while soft cleft palates accounted for (13.9%); submucosal clefts (1.9%) and uvula bifid (0.4%) were scarce. In (60.3%) of cases, alveolar were involved, and associated congenital anomalies were rare (1.5%). Between potential risk factors, consanguineous marriage was identified in (56.6%), and a positive family history in (29.2%), that it may suggest genetic predisposition. Complete cleft lips and palates were more frequent in males (33% and 35.2%, respectively) compared to females (25.8% and 25.5%).

Conclusion: Findings revealed a high prevalence of left-sided unilateral clefts and male predominance, which is consistent with trends, but with a relatively lower prevalence of alveolar clefts compared to international data. The high proportion of consanguinity as potential risk factors underscores the importance of community education and genetic counseling to reduce the burden of CL/P in the region.

Keywords: Cleft lip, Cleft palate, Congenital abnormalities, Consanguinity, Afghanistan

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Introduction

Cleft Lips/ Palate (CL/P) are conditions that arise when a baby's face doesn't develop properly during pregnancy. They can present as a cleft in the lip alone (CL), in the palate (CP), or as a combination of both (CLP) (1). CL/P happens during fetal development when the frontonasal process does not properly fuse with the two lateral maxillary processes and the palatine processes between five to ten weeks of gestation (2). The reasons behind CL/P are complex, involving both genetic factors and environmental influences (3, 4).

Several environmental risk factors can increase the risk of CL/P. Factors such as; maternal smoking, alcohol consumption, drug use, advanced parental age, and exposure to toxins have been associated with an increased risk of CL/P (5, 6). On the other hand, ensuring that mothers have enough folic acid and essential micronutrients before and during early pregnancy can help to reduce the incidence of orofacial clefts (7).

Globally, CL/P is the most common congenital craniofacial anomaly, that can affect about 1 in 700 live births (8). According to the WHO, the global incidence of CL/P at birth is about 15.37 cases per 10,000 live births. This condition is more frequent in the Asian population, with rates ranging from 0.82 to 4.04 per 1,000 live births (9, 10). Moreover, sex-related differences have been reported, for example males are more likely to be born with cleft lip with or without palate, and females are more affected by isolated cleft palate (11).

Cleft lip and palate not only effects on the physical and functional aspect but also on mental health and overall quality of life (12, 13). These challenges are more common in low-resource settings where accessibility to comprehensive care, such as surgical intervention, speech therapy, and psychosocial support, is limited (14). Such limitations can strongly hinder the management and outcomes of CL/P in these areas. A systematic review has highlighted the urgent need for integrated and accessible cleft care services (15).

Despite extensive research on the global burden of CL/P, especially in low- and middle-income countries (16), there is a lack of studies and data on its status in Afghanistan.

A study at Indira Gandhi Institute of Child Heath in Kabul revealed more than 458 cleft lip and palate surgeries performed (17). However, detailed information on patient demographics, types of cleft lip and palate, and risk factors in Afghanistan is largely missing from the literature (18).

Afghanistan is facing multiple challenges such as inadequate nutrition, limited access to educational and healthcare resources, and poverty, where children may be at higher risk of developing cleft lip and palate. Despite the global recognition of CL/P as a critical health issue, there is lack of data regarding its type in Afghanistan.

We aimed to describe the clinical and demographic characteristics of cleft lip and palate cases treated at a tertiary hospital using routine data from the health center. Understanding the type of CL/P is essential for developing effective treatment strategies and enhancing health outcome.

Materials and Methods

This descriptive cross-sectional study was documented in 2023 at Cure Hospital, Kabul, Afghanistan. The hospital provides outpatient and inpatient services and is one of the specialized centers for the treatment of CL/P. It has patients from all provinces of Afghanistan, and the Department of Plastic Surgery is actively involved in the treatment of cleft lip and palate cases.

We studied all individuals diagnosed with CL/P admitted to the hospital between Jan and Dec 2023. To ensure clarity, we defined CL/P and its type in Table 1. Patients were included in the study if they were diagnosed with CL/P by

principal investigator, a plastic surgeon, based on clinical examination and medical records. All diagnosed patients that provided informed consent were enrolled.

Table 1: Definition of the type of CL/P

Type of CL/P	*Definition*
Complete CL	A complete cleft lip involves a full separation of the lip and the nasal sill. Patients may present with either unilateral or bilateral cleft lips (19).
Incomplete CL	An incomplete cleft lip features a separation of the lip that extends through the white roll or vermillion border, typically accompanies by a downward displacement of the ala. However, the nasal still remains intact, and there is often a fibrous band present, known as a Simonart band (19).
Microform	Microform cleft lip is a subtle variation of cleft lip that features a notched peak of the Cupid's bow, a deficiency in the vermillion, nasal deformities, and a unique vertical groove in the philtrum that becomes more pronounced when puckering occurs (20).
Tessier Syndrome	A Tessier cleft is an uncommon and serious form of congenital facial cleft that affects more than just the lip and Jaw, unlike the more prevalent cleft lip and palate. It represents a division or opening in the face caused by the incomplete fusion of facial tissues and/or bones during embryonic development (19).
Complete CP	A complete cleft of the entire palate extends through both the primary and secondary palates, and an incomplete cleft affects only the secondary palate.
Isolate CP	An isolated cleft palate is a congenital opening in the hard or soft palate located behind the incisive foramen (19).
Soft CP	It is a congenital condition marked by a gap or opening in the soft tissue at the rear of the mouth (the soft palate). This condition can impact feeding and speech, and it may also result in ear infections due to problems with the Eustachian tubes (19).
Bifid Uvula	Bifid Uvula refers to the partial or complete splitting of the uvula (19).

We excluded patients with incomplete files that did not provide sufficient information for analysis. The sampling method was convenience sampling, a type of non-probability. This approach allowed us to include all eligible and consented patients who were present to the hospital within the defined study period. Although formal sample size calculations are usually not critical for descriptive studies, we aimed to capture a comprehensive representation of the CL/P population within our hospital during this period. In addition, Cure hospital is a center for cleft treatment in the country, so samples adequately represent the demographic and clinical characteristics of patients with CL/P in this study.

We collected data from two primary sources: the patients' files and consultations with patients conducted by resident doctors. Two trained nurses served as data collectors and asked some questions of patients or their caregivers in a private room to ensure confidentiality and comfort. The first author guided the data collectors on the study's objectives, inclusion and exclusion criteria, ethical considerations, and instructions on how to complete the data extraction form. Data collectors informed all patients and their caregivers that participation was voluntary and that information would be used only for scientific purposes. Personal information such as names and addresses were not recorded.

Ethical statement

The study was conducted with permission from Cure hospital, where patient records were accessed for data collection. Although formal approval from an institutional Ethics Committee was not obtained, all data were collected and handled in accordance with the hospital's OR-

policies and with respect for patient privacy. Data collectors did not record identifiable personal information, and all data were anonymized to maintain confidentiality. In addition, the research was conducted in line with the ethical principles of the Declaration of Helsinki, which emphasizes the importance of safeguarding participants' rights and welfare.

Statistical analysis

Patient case forms that met the definition of CL/P were entered into the Microsoft Excel. Data management procedures were conducted using Microsoft Excel and the final dataset was imported in IBM SPSS ver. 21, (IBM Corp., Armonk, NY, USA) for analysis. Descriptive statistics, including frequencies and proportions, were used to summarize the demographic characteristics, types of CL/P, and potential risk factors.

Results

During the study period, overall, 267 patients referred to the hospital with CL/P, with slight predominance of males, 55.8% (149), over females, 44.2% (118) (Fig. 1).

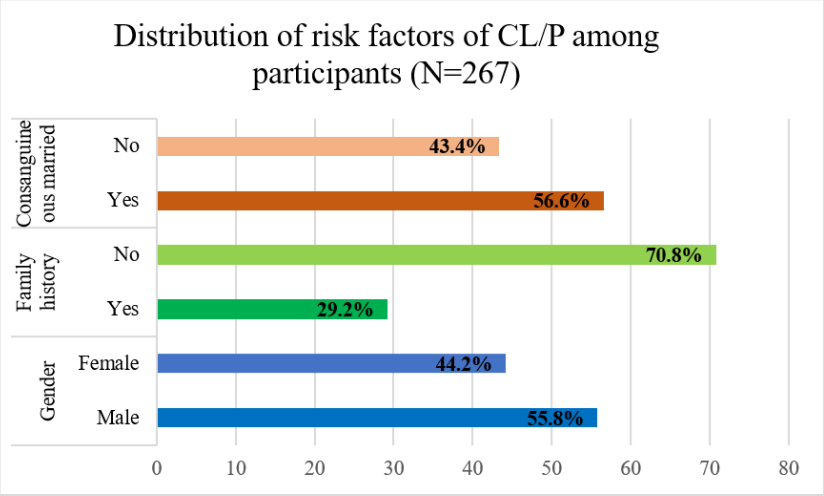

Fig. 1: Distribution of Risk factors of CL/P among referred cases (N=267)

About one-third (29.2%; n=78/267) of patients had a family history of CL/P, and the pattern of consanguineous marriage of parents was observed among more than half of the CL/P cases, 57% (56.6%; n=151/256). Furthermore, the average age of patients' mothers was 29.82±6.5 yr. Almost half (49.4%; n=132/267) of patients had cleft lips and palates simultaneously. One-third of the referred cases were presented with left unilateral cleft, followed by two-sided cleft lip, consisting of nearly one-quarter (23.6%, n=63/267) (Table 2). Regarding the type of cleft lip defect, complete cleft lips was identified in more than half of the cases (58.8%; n = 157/ 267) of patients. In terms of cleft palate location, complete cleft palate was the most frequent finding that affected 60% (n=162/267) of the cases (60.7%; n=162/267) while 13.9% (n=37/267) of cases were affected by soft palate. In terms of cleft palate defect, nearly three-quarters (73.8%; n=197/267) of the cases had complete cleft palate. Alveolar clefts affected 60.3% (n=161/267) of patients, and only 1.5% (n=4/267) of patients showed additional anomalies associated with CL/P (Table 2).

Table 2: Cases referred to Cure Hospital with CL/P, Jan-Dec 2023 (N=267)

Type of CL/P		*N*	*%*
Cleft Lip Classification (Location)	Left Unilateral Cleft	88	33
	Right Unilateral Cleft	42	15.7
	Two Sided	63	23.6
	No	74	27.7
	Total	267	100
Cleft Lip Classification	Complete	157	58.8
	Incomplete	36	13.5
	No	73	27.3
	Tessier Syn-drome	1	0.4
	Total	267	100
Cleft Palate Classification (Location)	Complete	162	60.7
	Soft Cleft Palate	37	13.9
	Uvula Bifid	1	0.4
	No Cleft palate	62	23.2
	Submucosal	5	1.9
	Total	267	100
Cleft Palate Classification	Complete	197	73.8
	Incomplete	7	2.6
	No cleft palate	63	23.6
	Total	267	100
Cleft Lip and Palate	Yes	132	49.4
	No	135	50.6
	Total	267	100
Alveolus	Yes	161	60.3
	No	106	39.7
	Total	267	100
Additional Anomaly	Yes	4	1.5
	No	263	98.5
	Total	267	100

Discussion

We aimed to determine the descriptive epidemiology of CL/P in a tertiary hospital in Kabul, Afghanistan, to provide an insight into the epidemiological status of this congenital anomaly. Findings of this study showed that about half of the referred cases presented with both cleft lip and palate (CL/P), which causes the complexity of the management of these patients. The study also indicated a higher occurrence of left-sided unilateral CL and a slight male predominance in CL/P cases, while the prevalence of alveolar clefts was lower than global averages. Moreover, the consanguineous marriages were presented as one of the prevalent risk factors among the referred cases in this study.

The frequency of CL/P observed in our study aligns with findings from other hospital-based studies in South Asia. For example, a retrospective study conducted in Mysuru, India (21), indicated that CLP accounted for (64.4%) of cleft cases. Similarly, research from the Sub-Himalayan region of India (22) identified CLP as the

most frequent type, echoing our results despite differences in regional socioeconomic situations. These similarities across regions highlight a broader trend in low- and middle-income countries, where combined cleft anomalies tend to be more severe and require comprehensive care.

The higher occurrence of left-sided unilateral CL was another key finding of this study, which was present in (33%) of the participants. Similarly, studies from Iran (23) and Turkey (24) indicated that left-sided clefts were about twice as prevalent as those on the right are. TIn Mysuru (25), unilateral clefts were more common than bilateral cleft lip, with a particular predominance of left-sided defects. One reason may be linked to variations in vascular development or the expression of genes that are lateralized during the process of facial formation. Additionally, our study found that (58.8%) of patients presented with complete cleft lips, that aligns with observations from Arab countries (26) and Pakistan (27), where complete clefts are more common than incomplete ones. Complete clefts typically require more extensive surgical repair over multiple stages ongoing orthodontic treatment. Afghanistan faces a substantial burden of CL/P, likely exacerbated by a high rate of consanguineous marriage, inadequate nutrition of mothers during pregnancy, and the poor economic situation (28). These factors contribute to both the prevalence and severity of cleft anomalies in the population, which necessitates dedicated financial support from both domestic and foreign stakeholders in the health system.

In this study, the prevalence of cleft conditions was slightly higher among males (55.8%) compared to females (44.2%), consistent with findings from several international studies. For instance, cleft lip with or without cleft palate tends to occur more frequently in males, while isolated cleft palate is more commonly reported in females (29). Similarly, Vyas et al. reported comparable gender-related patterns in their analysis of cleft cases (30). This observation contributing to sex-linked differences in the development of orofacial clefts. In our study, about (60.3%) of patients had alveolar clefts, which is somewhat lower than the approximately (75%) prevalence reported worldwide among cleft lip suffers (16, 31, 32). This discrepancy may reflect underdiagnoses or differences in case ascertainment among referred patients. About one-third of the participants had a family history of cleft lip and palate, and (56.6%) of participants were born to parents consanguineously married. These statistics are inconsistent with trends observed in Iran, where consanguinity was reported in about (30.5%) and family history in roughly (13%) of CL/P cases (33). Similarly, in Indonesia, parental consanguinity was significantly associated with an increased risk of cleft lip and palate (34). The consanguineous marriage of parents was significantly associated with an increased risk of cleft can increase the likelihood of congenital anomalies, including CL/P, emphasizing the importance of genetic factors in the etiology of these conditions (35-37). The persistence of this pattern in Afghanistan may be related to strong cultural traditions of intra-family marriage, limited access to premarital counseling, and inadequate genetic screening.

Taken together, these results underscore the important roles that genetic and socioeconomic factors play in the prevalence of CL/P in Afghanistan. Improving antenatal care, providing nutritional support, and improving public awareness about the risks associated with consanguineous marriage could potentially lower the occurrence of cleft anomalies in the nation.

The current study faced several limitations that may impact the interpretation and generalizability of its findings. Firstly, the collected data were solely based on clinical cases, hence, the number of investigated variables were limited. Therefore, this may lead to an incomplete understanding of the factors influencing outcomes. Secondly, the nature of study led to the elucidation of the risk factors in descriptive level and the comparison with control group was not feasible. Therefore, understanding causality and the

impact of different risk factors was not possible. Furthermore, the retrieved data may be subjected to recall bias for specific variables, since they were collected in self-reported manner. Then there is probability that findings may not reflect true patterns. Lastly, despite the hub for treatment and management of CL/P cases in central level, the generalizability of the findings might be limited. Therefore, caution should be considered. The current study presents the very first descriptive epidemiological landscape of the CL/P in the country with the tendency to highlight the prevalent risk factors and demographic data. The current study channels its findings with future research on specifying the potential underlying risk factors of CL/P, paving the way for more comprehensive studies. Moreover, the findings of this study still present the predominance of consanguineous marriages, which besides posing a socio-cultural challenge, concerns the public health outcomes among newborns in Afghanistan.

Conclusion

This study highlights important clinical and demographic characteristics of CL/P cases in a tertiary hospital in Kabul, Afghanistan. The most frequently observed condition was a combination of cleft lip and palate, with a notable prevalence of complete clefts on the left side, and a slight majority among males. The high incidence of consanguineous marriage and positive family history indicate a strong genetic component in this population. These findings emphasize the need for multidisciplinary care, better access to maternal health services, and further research to inform national cleft care strategies. By documenting the specific types of CL/P, this study can guide treatment policies and enhance healthcare delivery for vulnerable population in Afghanistan.

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Conflicts of interest

Authors declare no conflicts of interest.

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