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THE ASSOCIATION OF CONGENITAL HEART DEFECTS WITH CLEFT LIP AND PALATE IN PEDIATRICS IN AL-KHANSAA TEACHING HOSPITAL, MOSUL CITY

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ABSTRACT

Background: Congenital malformations, caused by hereditary, environmental, or unidentified factors, are structural and functional anomalies leading to chromosomal disorders, talipes equinovarus, cleft lip and palate, anencephaly, spina bifida, and respiratory system disorders. **Aim of study:** To examine the relationship between CHD and cleft lip and palate in pediatric patients at Mosul's Al-Khansaa Teaching Hospital as well as the variations in CHD according to gender. **Patients and Methods:** The study, conducted at Al-Khansaa Teaching Hospital in Mosul, focused on pediatric patients with cleft lip or palate, and collected data from April 2019 to April 2020. The patients were sent for an Echo study to detect congenital heart defects and identify their types, with statistical analysis using SPSS-26. **Results:** The study involved 58.5% males and 41.5% females, with a male to female ratio of 1:0.7. A positive family history was found in 26.4% of the sample, with 25.8% of males having it. Congenital heart defects were found in 26.4% of patients, with ASD II being the most common type. Cleft lip and palate were found in 47.2% of patients, with higher frequencies in males. The study found that 50.0% of patients had both, 14.3% had only the lip, and 35.7% had only the palate. Male patients with congenital heart defects were more frequent than females. **Conclusion:** The study found low congenital heart disease prevalence in orofacial cleft patients, emphasizing the need for routine echocardiography in children, and suggests future research for accurate diagnosis.

KEYWORDS: Cleft lip, cleft palate, congenital heart defects.

INTRODUCTION

Congenital malformations are defects in embryogenesis resulting in structural and functional anomalies, often caused by hereditary, environmental, or unidentified factors. They can cause chromosomal disorders, talipes equinovarus, cleft lip and palate (CL/P), anencephaly, spina bifida, respiratory system disorders, and more.[1]

Congenital malformations such as orofacial clefts are frequently associated with subsequent significant problems. One-third of cleft patients in Victoria, Australia, also had additional congenital abnormalities. Compared to cleft palate (CP), CL/P was more common.[2] In the United States, 38.7% of infants with cleft palate and 32.2% of patients with cleft lip and palate had other congenital defects.[3] In another Luijsterburg research, congenital disorders affecting the other systems affected 13% of individuals with clefts, and 10% of patients had additional anomalies of the craniofacial area.[4]

Congenital anomalies (CA) are the leading cause of infant mortality in the USA and account for an estimated 20.3% of all deaths during infancy.[5] With an incidence of 3–4% of all births, they are the fourth leading cause of neonatal mortality worldwide, with 295,000 deaths reported annually.[6]

Around 48 academic scientific publications in Iraq published articles covering the challenges of cardiac abnormalities from 1997 to 2022.[7] The majority of papers concentrate on the clinical pattern of abnormalities, which includes the frequency of clinical presentations, subtypes, age at diagnosis, and sex

distribution.[8] Male to female preponderance is shown among subtypes, and the majority of cases are identified in infancy.[9] Atrio ventricular canal defect, ASD, PDA, pulmonary artery stenosis, and VSD are more prevalent in men, whereas aortic stenosis, TOF, aortic stenosis, D-transposition of the great arteries, and coarctation of the aorta are more common in women.[10] A study at Al-Fallojah found an overall prevalence of 19.7/1000 congenital heart defects (CHD) in newborns and children, with ASD being the most common lesion. The prevalence is increasing over time.[8] According to a Basra Province research, 57 out of 1414 evaluated instances of CHD were found to have the greatest incidence, mostly as a result of circumstances associated to the war.[9] The Mosul study reported a prevalence of 6.1/1000 patients, with ASD being the most common type (42%), followed by VSD and PDA.[11]

Numerous investigations have demonstrated that the most common congenital defect in children with cleft palate is congenital heart disease[12-14], frequently mentioning atrial septal defect.[14,15] The tetralogy of Fallot, ventricular septal defect, patent ductus arteriosus, and pulmonary stenosis are among the others.[16] Neonates with cleft palates exhibit a broad range in the frequency and prevalence of congenital cardiac disease.[17,18] Congenital cardiac disease has been reported to carry a 23-fold risk compared to the general population.[16]

The current study aimed to assess the association of CHD with the cleft lip and palate among the pediatrics attending Al-Khansaa Teaching Hospital in Mosul city and to assess the correlation of different types of CHD with gender.

PATIENTS AND METHODS

A cross-sectional study design was adopted to achieve the study's aim. The study was conducted at Al-Khansaa Teaching Hospital in Mosul city and the data collection time extended from 3rd April 2019 to 3rd April 2020.

All the attended pediatric patients who had cleft lip or palate or both were registered and the detail history was taken with clinical examination. Those patients were sent for the Echo study to detect the presence of the congenital heart defects and to identify their types. The statistical analysis was done by SPSS-26.

RESULTS

The male to female ratio in the research sample, which comprised 53 patients, was 1:0.7. Of them, 58.5% were male and 41.5% were female as shown in figure (1).

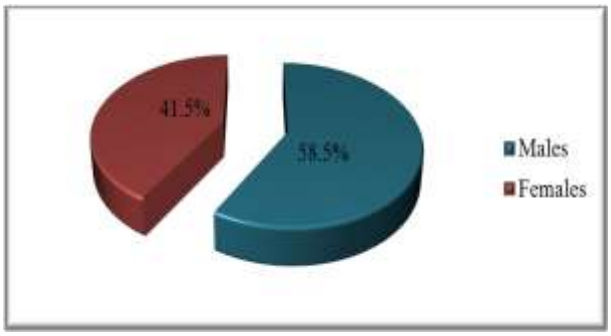

Figure (1): Distribution of the studied sample according to gender.

A positive family history was discovered in 26.4% of the sample under study. As seen in figure (2), the rate for men was lower than the rate for females (27.3%), although there was no statistically significant difference.

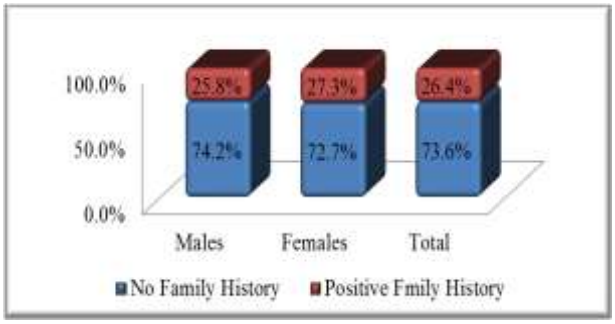

Figure (2): Distribution of the studied sample according to family history.

The congenital heart defects were found among 14 patients represented 26.4%. The most common type was ASD II in 42.9% followed by TOF in 21.4% and AO stenosis in 14.4% as demonstrated in table (1).

Table 1: Types of congenital heart defects.

Congenital Heart Defects (n=14; 26.4%)	No.	%
ASD II	6	42.9
TOF	3	21.4
AO stenosis	2	14.4
VSD and PDA	1	7.1
ECD and Dextrocardia	1	7.1
AO(Bicuspid)	1	7.1
Total	14	100.0

The distribution of cleft lip and palate among the studied sample was demonstrated in table (2) which elicited that cleft lip and palate was found in 25(47.2%), cleft lip in 10(18.9%), with the higher frequencies found among the males.

Table 2: Distribution of cleft lip and palate among the studied sample.

	Males		Females		Total
	No.	%	No.	%	No.(%)
Cleft lip and palate	14	56.0	11	44.0	25(47.2)
Cleft lip	7	70.0	3	30.0	10(18.9)
Cleft palate	10	55.6	8	44.4	18(33.9)

The comparison of the cleft lip or palate or both in relation to the presence of congenital heart defects was demonstrated in table (3) which revealed that 50.0% of those with congenital heart defects had cleft lip and palate, 14.3% had cleft lip only, and 35.7% had cleft palate only; the statistical differences were not significant.

Table 3: Comparison of the cleft lip or palate or both in relation to the presence of congenital heart defects.

	Congenital Heart Defects				Total	p-value
	Yes		No			
	No.	%	No.	%		
Cleft lip and palate	7	50.0	18	46.2	25	0.805*
Cleft lip	2	14.3	8	20.5	10	1.000**
Cleft palate	5	35.7	13	33.3	18	1.000**
Total	14	100.0	39	100.0	53	

*Chi square test; **Fisher Exact test

The comparison of the cleft lip or palate or both in relation to gender of patients with congenital heart defects was demonstrated in table (4). This table revealed that male-patients with congenital heart defects were more frequent than the females; the difference were statistically not significant.

Table 4: Comparison of the cleft lip or palate or both in relation to gender of patients with congenital heart defects.

	Congenital Heart Defects (n=14)				Total	p-value*
	Males		Females			
	No.	%	No.	%		
Cleft lip and palate	5	55.6	2	40.0	7	0.102
Cleft lip	1	11.1	1	20.0	2	0.106
Cleft palate	3	33.3	2	40.0	5	0.413
Total	9	100.0	5	100.0	14	

*Chi square test

DISCUSSION

Common congenital abnormalities, orofacial clefts can coexist with CHD. There is no consensus on the prevalence rate; research points to ranges between 1.5% and 63%. Evaluating the frequency of heart defects in patients with orofacial clefts is essential for creating new screening techniques and enhancing those that now exist.[19]

In the current study, 53 patients were involved; the males were 58.5% while the females were 41.5%; male to female ratio was 1:0.7. Hlongwa *et al.'s* investigation[20] revealed a similar trend, with the typical male to female ratio in the different OFC variations, such as cleft lip and/or cleft lip and palate, being 2:1. In Butali *et al.'s* research[21] on craniofacial deformities in Nigeria, the male to female ratio of all OFCs was 1.19:1.

Positive family history raises the likelihood of cleft development, and genetic variables are important in the incidence of CL/P.[22,23] The percentage of patients in the current research sample who had a positive family history was quite low when compared to the worldwide literature. Even if the precise genetic process behind cleft formation is still unknown, there is no denying the presence of a hereditary component in the development of the condition. In fact, over 50 genes have been linked to non-syndromic CL/P patients.[24] For example, it is thought that T-box and MSX genes are important for palatogenesis.[25] Remarkably, these gene families are also relevant to the formation of the heart.[26] Thus, the high rate of co-occurrence of heart disease and CL/P in the sample that was given may be explained by genetics. It is necessary to assume other contributing components, though. Stressful life experiences, for instance, may raise the risk of congenital cardiac disorders and CL/P during pregnancy.[27] In the current study, positive family history was found in 26.4% of the studied sample and the rate among the males (25.8%) was lower than that among the females (27.3%).

In the present study, of the 14 individuals, or 26.4%, congenital cardiac abnormalities were discovered. ASD II was the most prevalent form, accounting for 42.9%, followed by TOF (21.4%) and AO stenosis (14.4%). %). Similarly, Akhiwu *et al.*, study[27] from 15 revealed that the ASD and VSD were the most prevalent CHDs seen in this investigation, with the former occurring more frequently than the latter. Furthermore, Asani and Aliyu[28], Panamonta *et al.*,[29] and Fakhim *et al.*,[14] discovered that the most prevalent congenital cardiac abnormality observed in individuals with orofacial cleft was an ASD. Nevertheless, the molecular mechanism responsible for the common ASD and VSD in cases with orofacial cleft remains unclear.[29] However, Mottaghi *et al.*, study[30] discovered that cardiac abnormalities were present in 70 (57.4%) of the patients. With twenty-five cases, ventricular septal defect (VSD) was the most

prevalent kind of cardiac abnormalities. With just three occurrences, atrioventricular septal defect (AVSD) was the least common abnormality. Moreover, there was no statistically significant variation in the nature of heart defects across the various orofacial clefts ($p>0.05$).

The distribution of cleft lip and palate in the sample under the current study revealed that 25 people (47.2%) and 10 people (18.9%) had cleft lip and palate, with males having greater frequencies. According to a research by Mottaghi *et al.*,[30], isolated cleft palates (52.5%) were the most frequently discovered orofacial anomalies, whereas isolated cleft lips (8.2%) were the least frequently detected.

The current study found that 50.0% of individuals with congenital heart defects had both a cleft lip and palate, 14.3% had a cleft lip only, and 35.7% had a cleft palate only. The statistical differences between the two conditions were not statistically significant. Comparable results were seen in further research[31,32], which showed differing frequencies of cleft; some studies indicated that it was more prevalent in cleft palate, while another study by Harry *et al.*,[33] indicated that it was more common in cleft lip and palate. Barbosa *et al.*,[34] on the other hand, discovered that the prevalence of CHD was the same in both CL and CLP, indicating that there was no necessary correlation between the kind of cleft and the type of CHD.

In the current study, male patients with congenital cardiac problems were more common than female patients when cleft lip or palate, or both, was compared according to gender; however, the difference was not statistically significant. Similar findings were made by Liang *et al.*,[35] in their study on CHDs in men with orofacial clefts, as well as by Sun *et al.*,[36] and Sekhon *et al.*,[37] in their reports on the prevalence of malformations in boys with orofacial clefts compared to females. In contrast to the current findings, Akhiwu *et al.*, study[15] showed that while the incidence of a CHD was higher in females than men, orofacial clefts are more prevalent in males than in females.

CONCLUSION

According to this study, there was little congenital cardiac disease prevalence among individuals with orofacial clefts. Nonetheless, it is important to remember that all orofacial cleft patients, particularly young ones, require periodic echocardiography. To precisely ascertain the prevalence of chronic heart disease (CHDs) in children, future research should concentrate on community-based studies incorporating maternity homes and basic healthcare facilities.

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