

ORIGINAL ARTICLE

Chest Pain in Young Patients (5-15 Years) Referred to Pediatric Cardiology Outpatient ClinicMASROOR HUSSAIN SHARFI¹, ANUM ABBAS², RIFFAT FARRUKH³, MUHAMMAD UZAIR⁴, SHAHEEN MASOOD⁵, ABDULHADI ABDULLAH ALGHAMDI⁶¹Consultant Pediatric Cardiologist, King Faisal Specialist Hospital and RC, Jeddah, KSA²Islamabad Medical and Dental College Islamabad³Assistant Professor, Department of Pediatrics, Karachi Medical and Dental College and Abbasi Shaheed Hospital⁴Assistant professor pediatrics, Sahara medical college, Narawal⁵Assistant Professor Pediatrics, Karachi Medical and Dental College⁶Consultant Pediatric Cardiologist, East Jeddah Hospital Ministry of Health, KSACorresponding author: Masroor Hussain Sharfi, Email: Masroorsharfi@hotmail.com**ABSTRACT****Background:** Chest pain is the communal complaint among pediatric age groups. Chest pain due to heart disease is rare in children and adolescents, with an incidence of less than 6%. History and physical examination may be sufficient to identify the most important etiologies.**Aim:** The aim of the study is to review various causes of chest pain in young patients admitted to a pediatric cardiology clinic.**Method:** We retrospectively analyzed the clinical data of our patients visited to emergency or outpatient clinics in our hospital with chest pain from March 2022 to October 2022. A total of 56 patients (36 females and 20 males), aged 5-15 years were included in this study. Follow-up of the patients was carried out by calling all relatives of the patient and asking about the child's condition and chest pain. Clinical history and physical examination were performed.**Results:** A total of 56 patients between the ages of 5 and 15 were enrolled in the study, with a mean age of 11.78 ± 2.95 years. Six cases (10.7%) were identified to have a cardiac cause. 16 individuals (28.6%) had a respiratory cause identified. 3(5.4%) of patients referred to a gastroenterology clinic with gastrointestinal causes. The diagnosis of idiopathic chest pain was made in 6 individuals (10.7%) after a negative history, physical examination, and testing.**Conclusion:** Chest pain in children is usually mild. However, thorough physical examination and detailed history should be performed to detect any signs of disease.**Keywords:** Chest pain, Pediatric patients, Echocardiography.**INTRODUCTION**

Children and adolescents frequently complain of chest pain, which causes concern for both the patient and their families¹⁻². Heart murmurs are the 2nd most frequent cause of referral to pediatric cardiology. Heart disease only accounts for 1% to 10% of occurrences of chest pain in children; the most frequent non-cardiac causes are musculoskeletal and idiopathic origins³⁻⁴. The physical examination and history should be thoroughly done due to cardiac-related high mortality in chest pain⁵. In order to determine which child might have a serious cardiac issue and what tests might be used to make an accurate analysis, are subjects of debate⁶⁻⁷. Depending on the diagnostic techniques, the aetiology of chest pain can change significantly. Because the diagnosis and localization of chest pain are frequently not particularly exact, it costs money to diagnose pain and rule out heart disease in young children and appointment with a cardiologist is necessary⁸. Few studies, however, have examined the results of chest pain in patients who referred or visit to a pediatric cardiology centre.

For GPs and primary care professionals, complaints of chest pain in youngsters have been concerning. Numerous studies have examined this issue in children and teenagers, and the results show that the majority of them do not have cardiac disease⁹⁻¹⁰. When assessing a child with chest pain, the clinician should take a broad differential diagnosis into account and perform additional evaluations, including a history and physical examination¹¹.

The aim of the study is to review various causes of chest pain in young patients admitted to a pediatric cardiology clinic.

METHODS

This Retrospective analysis was done on the clinical data of our patients visited to emergency or outpatient clinics in our hospital with chest pain for eight months duration from March 2022 to October 2022. A total of 56 patients (36 females and 20 males), aged 5-15 years were selected for this study. Patients with a history of cardiac arrhythmia or congenital heart disease were eliminated. Parents of the patients gave their written informed consent.

Patient demographic information, counting sex, age and body mass index (kg/m²) were documented. The body mass index was considered as follows; (<18.5 kg/m² considered underweight, 18.5-24.9 kg/m² considered normal, and above 25 kg/m² considered overweight). The chest pain clinical features such as duration, onset, location, frequency, association with the exercise, quality, monthly and seasonal distribution, and radiating patterns have also been interrogated. The medical and family history was also noted.

Physical examination revealed pathological changes including deformities or tenderness at the costochondral or sternal junctions, galloping, murmur, abnormal heart sounds on auscultation, hepatomegaly, pericardial rub, peripheral edema, decreased peripheral pulse and tender or edematous extremities were also documented.

The diagnostic groupings in the chest pain aetiologies were categorized as cardiac, musculoskeletal, respiratory, gastrointestinal, idiopathic, and miscellaneous after a thorough evaluation of the patients. Possible cardiac causes of chest pain include aortic dissection, cardiomyopathies, myocarditis, pulmonary hypertension, valvular disease, and obstruction of the left ventricle. Based on the existence of pain when palpating the chest wall, the intensity of the pain during inspiration, pain during movement, muscle strain and the presence of pain when palpating costochondral junctions, a musculoskeletal cause was determined. The patients with primarily respiratory symptoms (e.g., recent history of wheezing asthma and chest pain secondary to acute cough) and gastrointestinal symptoms (such as pain associated with heartburn, vomiting or indigestion) were referred to Paediatric gastroenterologist and pulmonologist. In the absence of any diagnosis or with the physician advise, a consultation with a child psychiatrist was advised. The psychiatric evaluation made use of the Statistical and Diagnostic Manual of Mental Disorders-5 diagnostic criteria. Patients with no underlying aetiology of chest discomfort were classified as idiopathic after thorough clinical assessment.

Follow-up of the patients was carried out by calling all relatives of the patient and asking about the child's condition and chest pain. Clinical history and physical examination were

performed. The echocardiogram, electrocardiograms, and chest X-ray for all patients and 24-hour Holter monitor were done if required.

For statistical analysis, SPSS version 22.0 was used. All statistical analysis used have taken <0.05 of P-value as significant.

RESULTS

A total of 56 patients between the ages of 5 and 15 were enrolled in the study, with a mean age of 11.78 ± 2.95 years. Echocardiography and electrocardiography were performed on all patients. Six patients (10.7%) underwent Holter monitoring, and five (8.9%) had favorable echocardiogram results.

Table-1: shows the patients demographic features

Variables	Males	Females	Total	P-value
Age in years (Mean \pm S. D)	11.25 \pm 2.9	12.30 \pm 3.0	11.78 \pm 2.95	0.039
BMI (kg/ m ²)	18.5 \pm 3.8	19.2 \pm 3.10	18.85 \pm 3.14	0.29
< 18.5, n (%)	4(7.1%)	12(21.4%)	16(28.5%)	0.689
18.5-24.9, n (%)	10(17.9%)	15(26.8%)	25(44.6%)	
\geq 25, n (%)	6(10.7%)	9(16.1%)	15(26.8%)	

Six cases (10.7%) were identified to have a cardiac cause. Two of them had a bicuspid aortic valve with suprasternal thrill and a systolic murmur. ECHO exhibited moderate Aortic stenosis maximum pressure differential of between 50 and 55 mmHg, echocardiography revealed left ventricular hypertrophy. On physical examination, one patient with grade II mitral regurgitation and prolapse of mitral valve showed a long systolic murmur and an ejection click.

Table-2: shows the various causes of Chest pain

Causes	Number	Percentage
Musculoskeletal	20	35.7%
Idiopathic chest pain	6	10.7%
Respiratory causes	16	28.6%
Miscellaneous causes	5	8.9%
Gastrointestinal	3	5.4%
Cardiac causes	6	10.7%
Total	56	100%

In 3 individuals, the symptom was accompanied by palpitations, and dysrhythmia was discovered on the ECG and Holter monitor. One patient had Parkinson's with posteroseptal accessory pathway. The other 2 individuals experienced early ventricular contractions, which were treated with a -blocker.

16 individuals (28.6%) had a respiratory cause identified. Coughing, shortness of breath, and fever were associated symptoms. On a chest X-ray, 4 patients had bronchial asthma, 3 had patchy pneumonia, and 9 had bronchitis. 20 patients (35.7%) with a history of pain following overexertion, chest trauma, or pain due to abnormal movement of the upper limb and trunk had musculoskeletal reasons. Upon evaluation, there was mobility restriction and localized tenderness. 3(5.4%) of patients referred to a gastroenterology clinic with gastrointestinal causes. 4 of them had both esophagitis and gastroesophageal reflux illness. On a chest X-ray, one girl had achalasia, regurgitation, and wide mediastinal. Five patients had miscellaneous causes.

Four children had pleural chest pain and were cigarette smokers. In 6 girls, painful breast budding was found. The diagnosis of idiopathic chest pain was made in 6 individuals (10.7%) after a negative history, physical examination, and testing.

DISCUSSION

The patient, parents, and primary care physician all find chest pain to be a troubling issue. Due to the severity of chest pain and the worry that a heart condition may be underlying, cardiac reasons are their main concern in the adult population¹²⁻¹³. According to this study, non-cardiac causes of chest pain in children are far more prevalent than cardiac ones. As seen in the table, cardiac reasons only account for 0.3–4% of individuals with chest discomfort, which is consistent with another study in the literature. According to the

Drossner et al study, children's arrhythmias make for a significant fraction of those with cardiac aetiology in 5 out of 9 cases¹⁴. According to Cavarretta E et al., mitral valve prolapse is the primary cause of 80% of cardiac valve issues and 14% of arrhythmias¹⁵. The number of patients and selection criteria may be connected to this variance in aetiology. Musculoskeletal pain was the most frequent aetiology in the study (35.7%), followed by respiratory chest pain (28.6%). Almazwani et al. discovered idiopathic causes in 56% of cases and musculoskeletal causes in 16%, contrary to Mujtaba et al. who had a similar finding¹⁶. Clinical evidence of a cardiac origin by history or physical examination was present in all patients with cardiac chest pain. Palpitations, orthopnea, and syncope were symptoms related with cardiac reasons¹⁷⁻¹⁹. Murmurs, unusual heartbeats, paradoxical pulses, and elevated jugular vein pressure were observed in these patients. Only 5 patients had positive echocardiographic results. The major recommendations for treating people with chest pain include a thorough physical examination and a detailed medical history²⁰⁻²². If substantial signs and symptoms are found in children with chest pain, help from a qualified pediatrician should be sought.

CONCLUSION

According to the study, a thorough history and physical examination can rule out the minute percentage of cardiac etiologies of chest pain in youngsters. Chest pain in children is usually mild. However, thorough physical examination and detailed history should be performed to detect any signs of disease. Further investigation should be done based on the history and physical examination.

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