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Patterns of Emotional Behavioral Issues in Different Types of Congenital Heart Disease among Children and Adolescents

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Abstract
Objective To determine the pattern of Emotional Behavioral issues in Children and Adolescents with Congenital Heart Disease (CHD) in Pakistan
Study Design: Comparative group design was used to study variables
Place and Duration: Faisalabad Institute of Cardiology, April 2021 to November 2021
Methodology: A sample of 300 children and adolescents diagnosed with cyanotic and cyanotic CHD was studied to assess the prevalent emotional behavioral problems in different patterns of CHD. The strength and difficulty questionnaire was used to measure the emotional behavioral issues. Parent-reported form for children below 7 years of age and self-report for above 7 years was used. Detailed history and demographics were taken.
Results: The results explained that 65% of the CHD population is in the clinical range of emotional behavioral issues**.** The comparison of gender mean difference shows that male CHD population as compared to females($p<.05$). Whereas no difference was found in internalizing problems in both genders while males have more externalizing issues and females are better in prosocial behavior as compared to male counterparts**.** Children and adolescents with cyanotic CHD have more clinical range of emotional and behavioral issues*($p<.01$).*
Conclusion: Children and adolescents now have a long life as compared to previous decades but with this growing age and having a congenital condition they are having problems in their psychological health which is in need of assessment and repair.

Keywords: Emotional Behavioral Issues, Externalizing, Internalizing, Gender

INTRODUCTION

Congenital illness usually has an impact on the psychological health and well-being of any individual. An illness of early onset with a need for frequent hospital visits, admissions, or different diagnostic and therapeutic procedures creates an adverse effect on the social and emotional health of children and adolescents[1]
Congenital heart disease (CHD) has several birth defects, which disturb the normal functioning of the heart These defects can start from abnormal development of the heart's or major blood vessels' structures. CHD can present at the time of birth but in many cases, it can be detected in the prenatal environment. Many studies with children and adolescents have revealed increased life expectancy and normal growth [2]. The global mortality rate significantly reduced between 1990 to 2010. These contributing factors now resulted in a shift within future research. Now the researchers focused to sort out the ways to improve the paired emotional behavioral issues and quality of life in these children and growing adolescents[3].
With this increased focus the assessment was around the psychosocial functioning of CHD children and adolescents. The prime objective of all clinical care was not only to achieve life expectancy but research shifted to explore more possible psychological care and improved quality of life. There is no consensus among different researchers on assessing psychology but they are sorting out many ways to move forward. Many studies started to explore emotional behavior problems that can reduce their psychological and cognitive functioning as compared to healthy children of their age [4].
Children and adolescents with CHD experience challenges in their all-over development. The congenital conditions can be affected by several factors that contribute to severe emotional and behavioral issues, that make a hindrance in their normal development, socialization, or future life. Such behaviors include aggressive or destructive behavior, temper tantrums, and social issues [5]. Follow-up studies investigated psychosocial outcomes and reported contradictory results in different cultures Moreover, very few studies have evaluated the impact of CHD on the psychological health of the Pakistani population. Therefore, the following study assesses the relevant psychosocial problems in the CHD population.
The major objective of the current study is to explore the level and nature of emotional behavioral issues in local tertiary care hospital. As per our knowledge, it is the first study of its kind where the rate of CHD is quite higher than its neighboring countries. The advancement in pediatric cardiac care units has made it possible for the long-term life of the CHD population. But with their increased life-years along with a congenital condition created many hurdles in their normal psychosocial

functioning and daily routine. The assessment of these issues can help clinicians tackle them in a better way. Furthermore, this assessment helps to pave the way for their psychosocial care and improved quality of life.

Patients and Methods

This study, based on a cohort was completed in 10 months. This study was conducted in a tertiary care hospital, FIC (Faisalabad institute of Cardiology). The initial approval was forwarded to the Ethical committee review board from FIC and after this approval, the university IRB approval was taken. 300 children and adolescents were involved in the study. The standardized tool, strength and difficulty questionnaire[6] was used in the study. The Strengths and Difficulty Questionnaire(SDQ) is a valid and reliable measure for assessing the mental health status of people in the age range 2 to 18. 4500 clinical and academic studies used SDQ and over 5 million assessments of young people have been carried out on a single website since 1998. It takes 3 to 5 minutes to complete this scale. SDQ comprises 25 items based on 5 subscales for which each subscale score ranges from 0 to 10. Children with different types of CHD were recruited from the prospective cohort. A separate Demographic sheet was attached to record all the demographic details of children and adolescents with CHD. The data of the study were collected from April 2021 to December 2021. The informed consent from parents, as well as a self from the participants above 16, was taken and all the rights were given to the population as they can withdraw from the study at any time.

RESULTS

Table 1: The clinical and sociodemographic characteristics of CHD children and adolescents

variables	N	%	*Mean*	*SD*
Gender				
Male	169	51.8	4.26	
Female	157	46.2	4.20	
Age				
>_9	146	44.7	10.11	4.1
9- 13	82	20.6		
< 13	98	30		
Diagnosis				
PS	23	7.1		
ASD	76	23.3		
AVSD	41	12.6		
PDA	31	9.5		
VSD	73	22.3		
TGA	6	1.8		
TOF	76	23.4		
Medication Adherence			.89	.31
yes	289	88.7		
no	37	11.3		
Surgery	33	10.1	.10	.3
Non Surgery	293	89.9		

Table 2: Mean differences between Externalizing and Internalizing problems in different types of CHD

Diagnosis	Externalizing M(SD)	Internalizing M (SD)
PS	9.56 (2.10)	7.95 (3.06)
ASD	9.11 (3.45)	7.82 (3.23)
AVSD	9.68 (2.90)	9.78 (3.92)
PDA	8.25 (2.88)	7.12 (2.60)
TGA	7.00 (1.78)	7.66 (3.72)
TOF	9.07 (2.52)	8.96 (2.99)
VSD	9.32 (2.76)	8.30 (2.98)

Note= PS (pulmonary valve stenosis), ASD (atrial septal defects), AVSD (atrioventricular septal defects),PDA(patent ductus atrocious). TGA (dextotransposition of great artery), TOF(teratology of fallout),VSD (ventricular septal defect)

Table 3 : Prevalence of Emotional behavioral issues as per gender and diagnosis of CHD population

		diagnosis of disease							Total
		PS	ASD	AVSD	PDA	TGA	TOF	VSD	
Gender(F,M)		(12,11)	(42,34)	(17,24)	(18,13)	(4.2)	(39,37)	(25,48)	(157,169)
EB	Non-clin	5	20	4	12	2	9	13	65
	Borderline	6	26	12	8	2	24	23	101
	Clinical	12	30	25	11	2	43	37	160
Total		23	76	41	31	6	76	73	326

Note= EB(emotional behavioral issues), Non-clin(non-clinical range of EB), Borderline(borderline range of EB), Clinical(clinical range of EB)

Figure 1: Gender differences in emotional behavioral issues in CHD Children and Adolescents

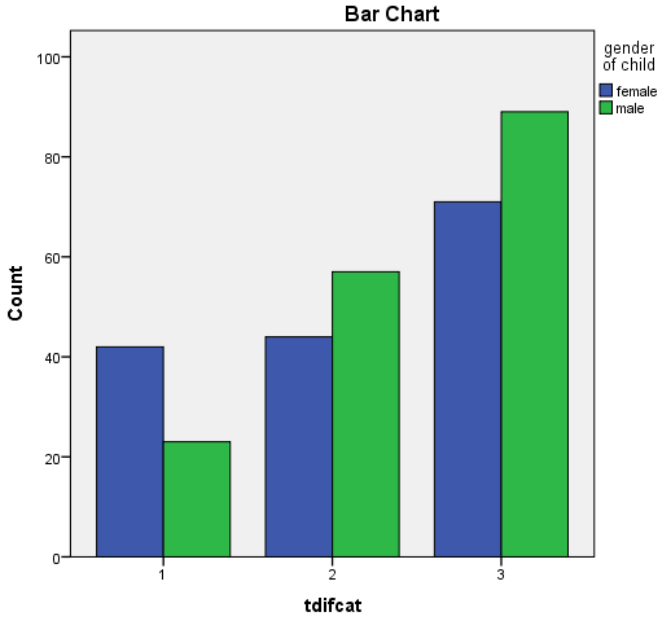
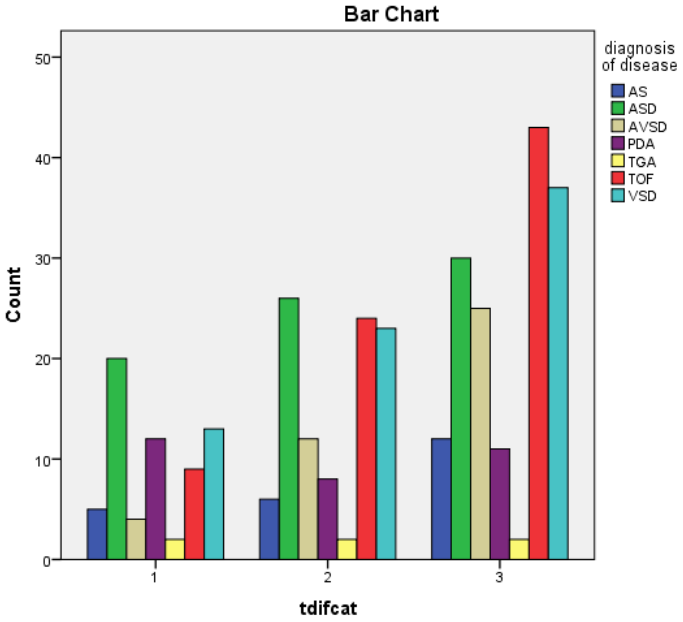


Figure 2: Prevalence of emotional behavioral issues in different diagnostic categories of CHD



Out of 326 children and adolescents 51.8() were males and 46.2() were females. The male-to-female ratio was 1.2:1. Most of the children were below the age of 9. Both cyanotic and cyanotic patients were present in the sample. Most prevalent types of CHD were ASD (Atrial septal defect), VSD(ventricular septal defect), and TOF(teratology of fallout) which were 23.3%,22.3, and 23.4 respectively.88.7 % of patients were taking their treatment and still on medicine while the other 11.3% were not on medication as they have come to their follow-up for symptomatic issues arise whenever. Out of 326,160 (49.1%), children and adolescents were above the clinical cutoff of emotional behavioral issues. While 101(31.1%) children and adolescents were at the borderline level in emotional behavioral difficulties.
Figure 1 explains that male children and adolescents have more emotional behavioral issues than the female population. Whereas Figure 2 explains that the TOF group has more emotional behavioral issues as compared to other diagnoses.

DISCUSSION

This study serves as the first of its kind for exploring the relative psychological functioning in terms of their emotional behavioral issues in children and adolescents with CHD a with valid and reliable assessment tool. Moreover, exclusion of other acute and chronic illnesses, genetic anomalies, mental retardation, and psychiatric disorders that might have negatively impacted on psychological health was important to clearly evaluate specific emotional behavioral issues in children and adolescents with CHD. Striking results were obtained through this methodology.

Congenital illness creates significant impairment everyday functioning of children and adolescents with CHD which requires complete medical care and suitable interventions for day-to-day activities. In a study where a researcher explored the difference between healthy children and other chronically ill children, the pediatric cardiac patients displayed more poor physical and psychosocial health[7].
The present study depicts that all types of CHD results create different emotional and behavioral issues which display the clinical cut off as well. The long-term illness and physical weakness experienced by this population create hindrance to their normal mental health and well-being. Their condition limits them from normal daily, school, and social functioning. The resultant anxiety and stress create many emotional and behavioral issues in this population[8].

When investigating the relationship between the presence of emotional behavioral difficulties it reveals that the male CHD population showed greater problems as compared to female CHD children and adolescents. Although the parallel prevalence rate of CHD in both gender the difference depict that male have more relative stress due to hurdles and hindrances in the normal functioning of life. Previous studies also demonstrate this trend. In post-surgical treatment group Boys unlike girls demonstrated more psychosocial issues (23.8% vs 12.6%) as compared to their female counterparts[2,9-11].
More than half of the population was showing clinical trends of malfunctioning in their psychological health. In which the diagnosis which has more complexities and prolonged treatment (TOF, VSD, ASD) has more emotional and behavioral issues. A study compared four CHD diagnostic groups of different CHD severities, they found that children and adolescents with VSD revealed more social (mean 4.4) and externalizing problems (mean 9.0) than children and adolescents with atrial septal defect (mean 2.2 and 5.2, respectively) and pulmonary stenosis (mean 2.4 and 5.0, respectively). Clinically VSD comprises more severe symptoms than ASD and PS.

In another study of infants of 36 months with different variations in CHD diagnosis, infants did not differ in showing any risks of developing emotional problems, however, In growing time they demonstrated more behavioral issues with different modalities in their severity. They are 60% higher risk of emotional problems Hence, these results suggest that children and adolescents with high disease severities develop more problems in their later life than lower disease severities [13-15].

Reportedly the ratio of emotional and behavioral issues in different cultures varied, some studies of children and adolescents with different severities of CHD found no differences in behavioral and emotional problems were found across all severities of CHD like research in Norway assesses the same level of emotional behavioral issues across all modalities of CHD. In contrast, in Turkey, it was found that the more severe the cardiac condition, the higher the withdrawal behavior (p ¼ .002) and externalizing issues in the population with CHD [16-17-18].
This study result was also explaining that the more severe or complex the diagnosis the more internalizing and externalizing issues the population was suffering. It is also showing that the male population has more issues. The mean differences were showing that all types of CHD showed greater externalizing problems as compared to internalizing issues except TGA and AVSD.
Long hospitalization, complex invasive treatments, long treatment hours, more hospitalization, and relative stigma can be reasons for these resultant issues. Another explanation is the development of these emotional behavioral issues is due to a genetic link between a child's heart and emotions.
Age gender and parent-child interaction, as well as socio-demographic factors like socioeconomic condition parental education, family system, and size of family, also contribute to these issues.

Implications for practice
It is anticipated that the findings of current research provide help to Healthcare Professionals in gaining new knowledge and paying particular attention to the psychosocial functioning of the growing CHD population. It also them to refer and seek appropriate support for better psychological health. Future research will potentially inform the development of future preventive interventions, such as support groups of behavioral and emotional care for CHD children and adolescents

Conclusion: All previous studies in Pakistan mainly relied on the reporting of prevalence and level of GHD but this study assesses behavior and emotions relevant to their health-related quality of life. Furthermore, the investigation around the relationship between gender and behavioral and emotional issues also assessed CHD which was needed earlier. It was identified that there is a need for future qualitative studies that explore in-depth these issues in CHD and how their behavior and emotions, effecting the younger population.

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