

ANXIETY AND DEPRESSION IN CHILDREN AND ADOLESCENTS WITH CONGENITAL HEART DISEASE BEFORE AND AFTER SURGICAL INTERVENTION PERIOD

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ABSTRACT

Objective: To evaluate the level of anxiety and depression in children and adolescents with congenital heart disease in pre and post-surgical intervention period.

Study Design: Quasi experimental study.

Place and Duration of Study: Rawalpindi Institute of Cardiology, Rawalpindi Pakistan, from Jan to Dec 2019.

Methodology: After written informed consent from parents and approval of hospital ethical committee 152 children and adolescents with congenital heart disease were included in the study. Demographic and clinical data was recorded on relevant proforma. In addition to clinical assessment the level of anxiety and depression were objectively measured with the help of Urdu version of Hospital Anxiety and Depression Scale by the mental health specialist a day before and 15 days after surgery.

Results: The mean age of participants was 14.5 ± 3.3 years. Out of 152 participants, 80 (52.6%) were females, while 72 (47.4%) were males. Level of anxiety and depression was found higher in the preoperative period being 44 (28.9%) and 52 (34.2%) which dropped significantly in the postoperative period to 16 (10.5%) and 8 (5.3%) respectively. Majority of the patients had Tetralogy of Fallot i.e., 52 (34.2%) followed by Ventricular Septal Defect in 24 (15.7%) and Atrial Septal Defect in 18 (11.2%). Females were more likely to have depression than males (p -value=0.01).

Conclusion: We found significant decrease in anxiety and depression in the postoperative period.

Keywords: Anxiety, Congenital heart defect, Depression, Hospital anxiety & depression scale (HADS).

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INTRODUCTION

Congenital Heart Disease (CHD) is one of the commonest birth defects worldwide, having highest birth prevalence in Asia, approximately 9.3 per 1000 individuals.¹ In Pakistan, CHD is diagnosed in 40,000 children every year.² About 25% of these children require intervention either percutaneously or surgically in infancy.² With advances in diagnostic modalities, surgical techniques and better post-operative intensive care, the number of survivors has increased from 25% in 1950 to 95% in recent years.³ However, this increase in survival has exposed the children to several neuro-developmental and psychiatric morbidities.⁴ Approximately 13.8% patients with CHD report mental disorder and complex cognitive disorders.^{3,5}

Late presentation with chronicity of symptoms, make these individuals vulnerable to psychiatric problems, especially anxiety and depression. It is difficult to determine whether these psychological illnesses are independent or develop as a sequel of the somatic disease. Studies have shown that the level of anxiety in cardiac patients is comparatively higher than the

normal. Although anxiety was expected as a normal response in chronic illnesses but these illnesses may have deleterious impact on the individual's emotional health, social and family relationships, and academic performance.⁶ The prevalence of anxiety in Pakistani hospitalized patients was found to be 16%, and the severity of the illness increased with the duration of illness.⁷ Prevalence of depression estimates in Pakistan range from 22-60%, (in Karachi a populous city of 14.9 million) averaging at 47%.⁸ Another Pakis-tani study showed the prevalence of depression in 15% of cardiac patients.⁹

There is scarcity of knowledge regarding the psychological health of CHD survivors because of multiple reasons. First of all, the cardiologists mainly concentrate on physical health rather mental health, moreover, there is lack of awareness about psychological rehabilitation and paucity of sub specialties under one roof.

The concept of Quality of Life (QOL) has gained much attention in biomedical science over the past few decades because living a good quality life is as important as living longer.¹⁰ Like other patients having chronic medical conditions, most of the growing children and adolescents with repaired or unrepaired CHD

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continue to face life-long challenges before and even after successful surgical repair. Moreover, very few studies have evaluated the impact of CHD on psychological health of Pakistani population. Therefore, current study was designed to investigate the impact of surgical intervention on anxiety and depression in CHD patients before and after surgery.

METHODOLOGY

This quasi-experimental study was conducted at Pediatric Cardiology Department, Rawalpindi Institute of Cardiology, Rawalpindi, Rawalpindi, from January to December 2019. A total of 152 patients were included in the study. The sample size was calculated using WHO Calculator with confidence level of 95%, alpha error 5%, relative precision 11%, the anticipated population with depression was 61%.¹¹ Convenience sampling technique was done.

Inclusion Criteria: Patients having CHD were included in the study.

Exclusion Criteria: Patients with other comorbid conditions or having difficulty in comprehension were excluded.

After written informed consent from parents and approval of hospital ethical committee (No: RIC/RERC /27/20 Dated 17-03-20), we used the Hospital Anxiety and Depression Scale (HADs) for the evaluation of these two parameters.¹² There were 14 questions for the assessment of anxiety and depression. The scores assigned to each question were added for both depression and anxiety separately, thus leading to two main scores, each with a range between 0 and 21. To interpret the result following classification for 2 scores was used: score 0-7 meant no; score 8-10 meant moderate and scores >11 meant high levels of anxiety or depression.¹² This scale was found to be a comprehensive instrument in assessing the symptoms and their severity in both somatic, psychiatric and primary care patients as well as in general population.¹³ The HAD scale Urdu version was also found to be promising in assessing the anxiety and depression in Pakistani population.¹⁴

The data were entered and analyzed in Statistical Package for the Social Sciences (SPSS) Version 20. The categorical variables like gender, age categories, and congenital anomalies were measured as frequency and percentages. The continuous numerical variables like age and HADS scale were measured as mean and standard deviation. Chi square was used for qualitative variable. A *p*-value of ≤0.05 was considered significant.

RESULTS

A total of 152 patients with CHD were selected for the study. There were 80 (52.6%) female and 72 (47.3%) male patients. Mean age was 14.5 ± 3.3 years with a range of 8 to 18 years.

The HAD scale was compared in pre and post-operative periods. It was noted that the overall frequency of anxiety was 44 (28.9%) in the pre-operative period which dropped to 16 (10.5%) in the post-operative period (*p*-value=0.008). Similarly, the frequency of depression was found to be a bit higher being 52 (34.2%) in the pre-operative period which improved significantly in post-operative period to 8 (5.3%) patients only (*p*-value <0.001). It was noted that patients were more anxious and depressed before surgery compared to the post-operative period (*p*-value, <0.001) (Table-I).

Table-I: Comparison of anxiety and depression during pre and post intervention categories (n=152).

	Pre Intervention	Post Intervention	<i>p</i> -value
Anxiety	44 (28.9%)	16 (10.5%)	0.008
Depression	52 (34.2%)	8 (5.3%)	<0.001

Depression was more common in females as compared to males (*p*-value, 0.01). Patients in teen age were more likely to experience anxiety and depression. Stratified analysis of anxiety and depression frequency showed that anxiety was more prevalent in males being 24 (54.5%) versus 20 (45.5%) in females (Table-I), while depression was common in females being 36 (70.2%) versus 16 (30.8%) in males in the pre-intervention period (Table-II). In the post-operative period, anxiety and depression reduced in both genders equally. Adolescents were found to be more affected by anxiety and depression in the pre-operative period.

Low socioeconomic status was found in 120 (78%) patients. Most of the study cases had Tetralogy of Fallot (TOF) being 52 (34.2%), followed by Ventricular Septal Defect (VSD) being 24 (15.7%) and Atrial Septal Defect (ASD) being 18 (11.8%). Moreover, Rheumatic Heart Disease (RHD) including (Mitral Regurgitation, MR and Atrial Regurgitation, AR) and AR were found in 16 (10.5%) and 14 (9.2%) cases respectively. Although, the relation of severity of anxiety and depression with type of the congenital heart disease was not specifically measured but it was found that patient with cyanotic CHD have more severe symptoms than acyanotic CHD.

It was noted in this study that few cases who did not cross the cutoff level for anxiety and depression

had borderline score (like 7), were potential candidates for developing psychological issues and they were actual candidates for early referral to psychologists.

were similar in our study although our population was patients with CHD.

Behavioral problems and psychiatric disorders

Table-II: Association of age and gender with anxiety in pre and post-operative periods (n=152).

	Anxiety					
	Pre-Operative			Post Operative		
	With (n=52)	Without (n=100)	p-value	With (n=16)	Without (n=136)	p-value
Age (years)						
8-12	8 (18.2%)	40 (37.0%)	0.003	8 (50.0%)	40 (29.4%)	0.16
12-15	8 (18.2%)	16 (14.8%)	0.91	4 (25.0%)	20 (14.7%)	0.28
15.1 or above	28 (63.6%)	52 (48.1%)	0.96	4 (25.0%)	76 (55.8%)	0.03
Gender						
Male	24 (54.5%)	48 (44.4%)	0.96	12 (75.0%)	60 (44.1%)	0.03
Female	20 (45.5%)	60 (53.6%)	0.01	4 (25.0%)	76 (45.9%)	0.03

Table-III: Association of age and gender with depression in pre and post-operative periods (n=152).

	Depression					
	Pre-Operative			Post Operative		
	With (n=52)	Without (n=100)	p-value	With (n=16)	Without (n=136)	p-value
Age (years)						
8-12	8(15.4%)	40 (40.0%)	0.630	-	40 (33.3%)	0.006
12-15	8(15.4%)	16 (16.0%)	<0.001	8(50.0%)	20 (13.9%)	0.001
15.1 or above	36 (70.2%)	44 (44.0%)	0.005	8 (50.0%)	76 (52.7%)	0.791
Gender						
Male	16 (30.8%)	56 (56.0%)	0.005	8 (50.0%)	60 (47.2%)	0.820
Female	36 (70.2%)	44 (44.0%)	0.005	8 (50.0%)	76 (52.8%)	0.791

DISCUSSION

Anxiety and depression have deleterious effects on physical and psychological health of children and adolescents with CHDs, especially in the presence of low levels of education and severe cardiac ailments.¹⁵ In the last decade, due to progress in overall management there are increased number of teenagers with CHD who achieve adulthood. In developing countries like Pakistan, we even encounter adolescents with unrepaired CHDs. Current literature provides conflicting data regarding mental health status in growing children with CHDs. Many studies have been conducted to find out the effects of CHDs on physical and psychosocial health of children. Some studies show higher rates of behavior disorders whereas others failed to prove so.¹⁵⁻¹⁷

Etiology of anxiety and depression is multifactorial. In a developing country like Pakistan along with the main disease, accessibility and affordability of health services is also a contributory factor. Mumford *et al*, conducted two studies in Pakistan showing a high prevalence of anxiety and depression, especially in women and in rural population.^{18,19} Areias *et al*, concluded that female gender, poor academic performance and poor social support show worse psychosocial adjustment and quality of life.²⁰ Main factors responsible for anxiety and depression as described in literature

are significantly more frequent in adolescents with CHD compared to the general population.²¹ A study at Massachusetts General Hospital showed that out of 29 patients at follow up clinic depression was present in 4 (14%) and dysthymic disorder in 11 (38%) of patients using DSM-IV-R criteria.²² Latal and colleagues compared adolescents with CHD to healthy controls for presence of anxiety and depression. They demonstrated that anxiety (30% vs 10%) and depression (18.3% vs 3.3%) were common in patients with CHD and found that out of 152 patients, 48 (63%) teenagers were affected with anxiety and depression when assessed on the HAD scale.²³ These results are that same as ours.

The difference on psychological health post-intervention in CHD patients was assessed in multiple studies. Some showed promising positive results,²⁴ while others suggested same or worsening of situation regarding psychological and emotional outcome following cardiac surgery.²⁵ The studies with poor outcome were performed either to define screening tool for these patients or to see the frequency of psychological disturbances or to find out the associated risk factors but none of them compared how surgery influenced the outcome. This is the first ever study where we compared the pre and post-operative level of anxiety and depression. We found that the overall frequency was higher in the pre-operative period which decreased significantly in the

postoperative period. Teens were more anxious and depressed regarding their health. This could either be due to chronicity of symptoms, issues related to their physical appearance, social interaction, or more awareness regarding disease or delayed intervention.

Screening for psychological disorders is of prime concern in order to provide appropriate care for this susceptible population. Treating cardiologists should keep in mind the possible need for psychological rehabilitation in this high-risk population. Hoping that, this study will give the upcoming pediatric cardiologist a stimulus to have an insight into the complete well-being of patients.

CONCLUSION

We conclude that surgical intervention in patients with CHD decreases the severity of anxiety and depression. QOL can be improved in such patients by addressing their health issues using multidisciplinary approach.

Conflict of Interest: None.

Authors' Contribution

KA: Collection data, analysis, compiling, article writing, AMS: Concept, critical review, MMK: Review data, analysis & interpretation, AK: Data collection, data analysis, TA: Data collection, review, SM: Review.

REFERENCES

1. Van der Linde D, Konings EE, Slager MA, Witsenburg M, Helbing WA, Takkenberg JJ, et al. Birth prevalence of congenital heart disease worldwide: a systematic review and meta-analysis. *J Am Coll Cardiol* 2011; 58(21): 2241-2247.
2. Hussain S, Sabir MU, Afzal M, Asghar I. Incidence of congenital heart disease among neonates in a neonatal unit of a tertiary care hospital. *J Pak Med Assoc* 2014; 64(2): 175-178.
3. Desai R, Patel K, Dave H, Shah K, De Witt N, Fong HK, et al. Nationwide frequency, Sequential trends, and impact of comorbid mental health disorders on hospitalization, outcomes, and healthcare resource utilization in adult congenital heart disease. *Am J Cardiol* 2020; 125(8): 1256-1262.
4. Brosig CL, Bear L, Allen S, Hoffmann RG, Pan A, Frommelt M, et al. Preschool neurodevelopmental outcomes in children with congenital heart disease. *J Pediatr* 2017; 183(1): 80-86.
5. Bellinger DC, Watson CG, Rivkin MJ, Robertson RL, Roberts AE, Stopp C, et al. Neuropsychological status and structural brain imaging in adolescents with single ventricle who underwent the Fontan procedure. *J Am Heart Assoc* 2015; 4(12): e002302.
6. Lacomba-Trejo L, Valero-Moreno S, Montoya-Castilla I, Pérez-Marín M. Psychosocial factors and chronic illness as predictors for anxiety and depression in adolescence. *Front Psych* 2020; 11(1): 568941.
7. Dogar IA, Khawaja IS, Azeem MW, Awan H, Ayub A, Iqbal J, et al. Prevalence and risk factors for depression and anxiety in hospitalized cardiac patients in Pakistan. *Psych* 2008; 5(2): 38-41.
8. Altaf A, Khan M, Shah SR, Fatima K, Tunio SA, Hussain M, et al. Sociodemographic pattern of depression in urban settlement of Karachi, Pakistan. *J Clin Diagn Res* 2015; 9(6): VC09-VC13.
9. Dogar IA, Haider N, Irfan N, Ahmad M, Azeem MW. Psychiatric co morbidity in medical patients. *J Pak Psych Soc* 2010; 7(2): 91-96.
10. Areias ME, Pinto CI, Vieira PF, Teixeira F, Coelho R, Freitas J, et al. Long term psychosocial outcomes of congenital heart disease (CHD) in adolescents and young adults. *Transl Pediatr* 2013; 2(3): 90-98.
11. Aherrera JAM, Abrahani A, Racaza GZ. Depression and anxiety in adults with congenital heart disease using the validated fillipino version of the hospital anxiety and depression score (HADS-P). *Glob Heart* 2016; 54(1): 1-6.
12. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psych Scand* 1983; 67(6): 361-370.
13. Al Aseri ZA, Suriya MO, Hassan HA, Hasan M, Sheikh S, Al Tamimi A, et al. Reliability and validity of the hospital anxiety and depression scale in an emergency department in Saudi Arabia: a cross-sectional observational study. *BMC Emerg Med* 2015; 15(2): 28-31.
14. Lodhi FS, Elsous AM, Irum S, Khan AA, Rabbani U. Psychometric properties of the Urdu version of the hospital anxiety and depression scale (HADS) among pregnant women in Abbottabad, Pakistan. *Gen Psych* 2020; 33(5): e100276.
15. Awaad M, Darahim K. Depression and anxiety in adolescents with congenital heart disease. *Eur Psych* 2015; 30 (S1): 1-1.
16. Oliver AM, Wright KD, Kakadekar A, Pharis S, Pockett C, Bradley TJ, et al. Health anxiety and associated constructs in children and adolescents with congenital heart disease: a champs cohort study. *J Health Psychol* 2020; 25(10-11): 1355-1365.
17. Sterken C, Lemiere J, Vanhorebeek I, Berghe GV, Mesotten D. Neurocognition after paediatric heart surgery: a systematic review and meta-analysis. *Open Heart* 2015; 2(1): e000255.
18. Mumford DB, Saeed K, Ahmad I, Latif S, Mubbashar MH. Stress and psychiatric disorders in the rural Punjab: A community survey. *Br J Psych* 1997; 170(1): 473-478.
19. Mumford DB, Minhas FA, Akhtar I, Akhter S, Mubbashar MH. Stress and psychiatric disorder in urban Rawalpindi: community survey. *Br J Psych* 2000; 177(2): 557-562.
20. Areias ME, Pinto CI, Vieira PF, Teixeira F, Coelho R. Long term psychosocial outcomes of congenital heart disease (CHD) in adolescents and young adults. *Transl Pediatr* 2013; 2(3): 90-98.
21. Westhoff-Bleck M, Briest J, Fraccarollo D, Hilfiker-Kleiner D, Winter L, Maske U, et al. Mental disorders in adults with congenital heart disease: Unmet needs and impact on quality of life. *J Affect Disord* 2016; 204(2): 180-186.
22. Bromberg JJ, Beasley PJ, D'Angelo EJ, Landzberg M, DeMaso DR. Depression and anxiety in adults with congenital heart disease: a pilot study. *Heart Lung* 2003; 32(2): 105-110.
23. Latal B, Helfricht S, Fischer JE, Bauersfeld U, Landol MA. Psychological adjustment and quality of life in children and adolescents following open-heart surgery for congenital heart disease: a systematic review. *BMC Pediatr* 2009; 9(1): 6-8.
24. Wotherspoon JM, Eagleson KJ, Gilmore L, Auld B, Hirst A, Johnson S, et al. Neurodevelopmental and health-related quality-of-life outcomes in adolescence after surgery for congenital heart disease in infancy. *Dev Med Child Neurol* 2020; 62(2): 214-220.
25. Eagleson K, Campbell M, McAlinden B, Heussler H, Pagel S, Webb KL, et al. Congenital heart disease long-term improvement in functional health (CHD LIFE): a partnership programme to improve the long-term functional health of children with congenital heart disease in Queensland. *J Paediatr Child Health* 2020; 56: 1003-1009.