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IMPACT OF PRE & POST-OP PSYCHOLOGICAL DISTRESS AND COGNITIVE IMPAIRMENT ON HRQOL IN CABG PATIENTS: A GENDER AND AGE-STRATIFIED ANALYSIS

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Abstract

Background: Little Knowledge is available on what foresees psychological distress in cardiac patients post-cardiac surgery.

Aim: This short-term longitudinal study aimed to observe the impact of CABG on the health-related quality of life (HrQOL) of patients during both pre&postoperative period (1-week)

Objective:

To evaluate the impact of psychiatric distress related to anxiety and depression by applying HADS-A and HADS-D in both genders and all age groups

To compare the level of cognitive impairment among both genders of different age groups by applying the MMSE with short-term follow-up.

Method: A prospective, observational, short-term longitudinal study with pre-post comparison was designed in selected patients who were admitted to cardiac wards for CABG during of previous 3 months. Both patients and cardiac physicians were briefed about the basic plot of the study. After Careful observation of patients who were waiting for CABG in hospital critical care wards (IPD) written and oral consent was obtained from selected patients of both genders and aged 19-60 years. Patients were questioned both pre- and post-operatively (1 Week post-CABG) with short-term follow-up. A standard questionnaire based on the HADS and MMSE scales was designed. Part 1 of the questionnaire was modified to obtain demographic data from participants.

Results: 4 (8.9%) males& 7 (20%) females suffered Pre-Op anxiety, reduced to 1(2%) in males and 1(3%) female 1-week Post-Op. Symptoms of depression were found in 6(13.3%) males& 4(11.4%) females, and 5 (6.75%) among 80 patients had severe MMSE symptoms, which dropped to 4 (5%) post-Op.

Conclusion: Post-Op psychiatric symptoms were significantly improved than Pre-Op. HRQoL was lower pre-OP than POST-OP.

Background

Cardiac surgery is a well-known and widespread technique to treat coronary artery disease (CAD) and valve diseases. The procedure aims to alleviate the suffering of cardiac patients, relieve cardiac symptoms, and prolong life while improving health-related quality of life. Post-operative psychological discomfort, like sadness and anxiety, is common among patients recovering from cardiac surgery, adding to the complexity of their recovery process. Many researchers have reported that among cardiac patients undergoing cardiac surgery, 52% experienced depression [1-3] and nearly 40% of patients have reported clinically significant symptoms of anxiety before cardiac surgery, which normally go away post-procedure [4, 5] Research has shown a clear connection between anxiety and depression symptoms and various outcome measures [6] including hospital readmissions and post-surgery cardiac events, lower HRQoL, difficulty in performing daily tasks, long-term health issues, and treatment non-adherence [7], [8].

Recent research findings indicated convincingly and clearly that psychological variables have a big role in the emergence of symptoms of coronary artery disease (CAD). Risk of CAD occurrence may be linked to the risk of 5 particular psychological areas: sadness, [9] anxiety, [10] personality traits and variables, [11] social isolation, and long-term stress in life. Two types of pathophysiological mechanisms can explain how these variables can contribute to CAD [12] One is behavioral mechanism, like smoking and non-hygienic eating, can add to already aggravated bad health, and direct pathophysiological mechanisms, including neuroendocrine and platelet activation. It is still not conclusive, but according to many researchers, women are more prone to post-op anxiety and depression[13, 14].In this systematic review and meta-analysis [12] indicated a relatively weak association between increased social support and reduced pre-operative anxiety in patients undergoing elective surgery. However, researchers suggested that clinicians should encourage patients to engage with their social support networks before surgery. In his reasrch Nicholas Curcio et al 2018 [15] found that pre-op anxiety and depression were the strongest predictors of post-op depression and anxiety in cardiac patients who had CABG surgery.

Psychosocial and biomedical factors correlate throughout predictively, suggesting that psycho logical, social, and biological processes may influence health recovery as a unified complex p rocess[16].A clinical trial could investigate if psychological, social, or behavioral interventio ns speed up and improve physical sickness or trauma healing [17]. Post-operative psychological anguish is clinically substantial and has real repercussions. As mentioned above, up to 40-60% of cardiac surgery patients feel anxiety or sadness, according to studies. Post-CABG delirium was independently linked to poor preoperative executive function. Although the incidence of post-op cognitive impairment is minimal, 78 among cardiac rehabilitation patients [18] experienced mild cognitive deficiencies like decreased memory, attention, and impaired executive function. that negatively impact self-management education outcomes. The severity of the impairment may vary by type of coronary revascularization technique [19]. Unfortunately, these challenges are often overlooked. Post-operative care often prioritizes physical rehabilitation above mental wellness. Untreated psychological distress increases morbidity, hospital stays, medication nonadherence, and readmission rates, making recovery harder[20].

The purpose of this research is to document the clinical experiences of cardiac patients during the preoperative and postoperative period (after discharge). Comparison in severity of anxiety and depression was assessed through the HADS test. The Mini-Mental State Examination (MMSE) was created by [21],[22], [23].

Marshal Folstein developed the Mini-Mental State Examination (MMSE) in 1975 to quick assess mental health of hospitalized patients within 5–10 minutes [24].

Many hospitalized individuals have been assessed for cognitive impairment using it.

A score of 30 or more on the MMSE is considered normal, while a score of ≤ 24 indicates co

gnitive impairment[25].Delirium risk increases with lower MMSE scores.
Demographic characteristics like education, age, language, and ethnicity affect MMSE scores [26] .The lack of specific data on executive function, cognitive speed, and attention tests in MMSE, moderate cognitive impairment can't be identified early [27].
Neuroscientists globally accept MMS as a primary clinical practice recommendation to support MMSE for cognitive impairment screening, especially in older persons [28].
MMSE severity levels are typically interpreted as mild (≥ 20), mild to moderate (10–26), moderate to severe (≤14), and severe (≤10) [29]. Any cognitive impairment assessed by MMSE pre- and post-operatively can be used to judge the mental effects of CABG [30].
HADS scale, a standard questionnaire, was developed by Zigmond and Snaith in 1983. MMSE measures intellect, while HADS measures emotional well-being. HADS eliminates the confounding effects of somatic symptoms, including fatigue and sleep disruptions in medical and psychiatric patients, by targeting physically unwell people. This 14-item scale provides a complex assessment of emotional well-being with anxiety (HADS-A) and depression (HADS-D) subscales. It is especially useful in cardiac conditions where physical symptoms may hide psychological anguish. HADS scores predict post-operative complications, poor functional recovery, and death.
Both MMSE and HADS provide valuable insights, individually. Combining both can create a comprehensive psychological profile that captures cognitive and emotional discomfort. Together, these techniques can enable healthcare clinicians to stratify risk, adapt therapies, and track success.
A patient with a low MMSE and high HADS may need pharmaceutical therapy, integrated psychosocial support, cognitive-behavioral therapy, and family counseling. This holistic approach is crucial for vulnerable populations, such as the elderly or those with comorbidities, to improve HrQoL.

Methods

A prospective, explorative panel study was done in Punjab, Pakistan, in cardiac care institutions from October to December 2023.
The study included 80 male and female cardiac patients in the cardiac ward awaiting surgery. Prior written and verbal consent of those suffering from anxiety and depression was assessed utilizing the HADS scale 48 hours before and 1-week post-CABG. All patients between 19 and 60 years of age were included. Patients above 60 and children were excluded.
HADS has two 7-item subscales, Anxiety and Depression. It has 0–2 scores.
Moderate to severe sadness and anxiety were indicated by scores >10. Both subscales were measured separately. All patients who had given informed consent were evaluated psychologically and physically. Pre-operative CBC, serum urea and creatinine levels, and liver function tests were conducted to eliminate individuals with significant metabolic diseases that could compromise the sensorium. For patient understanding, both scales were translated into Urdu. Part 1 of the questionnaire consists of questions to collect demographic information and patient factors like age, gender, occupation, education, and comorbidities.

Statistical analysis

Data were analyzed using GraphPad 10.12. Quantitative data were expressed as mean ± (SD). Qualitative data were expressed in graphs. A one-way analysis of variance (ANOVA) was used for comparison among different time points. Pearson's correlation coefficient (r) test was used for correlating data.

Results

Among the total participants (n = 80), 45(56.25%) were males and 35 (43.75%) were females (Table 1). The mean age of participants was 16 ± 6.85 years. The education of most patients was at a basic level, matriculation 40 (50%). 36 (44%) of the total patients were employed, but the nature of their job was not known. In total, 50% of the patients were smokers, all of them were males, and only 5 out of 45 males were non-smokers. Pre-op comorbidities among patients were HTN in 18 (22.5%), Type 2 DM in 8 (10%), and nephropathy in 1 (2%) patients. Single cardiac manifestation was reported among 20 (25%) patients, while 60 (75%) were diagnosed with multiple cardiac manifestations. Among those 60 participants, 22 (36.7%) were suffering from both arrhythmia and angina, and 9 (15%) were suffering from angina, arrhythmia, and congestive heart failure (CHF). The mean intensive care unit length of stay (ICU-LOS) was 8±2.5 days post-surgery. Patients were also interviewed about warning signs of cardiac manifestations. Among the total patients, 34 experienced some warning signs of cardiac problems prior to surgery, and chest pain was most common in 23 (67.6%) patients. 46 out of 80 patients experienced a combo of 2 or more warning signs. Among a total of 80, 72 suffered any one complication post-op for example memory loss 4 (5.5%), constipation 5 (6.9%), muscle pain 4(5.5%), chest pain 19 (26.4%), insomnia 10 (13.8%), loss of appetite 30 (41.6%) while 8 patients suffered more than one complication post-operatively.

Table 1: Demographic and patient characteristics

Demographic data		
Age	**Range**	19-90years
	Mean ± SD	43.5 ± 14.6
Gender	Male	45 (56.25%)
	Female	35 (43.75%)
Occupation	Employed	36 (44%)
	Unemployed	23 (29%)
	Housewife	21 (27%)
Clinical comorbidity		
Hypertension (HTN)		18 (22.5%)
Type 2 DM		8 (10%)
Nephropathy		1 (2%)
Types of cardiac surgery		60% CABG, 20% Angioplasty
(ICU-LOS) post-surgery		8±2.5 days

HADS anxiety test revealed that 4(8.9%) males and 7(20%) females had severe pre-op anxiety, which was later decreased to 1(2%) in males and 1(3%) females after 1 week post-op. Pre-op HADS depression test reported positive for 6 (13.3%) males and (11.4%) females

pre-operatively, which later decreased to 4 (6%) males and 3 (8.9%) females 1 week post-operatively (Table:2.)

Table 2: (a) Mean value of (HADS-A) and (HADS-D) analysis

HADS scale	Pre-operative		Post-operative		F	*P* value
	Male	Female	Male	Female		
Anxiety	11.38 ± 3.6	14.6 ± 1.39	6.689 ± 2.8	6.25 ± 2.6	4.776	0.0097
Depression	12.24 ± 1.79	12.4 ± 1.57	12.22 ± 1.08	11.88 ± 1.45	0.0725	0.093

Table 2: (b) Comparison between male & Female (HADS-A) scores

Tukey's multiple comparisons test	Mean Diff	95.00% CI of diff.	Below threshold	Summary	*P Value*
MALE vs. FEMALE	-1.4	-2.5 to -0.33	Yes	**	0.0066

1-week post-surgery, statistically significant (P< 0.0097) improvement was observed in patients after the HADS-A test; mean values of HADS-D also improved post-surgery, but slightly, as compared to preoperative values (P < 0.093). While Tukey's multiple comparisons test indicated a significant difference between male and female pre- & Post operative mean values of the HADS-anxiety test. While no considerable difference was observed during the comparison of male and female patients, Pre- & Post operative mean values of the HADS-depression test. Cognitive impairment level according to the MMSE scale, both in male and female pre- and post-operatively, according to the age groups mentioned in Table 3.

Table 3: Cognitive impairments in male and female pre- and post-op as per MMSE scale according to age groups

			Level of Cognitive Impairment	Male		Female	
Age groups (yr.)	Male	Female		Pre-OP	Post-Op	Pre-OP	Post-Op
19-29	9	3	Normal	5.33±2.309	5±2.0	3.7±3.05	2.4±1.34
30-39	6	2	Mid severity	3.6±2.30	3.6±2.40	2±1.41	2.3±2.30
40-49	10	13	Mild to moderate severity	3.33±0.577	2±0	3.33+2.08	3.7±4.61
50-59	10	12	Moderate to severe	1	1	0	0
> 60	10	5	Extremely severe	0	0	2.5+0.707	1.67±1.15

Table 3 depicts more patients, both male and female, who were at mild, severe, and mild to moderately severe levels of cognitive impairment in the middle age group, 30-39 and 40-49 years.

Table 4. Cognitive impairments in males pre- and post-op as per the MMSE scale

Tukey's multiple comparisons test	Mean Diff.	95.00% CI of diff.	Significant	Summary	P Value
NORMAL vs. Mild severity	0.6	-0.5893 to 1.789	No	ns	
NORMAL vs. Mild to moderate severity	1.9	0.7107 to 3.089	Yes	***	0.0007
NORMAL vs. Moderate to severe	3.4	2.211 to 4.589	Yes	****	<0.0001
NORMAL vs. Extremely severe	3.6	2.411 to 4.789	Yes	****	<0.0001
Mild severity vs. Mild to moderate severity	1.3	0.1107 to 2.489	Yes	*	0.0272
Mild severity vs. Moderate to severe	2.8	1.611 to 3.989	Yes	****	<0.0001
Mild severity vs. Extremely severe	3	1.811 to 4.189	Yes	****	<0.0001
Mild to moderate severity vs. Moderate to severe	1.5	0.3107 to 2.689	Yes	**	0.0085

Mild to moderate severity vs. Extremely severe	1.7	0.5107 to 2.889	Yes	**	0.0025
Moderate to severe vs. Extremely severe	0.2	-0.9893 to 1.389	No	ns	

Significant difference in pre- and post-operative MMSE scales were observed among males, but in females, no such significant difference was observed due to almost the same number of female patients in pre- and post-operatively as compared to a smaller ratio in males.

Discussion

Previous reports indicate that patients undergoing cardiovascular surgery have an increased likelihood of experiencing mental health issues, such as anxiety and depression [31] [32]. The prevalence of anxiety and depression among patients before and after surgery has been documented in several studies (Mendonça da Cunha et al., 2016; Younes et al., 2019). Cardiac surgeons primarily concentrate on the post-operative physical and psychological recovery of patients. The current study found that 24% of the 80 cardiac patients exhibited pre-operative depression symptoms, while 29.8% displayed severe pre-operative anxiety symptoms [33]. Hoyer et al. (2008) observed a decline in both depressive and anxiety symptoms in patients during the postoperative week. In our study, the HADS-anxiety scale demonstrated a significant improvement in the first week postoperatively as compared to preoperative baseline values. The improvement continued thereafter, although it was not statistically significant. There was no significant improvement in depression symptoms among patients post-operatively compared to the preoperative baseline level. Females exhibited greater pre-operative anxiety than males, a finding consistent with previous research indicating that women awaiting heart surgery demonstrated elevated levels of pre-operative anxiety [34]. Variations may be attributed to hormonal fluctuations in women. Our research found no impact of smoking on HADS scores [35]. The MMSE is widely recognized as the standard screening instrument for cognitive impairment [36]. Cognitive impairment is often inadequately identified through client interaction; therefore, implementing routine screening with tools like the MMSE is advisable, particularly for higher-risk populations such as older inpatients [37-39].

An assessment of 80 patients was conducted for Pre and Post-operative MMSE. Age-wise distribution revealed that the patient groups comprised 9 males and 3 females aged 19-29 years, 6 males and 2 females aged 30-39 years, 10 males and 13 females aged 40-49 years, 10 males and 12 females aged 50-59 years, and 10 males and 5 females aged over 60 years. The mean MMSE results for Pre- and Post-opt males were 5.33 ± 2.309 and 5 ± 2.0 for normal individuals, 3.6 ± 2.30 and 3.6 ± 2.40 for mild cases, 3.33 ± 0.577 and 2 ± 0 for mild to moderate cases, and 1 for moderate to severe patients. The mean MMSE results for Pre- and Post-opt females were 3.7 ± 3.05 and 2.4 ± 1.34 for normal patients, 2 ± 1.41 and 2.3 ± 2.30 for mild to severe patients, 3.33 ± 2.08 and 3.7 ± 4.61 for mild to moderate patients, and 2.5 ± 0.707 and 1.67 ± 1.15 for extremely severe patients. A significant difference in pre- and post-operative MMSE scales was observed among males; however, no such difference was noted

in females, attributed to a comparable number of female patients pre- and post-operatively, in contrast to a lower ratio in males [40].

Limitations

The primary limitations of this research are the lack of information and the short span of the follow-up. To fully understand the changes in psychiatric profile and cognitive performance post-CABG, future research would need to reproduce the findings of this work with a larger sample size and a long-term follow-up. Assessing the change in mental function complying with surgery may also be facilitated by comparing the postoperative psychiatric/cognitive profiles of patients undergoing heart surgery with a cohort of patients undergoing preventative psychiatric therapy.

Conclusion

In cardiac patients, anxiety and depression symptoms negatively impacted HrQOL, which showed improvement over time. Cognitive function declined before surgery; however, it showed improvement in one month post-operation. The findings underscore the importance of cognitive therapy, medication, and psychiatric consultation before and after heart surgery to enhance surgical outcomes and patient HrQOL. A collaborative effort between psychiatrists and cardiac surgeons is essential to mitigate potential psychiatric side effects associated with heart surgery.

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Conflict of Interest:

Ms. Areeba Sajid and Dr. Aqna Malik co-authored the Research Article. This manuscript has not been published elsewhere in part or entirety and is not under consideration by another journal. The appropriate institutional review board approved the study design, ***IRB* No. *0040UCH.*** We have read and understood the policies of your journal. There are no conflicts of interest to declare.

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