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Assessment of Quality of Life for Patients Undergoing Treatment after Cardiovascular Disease in a Hospital Outpatient Department

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ABSTRACT

Background: Cardiovascular disease (CVD) significantly affects the quality of life (QoL) of patients, influencing both physical and mental health. Despite growing evidence linking CVD with reduced QoL, the impact of factors such as age, gender, co-morbidities, and depression remains understudied. This study aim to assess QoL among CVD patients and examine the effects of demographic and clinical factors.

Material and Methods: A cross-sectional observational study was conducted at a tertiary hospital between September 2023 and February 2024. A total of 111 outpatients with confirmed CVD participated, meeting specific inclusion criteria. QoL was assessed using the SF-36 questionnaire, while depression severity was measured through the PHQ-9 scale. Ethical approval was obtained prior to data collection, which involved structured patient interviews.

Statistical analysis: the collected data were analyzed using GraphPad Prism (version 10.2.2) Descriptive statistics were used to summarize participatant characteristics, while Mann-Whitney U tests and ANOVA were performed to compare QoL scores across different groups. A significance threshold of $p<0.05$ was applied

Results: patients diagnosed with heart failure exhibited the lowest QoL scores, with significant impairments in physical and mental health ($p<0.05$). depression was prevalent, particularly among older adults and those with multiple co-morbidities. Gender difference in QoL were minimal.

Conclusion: CVD substantially reduces QoL, particularly in patients with heart failure and depression. Implementing multidisciplinary interventions focusing on both physical rehabilitation and mental health support can improve outcomes. Future research should explore long-term strategies for enhancing QoL in high-risk groups.

Keywords: *Cardiovascular disease, Quality of life, Depression, Co-morbidities, Rehabilitation*

INTRODUCTION

Cardiovascular disease (CVD) represents a significant public health challenges, impacting millions of individuals across the globe.[1] According to WHO, quality of life is comprehensive notion that embraces elements including personal freedom, social relationship, and both physical and mental health, along with environmental considerations.[2] CVD stands as the foremost reason for mortality globally, culpable in nearly 17.9 M fatalities in the year '19 or 32% of the fatalities worldwide.[3] Indian play a significant role in these statistics, particularly among younger populations. Data from the WHO highlights this concerning trend. Research on the Global Burden OF Disease indicates that the death rate from CVD remains 272 per million individuals in India, surpassing worldwide mean of 235.[4]

Beyond its mortality and economics burdens, CVD profoundly affects Patients' quality of life (QoL). Physical limitation such as reduced exercise capacity and fatigue often lead to decreased daily functioning. These impairments can results in social isolation and negatively impact psychological well-being.[3] Factors contributing to reduced physical activity in CVD patients include exercises intolerance, fatigue, and fear of disease progression.[5]

Depression is also highly prevalent in individuals with CVD, with incidence rates considerably exceeding those seen in the general population. This psychological co morbidity not only worsens disease progression but also impedes recovery. Research indicates that depression contributes to poor medication adherence and decrease participation in cardiac rehabilitation programs, complicating overall disease management [6]. Addressing these multifaceted challenges requires an integrated healthcare approach that prioritizes both physical and mental well-being to improve outcomes for CVD patients.

MATERAL AND METHODS

This study was a cross-sectional observational investigation conducted to assess QoL and depressive severity in individuals diagnosed with CVD. The study was carried out over a six-month period, from September 2023 to February 2024, at the cardiology out patients department of a tertiary care hospital in Vadodara, Gujarat, India.

A total of 111 outpatients diagnosed with CVD were enrolled in the study. Inclusion criteria required participants to be aged 18 year or older, have a documented history of cardiovascular disease, and be willing to engage in the study or complete the questionnaire. Patients who had many cardiac procedures like coronary artery bypass grafting (CABG), stent, etc or not done with any cardiac procedure both are included. Exclusion criteria encompassed individual younger 18 year, those unwilling to participate, or those who refused to complete the study questionnaire.

The study protocol received approval from the Institutional Ethics Committee (Approval No: PUIECHR/PIMSR/NOC/2024/18).

Data collection involved the administration of a standardized questionnaire, which was read aloud to each participant by the investigator to ensure clarity. The questionnaire included demographic details, medical history, and health status indicators. QoL was assessed using the 36- item Short-Form Survey (SF-36), while depression severity were evaluated using the Health Questionnaire-9 (PHQ-9) the SF-36 measures eight domains of health, with scores ranging 0 to 100, where higher score indicate better health status. PHQ-9 is a validated tool for assessing depression severity, with total score cab range from 0 – 27, categorized into minimal (0-4), mild (5-9), moderate (10-14), moderately severe (15-19), and severe depression (20+). Each participant completed the questionnaire in approximately 20 minutes.

Descriptive and inferential statistical analyses were performed using Graphpad Prism software (version 10.2.2). Categorical variables were presented as frequencies and percentages, while continuous variables were expressed as means and standard deviations. The Mann-Whitney U test was applied to compare two independent groups, while analysis of variance (ANOVA) was used to assess differences among three or more groups. A p-value of <0.05 was considered statistically significant.

1) DEMOGRAPHIC CHARACTERISTICS OF THE PATIENTS WITH CARDIOVASCULAR DISEASE

1.1 Distribution as per age and sex

Table 1: Distribution as per age and sex

	Number of patients	Percentage (%)
Age		
21-30	4	3.60%
31-40	22	19.82%
41-50	33	29.73%
51-60	28	25.23%
61-70	16	14.41%
>70	8	7.21%
Sex		
Male	71	63.96%
Female	40	36.04%

1.2 Social history wise distribution

Table 2: Social history wise distribution

Social history	Total no. Of patients	Percentage (%)
Addiction		
Alcohol	11	9.91%
Smoking	12	10.81%
Tobacco chewer	9	8.11%
Alcohol + smoking	21	18.92
Alcohol + tobacco chewer	1	0.90%
Alcohol+smoking+tobacco chewer	11	9.91%
Smoking + tobacco chewer	7	6.31%
No addiction	39	35.14%
Occupation		
Professional	37	33.33%
Worker	40	36.04%
Unemployed	30	27.03%
Student	4	3.60%

1.3 Distribution as per medical history

Table 3: Medical History wise distribution

Medical history	Total no. Of patients	Percentage (%)
Co-morbid conditions		
Hypertension (HTN)	40	36.04%
Diabetes (DM)	13	11.71%
Hypertension + diabetes (HTN+DM)	25	22.52%
Renal disease	7	6.31%
Other	11	9.91%
No co- morbidities	15	13.51%
Final diagnosis		
Angina	8	7.21%
Coronary artery disease	23	20.72%
Myocardial infraction	38	34.23%
Heart valve disease	10	9.01%
Heart failure	14	12.61%
Other heart disease	18	16.22%
Surgery		
Stent	46	41.44%
CABG	28	25.23%
Valve replacement	9	8.11%
No surgery	28	25.23%

2) QUALITY OF LIFE

Significant impairments were observed in physical role functioning (45.14 ± 27.46), general health perception (43.49 ± 18.81), energy levels (55.99 ± 10.20), and emotional role limitations (54.96 ± 36.22). Overall physical (51.90 ± 2.698) and mental (50.16 ± 1.772) health scores were also reduced, reflecting compromised quality of life. These are expressed in table 4.

Table 4: mean &std.deviation of SF-36 score

Questionnaire	Subscale	Mean (SD) of disease patients
SF – 36	Physical functioning	68.02 (19.23)
	Limitation due to physical health	45.14 (27.46)
	Pain	83.16 (18.62)
	General health	43.49 (18.81)
	Vitality	55.99(10.20)
	Social functioning	65.45 (21.40)
	Limitation emotional problem	54.96 (36.22)
	Mental health	67.62(17.42)
	PCS	51.90 (2.698)
	MCS	50.16 (1.772)

Table 5 summarizes Gender-based comparisons of SF-36 scores showed no distinct differences ($p > 0.05$). Females scored slightly lower in pain (81.37 ± 19.25), social functioning (63.28 ± 22.51), and mental health (52.42 ± 18.56), but overall, quality of life was comparable between genders.

Table 5 : Effects of gender on quality of life

SF-36 DOMAIN	FEMALE	MALE	P- VALUE
Physical functioning	67.54 (18.97)	68.88 (19.89)	0.5131
Limitation due to physical health	45.21 (26.92)	45.00 (28.76)	0.2029
Pain	81.37 (19.25)	86.35 (17.22)	0.1224
General health	46.96 (21.97)	44.95 (20.26)	0.9279
Vitality	55.99 (10.41)	56.00 (9.949)	0.2300
Social functioning	63.28 (22.51)	69.30 (18.94)	0.2369
Limitation emotional problem	54.01 (37.60)	56.65 (34.03)	0.3263
Mental Health	52.42 (18.56)	54.20 (15.32)	0.2191

*Table note: if P-value (<0.05) there is significant difference

Age-based comparisons of SF-36 scores revealed significant differences in physical functioning ($p = 0.0315$) and limitations due to physical health ($p = 0.0256$), indicating a decline in physical health and increased limitations with age. detailed in table 6.

Table 6: Effect of age on quality of life

SF-36 DOMAIN	21 – 30yr	31 – 40yr	41 – 50yr	51 – 60yr	61 – 70yr	>70 yr	P – value
Physical functioning	68.75 (32.76)	75.00 (16.11)	75.00 (16.15)	64.64 (18.35)	53.44 (20.63)	50.63 (13.74)	0.0315
Limitation due to physical health	60.00 (35.36)	58.86 (26.14)	52.42 (26.87)	48.57 (25.20)	46.19 (21.83)	30.75 (17.68)	0.0256
Pain	86.00 (12.27)	84.77 (22.02)	82.15 (20.19)	82.32 (16.56)	76.75 (15.78)	78.75 (20.17)	0.9321
General health	63.50 (27.98)	58.18 (13.95)	50.09 (18.44)	49.39 (22.32)	44.31 (13.13)	44.00 (14.13)	0.1332
Vitality	52.50 (11.90)	55.91 (10.54)	55.61 (8.547)	55.18 (11.18)	59.69 (12.45)	55.00 (7.071)	0.7281
Social functioning	53.50 (37.56)	68.41 (21.67)	67.30 (20.69)	62.75 (23.32)	61.19 (16.98)	73.63 (15.55)	0.5341
Limitation emotional problem	75.00 (50.00)	69.68 (32.48)	62.64 (35.20)	52.93 (37.34)	49.56 (30.48)	45.75 (30.68)	0.514
Mental Health	75 (21.09)	58 (18.70)	75 (22.20)	69 (20.62)	68 (22.87)	65 (26.14)	0.0568

* Table note: if P-value (<0.05) there is significant difference

SF-36 analysis revealed significant differences in thresholds because of physiological health (p value of 0.0054) as well as emotional problems (p value of 0.0077) among patients with co-morbidities, especially hypertension, diabetes, or renal disease. Other domains showed no significant differences (p > 0.05), indicating minimal variation across co-morbidity groups. These are expressed in table 7.

Table 7: Effects of co morbid condition on quality of life

SF-36 DOMAIN	HTN	DM	HTN + DM	Renal disease	Other	No co-morbidities	p-value
Physical functioning	57.12 (24.4)	56.15 (23.0)	55.2 (26.3)	46.66 (17.22)	67.85 (22.7)	70 (25.70)	0.1154
Limitation due to physical health	56.88 (24.67)	54.23 (29.14)	52.00 (16.33)	51.67 (37.64)	56.82 (19.66)	60.00 (26.39)	0.0054
Pain	81.90 (19.98)	88.15 (12.10)	76.92 (20.19)	86.00 (16.40)	91.82 (14.35)	84.00 (19.08)	0.1204
General health	45.28 (19.36)	46.31 (18.90)	43.56 (20.17)	40.83 (28.19)	50.36 (15.80)	66.00 (19.87)	0.0154
Vitality	55.50 (11.48)	58.85 (8.454)	53.60 (12.29)	55.83 (5.845)	59.09 (5.839)	56.67 (8.165)	0.6324
Social functioning	64.08 (21.33)	68.46 (26.36)	62.20 (16.70)	64.83 (21.39)	75.18 (19.30)	66.87 (25.80)	0.4204
Limitation emotional problem	76.68 (35.34)	58.92 (38.94)	55.32 (31.86)	50.00 (46.00)	78.82 (27.04)	71.20 (35.35)	0.0077
Mental Health	65 (20.29	62 (22.66)	60 (23.6)	61 (19.04)	73 (22.26)	71 (19.53)	0.0823

* Table note: if P-value (<0.05) there is significant difference

SF-36 scores showed significant differences in physical functioning (p = 0.0353), physical health limitations (p = 0.0202), general health (p = 0.0245), and emotional problems (p = 0.0402). Heart failure patients had the lowest QoL, while those with angina or other conditions reported better outcomes. Other domains showed no significant differences (p > 0.05). These are expressed in table 8.

Table 8: effects of type of disease on quality of life

SF-36 DOMAIN	Angina	CAD	MI	Heart failure	Heart valve disease	Other	p-value
Physical functioning	76.25 (9.161)	70.43 (19.06)	66.18 (20.35)	54.29 (16.27)	66.50 (19.44)	76.67 (17.32)	0.0353
Limitation due to physical health	56.88 (28.15)	55.96 (30.03)	50.61 (26.54)	47.86 (20.64)	57.50 (21.89)	45.83 (26.08)	0.0202
Pain	77.00 (29.51)	74.65 (18.52)	84.95 (19.85)	83.14 (14.90)	88.80 (26.28)	89.89 (18.38)	0.1350
General health	72.88 (10.59)	45.30 (19.65)	45.32 (19.97)	32.00 (14.70)	46.30 (10.92)	56.33 (19.11)	0.0245
Vitality	58.13 (22.28)	57.17 (13.97)	60.00 (16.24)	53.29 (7.472)	52.50 (15.20)	58.06 (17.20)	0.1986
Social functioning	73.63 (24.47)	59.43 (19.97)	62.76 (18.08)	54.79 (21.22)	66.50 (24.88)	72.89 (11.44)	0.2810
Limitation emotional problem	87.63 (17.08)	52.22 (36.08)	47.32 (36.95)	31.00 (30.71)	63.40 (33.23)	74.06 (29.39)	0.0402
Mental Health	74 (31.01)	61.22 (18.65)	60.12 (21.40)	49.00 (25.12)	56.12 (21.74)	67.52 (23.00)	0.2350

* Table note: if P-value (<0.05) there is significant difference

SF-36 analysis based on surgical status showed significant differences in physical functioning (p = 0.0215), limitations due to physical health (p = 0.0425), general health (p = 0.0347), and emotional problems (p = 0.0234). CABG patients had the lowest scores. Other domains, such as pain, vitality, social functioning, and mental health, showed no significant differences (p > 0.05). These are expressed in table 9.

Table 9: Effects of surgery on quality of life

SF-36 DOMAIN	Stent	CABG	Valve replacement	No surgery	P- value
Physical functioning	68.26 (20.39)	58.57 (16.32)	64.56 (20.38)	77.86 (15.12)	0.0215
Limitation due to physical health	51.52 (26.58)	43.21 (24.47)	47.22 (23.20)	49.11 (26.77)	0.0425
Pain	87.17 (21.91)	81.21 (15.53)	87.56 (20.83)	82.96 (15.00)	0.2800
General health	44.65 (16.06)	30.25 (19.10)	46.78 (11.48)	64.64 (19.86)	0.0347
Vitality	53.37 (12.02)	59.29 (5.887)	52.78 (10.64)	58.04 (9.163)	0.0537
Social functioning	62.46 (19.13)	63.25 (20.82)	64.11 (25.15)	73.00 (23.58)	0.1101
Limitation emotional problem	46.33 (33.42)	39.32 (30.31)	63.00 (35.22)	82.21 (32.02)	0.0234
Mental Health	68 (21.13)	57 (22.87)	65 (23.33)	74 (20.85)	0.1612

* Table note: if P-value (<0.05) there is significant difference

PHQ-9 results revealed that depression was more prevalent in older adults (>60 year) 50%, Males had (25.36%), unemployed individuals 33.34%, and those with heart failure (78.58%). while CABG patients had the highest (28.58%). [Table 10].

Table 10: Depressive symptoms with comparisons across demographic details and PHQ-9 score

DEMOGRAPHICS	PHQ-9 < 10 (n=111)	PERCENT AGES (%)	PHQ-9>10 (n=111)	PERCENT AGES (%)
Age				
21-30	4	80%	1	20%
31-40	18	81.18%	4	19.8%
41-50	30	90.1%	3	9.9%
51-60	20	71.42%	8	29.68%
61-70	8	50%	8	50%
70 <	4	50%	4	50%
Gender				
Male	53	74.64%	18	25.36%
Female	31	77.5%	9	22.5%
Addiction				
Alcohol	8	72.72%	3	27.28%
Smoking	8	66.66%	4	33.34%
Tobacco chewer	8	88.88%	1	11.12%
Alcohol + smoking	15	71.42%	6	28.58%
Alcohol + tobacco chewer	1	100%	0	0%
Alcohol +smoking + tobacco chewer	9	81.81%	2	18.19%
Smoking + tobacco chewer	6	85.71%	1	14.29%

No addiction	29	74.35%	10	25.65%
Occupation				
Professional	29	78.37%	8	21.63%
Worker	31	77.5%	9	22.5%
Unemployed	20	66.66%	10	33.34%
Student	4	100%	0	0%
Co-morbidities				
HTN	28	70%	12	30%
DM	7	70%	3	30%
HTN + DM	15	55.55%	12	44.45%
Renal disease	4	66.66%	2	33.34%
Other	11	91.66%	1	8.34%
No co-morbidities	14	87.5%	2	12.5%
Disease				
Angina	8	100%	0	0%
CAD	20	86.95%	3	13.05%
MI	30	78.94%	8	21.06%
Valve heart disease	9	90%	1	10%
Heart failure	3	21.42%	11	78.58%
Other heart disease	14	77.77%	4	22.23%
Surgery				
Stent	42	91.30%	4	8.7%
CABG	20	71.42%	8	28.58%
Valve replacement	8	88.88%	1	11.12%
No surgery	26	92.85%	2	7.15%

Descriptive statistics in Table 11 show that patients without depression had higher mean PCS scores across all depression categories, while mean MCS scores decreased as depression severity increased, as indicated by adjusted means, standard deviations, and patient counts.

Table 11: adjusted PCS and MCS means by PHQ-9 categories

QOL components: Mean (SD)			
PHQ categories	**No. of patients**	**PCS**	**MCS**
None	26	52.88	50.91
Mild	58	52.39	50.21
Moderate	23	50.78	49.46
Moderately severe	2	48.80	48.69
severe	2	48.79	48.46

DISCUSSION

This study provides compelling evidence that CVD not only affect physical health but also significantly impacts mental well-being, particularly in older patients, those with multiple co-morbidities, and those undergoing major surgical procedures. The findings underscore the need for an integrated care model that addresses both physical and psychological health to improve overall patient outcomes.

The result aligns with prior research indicating that heart failure patients experience the most substantial QoL impairment. Zhao and Chen (2022) found that heart failure is associated with frequent hospitalization and a substantial symptom burden, which significantly diminishes QoL.[7] similarly, severe limitation in daily activities and require targeted rehabilitation programs to enhance functional status.[8]

Gender differences in QoL were minimal in this study, with males reporting slightly better social functioning and emotional well-being. However, Prata et al. (2016) observed that women generally report worse QoL due to greater symptom burden and anxiety levels.[9]

Age significantly impacted QoL, with patients over 70 year exhibiting lower score in physical functioning. Similarly found that advancing age correlates with decreased mobility and independence, emphasizing the need for age-specific rehabilitation intervention.[10]
Patients with hypertension and diabetes had significantly lower QoL score, particularly in general health and vitality domains. This supports findings by Weiss et al. (2019). Who highlighted that metabolic disorders exacerbate both physical and psychological strain in CVD patients. [11]
Surgical intervention also played a crucial role in QoL outcomes. Patients who underwent CABG had significantly lower physical functioning (p=0.0215) and grater limitation in daily activities (p=0.045) compared to those who received stents or no surgical intervention this is in line with Schmidt-Rio Valle et al. (2021) who found that while CABG patients initially report lower QoL, gradual improvement occur with long-term rehabilitation.[12] However, the observed increase in emotional distress among CABG patients (p=0.0234) suggested that psychological support should be in integral component of post-operative care.

CVD strongly associated with mental health challenges, including anxiety and depression. Studies have shown that depression rate among CVD patients are significantly higher than in the general population, with estimates ranging between 20-40%. The PHQ-9 is commonly used to assess depression severity in these patients, and findings indicate that those with severe depressive symptoms have lower treatment adherence, higher hospitalization rates, and poorer overall health outcomes.
Fear of disease progression, lifestyle restrictions, and uncertainly about the future contribute to psychological distress among CVD patients. Comorbidities in heart failure patients, such as diabetes and depression, are linked to diminished QoL and heightened risk of mortality and rehospitalisation.[13] Research has demonstrated that patients with multiple comorbidites tend to experience increased depressive symptoms, reduced physical functioning, and greater limitation in their daily activities, significantly affecting their overall QoL.[14,15]

Our findings also indicated that patients without depression had higher mean PCS than those in any depression category, while MCS lessened depression levels heightened. Individuals with both depression and CVs disease exhibited poorer health outcomes compared to their non-depressed counterparts. Furthermore, it was observed that depressed patients often struggled with poorly controlled hypertension, while those with hypertension frequently exhibited depressive symptoms.[16]
The interplay between comorbid depression and QoL is intricate; generally, greater depression severity correlates with a decline in QoL. According to Weiss et al. Reduced health-related QoL is directly linked to manifestations of depression.[11] Factor such as disease severity, employment status, and social support were linked with greater depression incidences among individuals with cardiac conditions.

CONCLUSION

CVD significantly reduces patients' QoL, with age, comorbidities, and depression acting as major contributing factors. Heart failure and post-CABG patients experience the most severe impairments, necessitating comprehensive management strategies. Early depression screening and psychological support should be prioritized, particularly in high-risk groups. Moving forward, future research should explore personalized interventions that address both physical and mental health to improve long-term outcomes in CVD patients.

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