

Evaluation of Health-Related Quality of Life in Patients with Heart Diseases at a Tertiary Care Hospital

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ABSTRACT

Background: Cardiovascular diseases damage the heart and blood arteries. Cardiovascular disorders account for 31% of all fatalities worldwide, ultimately resulting in death, according to the WHO. A blood clot (thrombosis) or a build-up of fat deposits within an artery (atherosclerosis) can both cause a decrease in blood flow to the heart, given the significant impact on patient's lives posed by cardiovascular diseases. **Purpose:** The purpose of our study was to evaluate the Health-Related Quality of Life (HRQOL) of patients with heart diseases by using the SF-36 and SAQ-CAN questionnaires. **Materials and Methods:** A six-month cross-sectional study involving 170 individuals was conducted in the cardiology department. **Results:** In our study involving 150 Acute Coronary Syndrome (ACS) patients, we found a significant correlation between age, gender and diagnosis, with HRQOL using the SAQ-CAN questionnaires. Among 20 patients who are other than ACS, we found that Physical Component Summary (PCS) and Mental Component Summary (MCS) were positively correlated with age, gender and diagnosis in study subjects. Age was significantly correlated with Physical Functioning (PF) and Role Limitations due to Physical health (RLPF), while Emotional Well-Being (EW-B) positively correlated with gender and energy/fatigue positively correlated with diagnosis. However, no significant correlation was found between PCS and gender or PCS and diagnosis. **Conclusion:** Our research concluded that a number of factors might impact a patient's HRQOL with Cardiovascular Disease (CVD). Determining these factors in advance can help identify individuals who are more likely to have poorer HRQOL.

Keywords: SAQ-CAN, SF-36, PCS, MCS.

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INTRODUCTION

Cardiovascular Disease (CVD) damages the heart and blood arteries (Cleveland Clinic 2022). Reduced blood flow to the body, brain, or heart can occur from (a) A blood clot (thrombosis) or (b) A build-up of fat deposits within an artery (atherosclerosis) (NHS INFORM 2022). Cardiovascular Diseases (CVDs) lead to the majority of deaths worldwide. With an expected 17.9 million deaths, Cardiovascular Diseases (CVDs) accounted for 32% of all fatalities globally in 2019. Strokes and heart attacks were the reason for 85% of these deaths (World Health Organization 2021). India ranks among the countries with the highest global rates of cardiovascular disease. It is anticipated that by 2020, there will be 4.77 million CVD deaths annually in India, up from 2.26 million in 1990 (World Heart Report 2023). Perhaps the first indication of an

undiagnosed illness is a heart attack or stroke. Pain or discomfort in the arm, left shoulder, back, or chest are among the most typical signs and symptoms of cardiovascular disease. Other symptoms include difficulty breathing, light-headedness, dizziness, loss of balance, coordination, fainting, or unconsciousness (British Heart Foundation 2019).

Health-Related Quality of Life (HRQOL) is crucial in the assessment and care of people who have suffered a cardiac disease. CVD is a serious medical disorder that can significantly impair an individual's physical, mental and emotional well-being. To better assess the patient's cure, overall well-being and treatment needs, healthcare practitioners monitor the patient's HRQOL.

HRQOL is evaluated in CVD patients using a variety of HRQOL questionnaires, such as the Short Form-36 (SF-36) or the Seattle Angina Questionnaires-Canadian version (SAQ-CAN). These evaluations offer useful data that can drive choices about treatments, recovery programs and patient education initiatives (Frøjd *et al.*, 2023). Healthcare professionals can ultimately help CVD patients' overall rehabilitation and quality of life by



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addressing their HRQOL problems. HRQOL of individuals who have experienced a cardiac disease focuses on several important aspects related to their overall well-being and functioning. These aspects include:

To assess the individual's ability to perform daily activities and tasks.

To evaluate the emotional and psychological impact of a heart attack, including anxiety, depression and stress.

To assess lifestyle choices such as eating habits, exercise and smoking (Höfer, 2020).

MATERIALS AND METHODS

Study design

The cross-sectional research methodology was used and the study was performed from August 2023 to January 2024. A Pilot study was conducted to determine the sample size. After that, the research comprised 170 patients with CVD diagnoses who were admitted to the Cardiology department at Vivekananda General Hospital, Hubballi, India.

Study population

Inclusion criteria

All the patients who underwent cardiac-related problems, Subjects above 18 years, Subjects of both genders and Subjects with/without comorbid conditions.

Exclusion criteria

Subjects who attended the outpatient department and vulnerable group breastfeeding, lactating women and pediatric are excluded.

Definitions

Social habits

Social habits like smoking, alcohol consumption and tobacco chewing were included. Occasional and habitual smokers were categorized as 'smokers'; patients who were social and habitual drinkers were categorized as 'drinkers'; patients who chewed tobacco in any form were categorized as 'tobacco chewers'.

Diet

The sub-category 'Vegetarians' included patients who did not consume meat, fish and eggs. Whereas, 'non-vegetarians' included patients who consumed meat, fish and eggs.

Body Mass Index (BMI)

Patients were classified based on their BMI as follows: a) Underweight (<18.5 kg/m²), b) Normal weight (18.5-24.9 kg/m²), c) Overweight (25-29.9 kg/m²) and d) Obesity (≥30 kg/m²) (Tefera *et al.*, 2020).

The patients in our research were categorized according to their socioeconomic position using the Kuppuswamy scale. The scores assigned to each category were as follows: a) Upper class (26-29), b) Upper middle class (16-25), c) Lower middle class (11-15), d) Upper lower class (5-10) and e) Lower class (<5) (Kumar *et al.*, 2022).

Polypharmacy

Based on the number of drugs prescribed, it is classified into No polypharmacy (1-4 drugs), Polypharmacy (5-9 drugs) and Excessive polypharmacy (≥10 drugs) (O'Dwyer *et al.*, 2016).

Statistical Analysis

The Statistical Package for Social Sciences (SPSS) for Windows version 26.0 was utilized to conduct statistical analyses, whereas continuous data were shown as mean and categorical variables were shown as numbers and percentages. The paired sample *t*-test, the Mann Whitney U test and the Kruskal Wallie's test were used to examine the relationship between age, gender and diagnosis with HRQOL. A statistically significant *p*-value was defined as one that was <0.05.

RESULTS

Table 1 summarizes the clinical characteristics of the research participants. We recruited and examined 170 participants in all throughout the course of our investigation. Participants in the research were from the inpatient cardiology department of Hubballi's Vivekananda General Hospital. Of the 170 subjects, 64 (37.5%) were female and 106 (62.4%) were male. The participants were divided into five age ranges: 36-45, 46-55, 56-65, 65-75 and 76-85 years. The study population's mean age was 59.23±12.09. The majority of the population, or 55 (32.4%) was in the age range 56-65 years, while the smallest proportion, or 11(6.5%), was in the age group 36-45 years. The research population comprised 132(77.6%) patients who were tobacco chewers, 30(17.6%) were smokers and 42(24.7%) were alcoholics.

According to their BMI, the people were divided into four groups: underweight, normal weight, overweight and obesity, with frequencies of 12(7.1%), 64(37.6%), 83(48.8%) and 11(6.5%) respectively. 89(52.4%) of the survey individuals were rural residents and 81(47.6%) urban residents. In our study population, 100(58.8%) were vegetarians and 70(41.2%) were non-vegetarians.

In our study, the most frequently observed diagnoses were ST-Elevation Myocardial Infarction (STEMI) 63(37.1%), Non-ST-Elevation Myocardial Infarction (NSTEMI) 60(35.3%), Unstable angina 27(15.9%), Complete Heart Block, Dilated Cardio Myopathy, Rheumatic Heart Disease, Heart Failure of 4(2.4%), 6(3.5%), 8(4.7%) and 2(1.2%) respectively. The two co-morbidities that were most often seen in our research sample were diabetes mellitus (*n*=54) and hypertension 91(52.3%).

In the research sample, pedal edema and atrioventricular block 1(0.57%), were the least prevalent comorbidities. The remaining co-morbidities were Rheumatic heart disease 4(2.3%), hypothyroidism 2(1.15%), old CVA hemiparesis 3(1.72%) and ischemic heart disease 18(10.35%). The individuals in our study who have both diabetes and hypertension as comorbidities are at an increased risk of heart disease.

The patients in our study were categorized using the modified Kuppuswamy scale. (Ayoub and Raja, 2023). There are four categories on this scale: Upper class 5(2.9%), Upper middle class 13 (7.6%), Lower middle class 56(32.9%), Upper lower-class 81(47.6) and Lower class 15(8.8%). Based on the number of drugs prescribed, it is classified into No polypharmacy (1-4 drugs), Polypharmacy (5-9 drugs) and Excessive polypharmacy (≥ 10 drugs). The majority of patients 132(77.6%) fell into the category of polypharmacy.

Assessing HRQOL using the SAQ-CAN questionnaire

In Table 2, we observed that male patients score lower than females for SAQ-CAN scores ($p=0.000$). In the same way, Compared to NSTEMI and unstable angina, STEMI patients had significantly reduced SAQ-CAN scores ($p=0.000$) and elderly patients reported significantly lower scores than younger patients ($p=0.000$) using paired sample t-test.

Assessing HRQOL using SF-36 questionnaire

Correlation of Age with HRQOL in the study population using the Kruskal Wallis test.

Correlation of Age with PCS

Age and PF showed a strong association ($p=0.009$) in the test, which also demonstrated RLPF ($p=0.048$) and correlation was not statistically significant between age with Pain ($p=0.254$) and GH ($p=0.93$) as shown in Table 3.

Correlation of Age with MCS

The test indicated a positive relationship between age and RLEP ($p=0.014$) and insignificantly correlated age with Energy/fatigue ($p=0.491$), EW-B ($p=0.66$) and SF ($p=0.117$) as shown in Table 3.

Correlation of gender with HRQOL in the study population using the Mann-Whitney U test.

Correlation of gender with PCS

The test's results revealed an insignificant correlation between gender and PF ($p=0.69$) as well as pain ($p=0.432$), GH ($p=0.676$) and RLPF ($p=0.298$) as shown in Table 3.

Correlation of gender with MCS

A positive correlation was revealed by test results between gender and RLEP ($p=0.005$) and correlation was not statistically

significant between gender with Energy/fatigue ($p=0.899$), EW-B ($p=0.406$) and SF ($p=0.701$) as shown in Table 3.

Correlation of diagnosis with HRQOL in the study population using the Kruskal Wallis test.

Correlation of diagnosis with PCS

The evaluation revealed an insignificant correlation between diagnosis and PF ($p=0.637$), RLPF ($p=0.282$), pain ($p=0.875$) and GH ($p=0.632$) as shown in Table 3.

Correlation of diagnosis with MCS

The evaluation showed a positive correlation of diagnosis with energy/fatigue ($p=0.024$) and a negative correlation of diagnosis with RLEP ($p=0.323$), EW-B ($p=0.210$) and SF ($p=0.486$) as shown in Table 3.

DISCUSSION

The six-month prospective cross-sectional investigation was conducted in the inpatient cardiology department of Hubballi-based Vivekananda General Hospital. The study involved 170 patients, out of which 64(37.6%) were women and 106(62.4%) were males.

A mean age of 59.23 ± 12.09 was identified for the study population. The majority of participants, 55(32.4%), were in the 56-65 years of age group, while the least numbers, 11(6.5%) belonged to the 36-45 years of age group. A related investigation was carried out by (Shipra Jain *et al.*, 2017). Subjects aged 51-60 years were the majority and those 21-30 years were minimal in number. Of the 170 individuals in this study, 42(24.70%) persisted in drinking alcohol, 30(17.64%) persisted in smoking and 132(77.64%) chewed tobacco. In a related investigation (Bibirsa Sefera *et al.*, 2022), found that 62 individuals chewed gutka, 38 were smokers and 31 were those who consumed alcohol.

Our study observed the most frequently observed diagnoses were STEMI 63(37.1%), NSTEMI 60(35.3%), Unstable angina 27(15.9%), Complete Heart Block, Dilated cardiomyopathy, Rheumatic Heart Disease, Heart Failure of 4(2.4%), 6(3.5%), 8(4.7%) and 2(1.2%) respectively. DM 54(31.04%), along with HTN 91(52.3%), were the most frequently detected comorbidities, whereas AV block and pedal edema 1(0.57%) were the least common. The remaining comorbidities identified in the individuals included hypothyroidism 2(1.15%), old CVA hemiparesis 3(1.72%), RHD 4(2.3%) and IHD 18(10.35%). (Asmita *et al.*, 2021), conducted a similar study and the findings were similar. In our study sample, the proportion of people from urban and rural areas was 81 (47.6%) and 98 (52.4%), respectively. Of the subjects, 62 (77.5%) were from urban and 18 (22.5%) were from rural according to (Aikaterini *et al.*, 2021). Of the 170 individuals involved in the current study, 64(37.6%) had a normal body weight, 12(7.1%) were underweight, 83(48.8%)

Table 1: Clinical characteristics of patients (n=170).

Sl. No.	Categories	Subcategories	No. Of subjects n (%)
1.	Gender	Male Female	106(62.4%) 64(37.5%)
2.	Age	36-45 years 46-55 years 56-65 years 66-75 years 76-85 years	11(6.5%) 44(25.9%) 55(32.4%) 42(24.7%) 18(10.6%)
3.	Social habits	Smoker Alcoholic Tobacco chewers	30(17.6%) 42(24.7%) 132(7.6%)
4.	BMI	Underweight Normal weight Overweight Obesity	12(7.1%) 64(37.6%) 83(48.8%) 11(6.5%)
5.	Residence	Rural Urban	89(52.4%) 81 (47.6%)
6.	Diet	Vegetarian Non-vegetarian	70(41.2%) 100(58.8%)
7.	Diagnosis	STEMI NSTEMI Unstable angina Complete Heart Block Dilated Cardio Myopathy Rheumatic Heart Disease Heart Failure	63(37.1%) 60(35.3%) 27(15.9%) 4(2.4%) 6(3.5%) 8(4.7%) 2(1.2%)
8.	Comorbidities	Hypertension Diabetic mellitus Ischemic heart disease Rheumatic heart disease Old CVA hemiparesis Hypothyroidism Pedal oedema Atrioventricular block	91(62.3%) 54(31.04%) 18(10.35%) 4(1.72%) 3 (1.72%) 2 (1.15%) 1(0.57%) 1(0.57%)
9.	Social-economic status	Upper class Upper middle class Lower middle class Upper lower class Lower class	5(2.9%) 13(7.6%) 56(32.9%) 18(7.6%) 15(18.8%)
10.	Number of drugs prescribed	No Polypharmacy Polypharmacy Excessive Polypharmacy	11(6.5%) 132(77.6%) 27(15.9%)

were overweight and 11(6.5%) were obese. Yonas Getaye (Tefera et al., 2020), conducted a similar investigation with comparable findings.

We divided diets into two categories in our study: vegetarian and non-vegetarian. 70(41.2%) of the 170 participants were vegetarians, while the remaining 100(58.8%) were not. Comparable results were discovered in research that was carried out by (Dr. Francesca Crowe et al., 2013). Among the 170 participants in the study, 5(2.9%) belonged to the upper class, 13(7.6%) to the upper middle class, 56(32.9%) to the lower middle class, 81(47.6%) to the upper lower class and 15(8.8%) to the lower class. In a study (Atul Kumar et al., 2022). discovered similar results. No polypharmacy, polypharmacy and excessive polypharmacy were the classifications for the number of prescription medicines in this study, with 11(6.5%), 132(77.6%) and 27(15.9%) prescribed, respectively Comparable results were discovered in research that was carried out by Maire (O'Dwyer et al., 2016).

Our research used the paired sample *T*-test to assess differences across HRQOL categories with preference to age grouping, gender and diagnosis in CAD participants. In terms of indoor and outdoor physical limitations, anginal stability and burden, treatment-related experience, age ($p=0.000$), gender ($p=0.000$) and diagnosis ($p=0.000$), the test results showed a significant correlation. (Oluwaseyi et al., 2022), carried out a study that was comparable and the findings covered every aspect of the Seattle Angina Questionnaire. SAQ-CAN was helpful in comparing the health status of people with CAD across different population groups.

The Kruskal-Wallis test was used in this study to evaluate HRQOL variation across domains in relation to age grouping in patients with CVD. The test results in the PCS domain showed an insignificant link between GH ($p=0.930$) and pain ($p=0.254$), but a positive association between age and PF ($p=0.009$) and RLPF ($p=0.048$) components of HRQOL. The test results in the MCS

Table 2: Effect of various demographic and clinical factors on SAQ-CAN domains.

Grouping Variable		IPL	OPL	ASB	TRE
Age (Years)	36-45 years	58.9(14.9)*	62.18(12.4)*	63.36(11.4)*	63.81(6.9)*
	46-55 years	55.8(10.3)*	53.77(10.4)*	54.58(8.7)*	60.27(8.5)*
	56-65 years	40.13(8.1)*	45.52(9.3)*	47.88(7.5)*	52.58(8.6)*
	66-75 years	35.92(10)*	42.36(7.1)*	41.95(5.7)*	40.58(10.2)*
	76-85 years	26.72(6.6)*	37.72(10)*	35.72(8.2)*	30.81(7.2)*
Gender	Male	41.88(13.1)*	47.17(10.9)*	47.04(9.2)*	50.23(12.9)*
	Female	46.06(14.6)*	47.57(12.0)*	50.62(12.4)*	50.7(13.5)*
Diagnosis	STEMI	41.25(12.2)*	44.25(10.0)*	47.87(10.0)*	49.78(11.3)*
	NSTEMI	43.073(12.9)*	47.64(11.2)*	48.05(10.5)*	49.51(14.0)*
	Unstable angina	46.06(17.3)*	53.13(11.5)*	48.7(11.2)*	53.26(14.3)*

*Statistically Significant $p < 0.05$.

NB: IPL=Indoor Physical Limitation; OPL=Outdoor Physical Limitation; ASB=Angina Stability and Burden; TRE=Treatment-Related Experience.

Table 3: Effect of various demographic and clinical factors on SF-36 domains.

Variables	PCS				MCS			
	PF	RLPF	PAIN	GH	RLEP	ENERGY/FATIGUE	EW-B	SF
Age (Kruskal Wallis test)	15.254	11.185	6.577	1.35	14.246	4.414	3.26	8.802
<i>p</i> -value	0.009*	0.048*	0.254	0.93	0.014*	0.491	0.66	0.117
Gender (Mann-Whitney U test)	20	29.5	32.5	37	9.5	40.5	32	37.5
<i>p</i> -value	0.069	0.298	0.432	0.676	0.005*	0.899	0.406	0.701
Diagnosis (Kruskal Wallis test)	1.7	3.81	0.692	1.72	3.483	9.45	4.53	2.44
<i>p</i> -value	0.637	0.282	0.875	0.632	0.323	0.024*	0.210	0.486

PCS-Physical component summary, MCS-Mental component summary, PF-Physical functioning, RLPF-Role limitation due to physical health, GH-General health, RLEP-Role limitation due to emotional problem, EW-B- Emotional well-being, SF-Social functioning.

where showed an insignificant link with energy/fatigue ($p=0.491$), EW-B ($p=0.660$) and SF ($p=0.117$) but a positive correlation with age and RLEP ($p=0.014$). In this study, the Mann-Whitney U test is used to evaluate how people with CVD vary in HRQOL across domains with preference to gender. The test found an insignificant relationship between gender and PCS of HRQOL i.e., PF ($p=0.69$) as well as pain ($p=0.432$), GH ($p=0.676$) and RLPF ($p=0.298$). The test found an insignificant link with energy/fatigue ($p=0.899$), EW-B ($p=0.406$) and SF ($p=0.701$) in the MCS domain, but a positive correlation with RLEP ($p=0.005$).

Using the Kruskal Wallie's test, our study assessed the variation among HRQOL categories with preference to diagnosis in CVD participants. The test found no significant link between the PCS of HRQOL with diagnosis i.e., PF ($p=0.637$), RLPF ($p=0.282$), pain ($p=0.875$) and GH ($p=0.632$). The test found an insignificant link with RLEP ($p=0.323$), EW-B ($p=0.213$) and SF ($p=0.486$) in the MCS domain, but a good correlation with energy/fatigue ($p=0.024$). (Aikaterini *et al.*, 2021), conducted a study with comparable findings.

Our study had limitations as an SF36 instrument, which asks participants to subjectively report; this could result in over- or underreporting. A larger sample size and a longitudinal study are needed to further explore the HRQOL of CVD patients in the future.

CONCLUSION

We recruited 170 patients from Vivekananda General Hospital, Hubballi, who were admitted to the inpatient cardiology department. Emphasizing the influence of being overweight on the risk of cardiovascular illnesses, the studies also emphasized the prevalence of cardiovascular risk factors, including alcohol drinking, smoking and chewing gutka. Additionally, our observations underscored the association between comorbidities such as hypertension and diabetes mellitus with an increased risk of heart disease. Furthermore, the study delved into the assessment of HRQOL using SAQ-CAN and SF-36 questionnaires, revealing significant correlations based on age, gender and diagnosis. These insights contribute to a comprehensive understanding of cardiovascular health and patient well-being. Further research and tailored interventions may help mitigate these risks and improve the quality of life for individuals affected by cardiovascular conditions.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORS' CONTRIBUTION

Each author had equal responsibility for the study's conception, literature review's execution, manuscript writing and revision. The final draft of the paper has been read and authorized by all writers, who have also promised to take responsibility for the entire project.

ETHICAL CONSIDERATIONS

The written informed consent was acquired from each participant after Information regarding the study was provided to the patients and their families. The KLE College of Pharmacy Ethical Committee gave its approval to the study. (IEC Reference Number: KLECOPH/IEC/2023-24/06).

ABBREVIATIONS

CAD: Cardiovascular disease; **BMI:** Body mass index; **STEMI:** ST-elevation myocardial infarction; **NSTEMI:** Non-ST-elevation myocardial infarction; **HRQOL:** Health-related quality of life.

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