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CONCORDANCE BETWEEN DISEASE SEVERITY AND QUALITY OF LIFE IN HEART FAILURE PATIENTS

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Abstract

Background: Chronic disorders such as heart failure, which have a high impact on QoL, have become more common in recent decades. This study aimed to assess the quality of life in relation to degree of illness in patients with congestive heart failure. **Design:** A descriptive cross-sectional study was carried out among conveniently the governmental and health insurance hospitals in Port Said n=90. **Methods:** Quality of life (QoL) was evaluated by the Short Form-36 (SF-36) questionnaire, while severity of disease was measured by the New York Heart Association (NYHA) functional class I, II, III. Data were collected from June to August, 2021. **Results:** The mean of overall % score of QOL was 69.62 ± 3.60 . There was a moderate negative correlation between vitality domains quality of life, weak significant correlation in mental health domain $P=0.022$, overall QOL scores $p=0.008$ and severity NYHA heart disease. Multiple regression procedures found significant predictors of worst quality of life, including body mass index (BMI) $p=0.001$, $\beta=-0.355$, severity NYHA functional class $p<0.001$, $\beta=-2.782$, concomitant disease as hypertension $p=0.015$, $\beta=2.594$, anemia $p=0.002$, $\beta=4.593$. These findings suggest that Vitality domains may have a greater impact on quality of life in HF patients than mental health domain or other quality of life domains. **Conclusions:** The results show that Quality of life in heart failure deteriorates with disease severity, BMI, concomitant disease as hypertension and, anemia with age. These data show a relationship between HRQL and disease severity obtained by NYHA functional status.

Keywords: New York Heart Association, Short form (SF-36), Heart Failure, Quality Of Life
抽象的

背景：近几十年来，对生活质量有很大影响的心力衰竭等慢性疾病变得越来越普遍。本研究旨在评估充血性心力衰竭患者与疾病程度相关的生活质量。设计：在塞得港 n = 90 的政府和健康保险医院之间方便地进行了描述性横断面研究。方法：生活质量 (QoL) 通过 Short Form-36 (SF-36) 问卷进行评估，而疾病严重程度通过纽约心脏协会 (NYHA) 功能等级 I、II、III 进行测量。数据收集时间为 2021 年 6 月至 8 月。结果：QOL 总得分的平均值为 69.62 ± 3.60 。活力领域的生活质量呈中度负相关，心理健康领域的弱显著相关性 $P = 0.022$ ，总体 QOL 得分 p

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= 0.008 和严重程度的 NYHA 心脏病。多元回归程序发现了最差生活质量的显著预测因子，包括体重指数 (BMI) $p=0.001$, $\beta=-0.355$, NYHA 功能分级严重程度 $p<0.001$, $\beta=-2.782$, 伴随疾病为高血压 $p=0.015$, $\beta=2.594$, 贫血 $p=0.002$, $\beta=4.593$ 。这些发现表明，与心理健康领域或其他生活质量领域相比，活力领域可能对 HF 患者的生活质量产生更大的影响。结论：结果表明，心力衰竭患者的生活质量随着疾病严重程度、BMI、伴随疾病如高血压和贫血而随着年龄的增长而恶化。这些数据显示了 HRQL 与通过 NYHA 功能状态获得的疾病严重程度之间的关系。

关键词：纽约心脏协会，简表 (SF-36)，心力衰竭，生活质量

Introduction

Heart failure (HF) is a worldwide public health issue that affects over 26 million people, with 550,000 new cases diagnosed each year. As a global epidemic, prevalence is still rising, with the number of persons infected in the United States anticipated to reach 8 million by 2030 [1]. Heart failure is a critical ailment for which there is typically no treatment [2]. When heart failure is treated with drugs and healthy lifestyle adjustments, however, many people with the illness can live a long and joyful life [3]. HF is thought to be the final common pathway for many cardiovascular illnesses, and the prevalence of HF is rising in low- and middle-income countries [4-5]. An illness's effects frequently extend beyond clinical outcomes like mortality and morbidity to subjective health related quality of life (HRQoL) metrics [6]. HRQoL is a multi-dimensional concept that encompasses areas such as physical, mental, social, and emotional health. There are several HRQoL measurement instruments available, some of which are generic and others of which are condition specific. Generic HRQoL measures (such as the SF-36 (36-item Short-Form Health Survey), SF-6D (Short-Form 6 Dimension) derived from the SF-36, and EQ-5D (Euro QoL- 5 Dimension)) are commonly used to assess multi-dimensional aspects of health and well-being in various populations [7]. Many studies in underdeveloped countries have found that individuals with cardiac distress and disability [8] have a lower quality of life and are two times more likely to die following a cardiac incident [9]. The most widely used system to describe the impact of heart failure on a patient's everyday activities is the New York Heart Association (NYHA) classification. [10] The classification system was created in 1928 and has since been updated [11]. It divides heart failure patients into four groups (I, II, III, and IV), with the higher categories reflecting more severe symptoms, limitations in physical activity, and poor health. Clinicians determine the NYHA class based on their indirect interpretation of reported patient symptoms, medical history, and clinical test results on heart anatomy and function [12], [13] The NYHA class assigned by a physician has been demonstrated to predict outcomes in heart failure, such as hospitalization and mortality. [14] Because the NYHA classification is based on doctors' subjective assessments of symptoms and clinical data, there is a lot of Interobserver variability [15]. Health related quality of life is a significant indicator in the treatment of heart failure patients. Patients' physical, social, spiritual, emotional, and economic components of life may be harmed as a result of their lack of understanding, which may

reduce their compliance and coping abilities [16]. Numerous physical, mental, and social aspects influence health-related quality of life, which is viewed differently by each person [17]. In order to promote patient-centered care, a standardized assessment of HR-QoL is important [18]. It prioritizes the patient's viewpoint and can pinpoint areas of particular need. This makes collaborative decision-making easier and ensures that the patient's preferences are taken into account when making decisions. This study sought to assess the quality of life in relation to degree of illness in patients with congestive heart failure.

Materials and methods

Heart failure patients attending outpatient clinic and medical department at Al-Salam, Health insurance hospital, and Port Fouad hospital in Port Said city – Egypt from June to August, 2021 were invited to participate. This was a cross-sectional approach carried out on 90 patients in those setting for a CHF examination. The sampling technique used was convenience sampling. Patients with neurological, peripheral vascular, orthopedic, and pulmonary disease, as well as those with New York Heart Association (NYHA) functional class IV, were excluded. The NYHA classification was established in all of the cases. This study includes 90 of the original 100 patients. The HRQOL questionnaire was not completed by 10 patients, thus they were excluded. Patients who were recruited signed an informed consent form that had been authorized by the institute's Ethical Committee.

Instruments

Two data collection instruments, namely, the 36-item Short-Form patient questionnaire to measure QOL and the New York Heart Association (NYHA) functional, were used to measure severity of disease, and to identify the patients' health status [10]. In addition, selected demographic variables such as age, gender, and level of education were included in the questionnaire. The SF-36 is a generic scale for assessing quality of life. With only 36 questions, it yields an 8-scale profile of functional health and well-being scores: Physical Functioning (PF), role limitations due to physical problems (RP), Bodily Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), role limitations due to emotional problems (RE), and Mental Health (MH), [19]. The results of the SF-36 questionnaire were transformed to a scale of 0 to 100, with a higher score indicating a higher quality of life [20-21]. It has internal consistency of the questionnaire is 0.8, and good test–retest reliability. It takes about 5–10 minutes to administer SF-36. When patients were unable to fill out the scales on their own due to visual impairment, the researchers would assist them without interfering

Statistical analysis

SPSS 20.0 (Armonk, NY: IBM Corp) was used to make analysis. The Kolmogorov-Smirnov test was employed to ensure that quantitative data was normal. To compare various groups, use the Chi-square test for categorical data. Monte Carlo is a resort town in Monaco. F-test (ANOVA) for normally distributed quantitative variables to compare between more than two groups regression to discover the most independent/ influencing factor for affecting QQL when more than 20% of the cells have expected count less than 5.

Results

Shows the mean of overall % score of QOL was 69.62 ± 3.60 , which mean a moderate level of quality of life score. There were significant relationship between overall % score of QOL and the variables of

age, gender, body mass index, level of education, and concomitant disease related hypertension and diabetes mellitus. Patients, who had age less than 60 year old, were male, obese, concomitant disease related hypertension and diabetes mellitus and illiterate education level had the lowest mean score of quality of life **table (1)**.

Table (1): Relation between overall % score of QOL and demographic data

Demographic data	% score of QOL	Test Sig.	of p
	Mean \pm SD.		
Type of work			
Employee	68.95 \pm 3.11	F= 1.285	0.282
Handwork	69.80 \pm 3.77		
Not working	70.29 \pm 3.99		
Age			
<60	69.22 \pm 3.32	t= 2.411*	0.018*
>60	71.61 \pm 4.40		
Gender			
Males	68.78 \pm 3.63	t= 2.107*	0.038*
Females	70.35 \pm 3.46		
BMI			
Underweight	69.24 \pm 2.45	F= 17.100*	<0.001*
Normal	71.59 \pm 3.01		
Overweight	68.88 \pm 2.67		
Obese	65.17 \pm 3.26		
Social Status			
Single	70.41 \pm 2.44	F= 0.530	0.590
Married	69.70 \pm 3.85		
Divorced	68.84 \pm 2.82		
Residence			
Wife	69.98 \pm 3.59	F= 1.560	0.216
Children	68.25 \pm 3.11		
Relatives	68.97 \pm 4.42		
Income			
Sufficient	69.63 \pm 3.68	t= 0.094	0.926
Insufficient	69.54 \pm 3.34		
Educational Level			
Illiterate	68.63 \pm 2.44	F= 3.816*	0.013*
Basic	73.56		
Secondary	68.76 \pm 3.40		
University	71.16 \pm 3.87		
Smoking			

Yes	69.79 ± 3.46	t=	0.623
No	69.42 ± 3.79		
Concomitant disease #			
Diabetes mellitus	68.47 ± 3.49	t=2.946*	0.004*
Hypertension	68.95 ± 2.82	t=2.280*	0.029*
Renal disease	69.56 ± 3.62	t=0.155	0.877
Anemia	68.29 ± 3.39	t=1.443	0.152

SD: Standard deviation

t: Student t-test

F: F for ANOVA test

*: Statistically significant at $p \leq 0.05$

#: More Than one answer

Table (2) is a relation between NYHA functional class and demographic data. The study revealed that patients age younger than 60 years old, secondary level of education, smokers and patients with concomitant disease as hypertension, renal disease, anemia were statistically significant variables associated with the higher percentage for sever level of disease NYHA classification III (81.3 %, 90.6 %, 75.0%, 67.3%, 78.1% respectively). While, married patients 85.7% was statistically significant variables associated with the higher percentage for sever level of disease NYHA classification II.

Table 2: Relation between NYHA Classification and demographic data and clinical profile of participants

Demographic data	NYHA Classification						χ^2	p
	Class I (n = 9)		Class II (n = 49)		Class III (n = 32)			
	Mean ± SD.	Mean ± SD.	Mean ± SD.	Mean ± SD.	Mean ± SD.	Mean ± SD.		
Type of work								
Employee	2	22.2	22	44.9	15	46.9	2.156	MC p= 0.733
Handwork	2	22.2	9	18.4	6	18.8		
Not working	5	55.6	18	36.7	11	34.4		
Age								
<60	4	44.4	45	91.8	26	81.3	12.451*	0.002*
>60	5	55.6	4	8.2	6	18.8		
Gender								
Males	3	33.3	21	42.9	18	56.3	2.068	MC p= 0.351
Females	6	66.7	28	57.1	14	43.8		
BMI								
Underweight	1	11.1	5	10.2	3	9.4	8.702	MC p= 0.154
Normal	8	88.9	20	40.8	13	40.6		
Overweight	0	0.0	15	30.6	12	37.5		
Obese	0	0.0	9	18.4	4	12.5		

Social Status								
Single	1	11.1	3	6.1	3	9.4	11.555*	MC p= 0.010*
Married	8	88.9	42	85.7	18	56.3		
Divorced	0	0.0	4	8.2	11	34.4		
Residence								
Wife	8	88.9	39	79.6	21	65.6	4.143	MC p= 0.347
Children	0	0.0	7	14.3	8	25.0		
Relatives	1	11.1	3	6.1	3	9.4		
Income								
Sufficient	9	100.0	36	73.5	29	90.6	6.060*	0.048*
Insuff.	0	0.0	13	26.5	3	9.4		
Educational Level								
Illiterate	0	0.0	15	30.6	0	0.0	26.773*	MC p <0.001*
Basic	0	0.0	1	2.0	0	0.0		
Secondary	2	22.2	17	34.7	24	75.0		
University	7	77.8	16	32.7	8	25.0		
Smoking								
Yes	4	44.4	33	67.3	11	34.4	8.762*	MC p= 0.013*
No	5	55.6	16	32.7	21	65.6		
Concomitant disease #								
Diabetes mellitus	1	11.1	24	49.0	17	53.1	5.208	MC p=0.074
Hypertension	3	33.3	35	71.4	25	78.1	6.815*	0.033*
Renal disease	2	22.2	32	65.3	13	40.6	8.175*	0.014*
Anemia	0	0.0	12	24.5	1	3.1	8.095*	MC p=0.012*

#: More Than one answer

 χ^2 : Chi square test

MC: Monte Carlo

*: Statistically significant at $p \leq 0.05$

Table (3) is the Quality of life as assessed by the short form SF-36 scores was lowest mean score for patients in NYHA functional class III, and there were only significant differences in scores between NYHA functional Classification classes, vitality, mental health domains, and Overall QOL score (0.001, <0.001, <0.001 respectively). Spearman correlation analyses revealed that moderate negative correlation between severity of disease NYHA functional status Vitality domains ($r = -0.300$, $P = 0.004$), **table (4)**. There were weak significant correlation in mental health domain ($r = -0.240$, $P = 0.022$), Overall QOL scores ($r = -0.278$, $P = 0.008$). Though, there was no significant correlation between general health, physical functioning, and role in physical, role in emotional health, social activities and severity of disease. **Table 5** shows the multivariate linear regression analysis body mass index (BMI) ($p = 0.001$, $\beta = -0.355$) NYHA functional class ($p < 0.001$, $\beta = -2.782$), concomitant disease as hypertension ($p = 0.015$, $\beta = 2.594$), anemia ($p = 0.002$, $\beta = 4.593$) were independent predictors negatively associated with total quality of life score ($p < 0.001$).

Table 3: Relation between NYHA Classification and totals scores of quality of life

Quality of life	NYHA Classification			F	p
	Class (n = 9)	Class II (n = 49)	Class III (n = 32)		
	Mean ± SD.	Mean ± SD.	Mean ± SD.		
General health	48.89±6.01	47.40±4.62	45.71±4.14	2.597	0.080
Physical functioning	76.67±11.30	71.35±13.14	69.59±9.12	1.635	0.201
Role limitations due to physical health	88.89±4.17	86.72±3.07	86.48±5.0	1.187	0.310
Role limitations due to emotional health	100.0±0.0	99.48±2.95	98.30±7.01	0.651	0.524
Social Activities	62.22±13.94	62.04±11.72	60.31±12.31	0.216	0.806
Pain	44.44±5.89	41.67±5.99	41.33±6.12	1.014	0.367
Vitality	95.56±5.27	78.98±14.07	75.16±15.21	7.551*	0.001*
Mental health	87.11±5.58	69.63±11.84	69.31±8.58	13.558*	<0.001*
Overall QOL	75.47±2.37	68.97±3.17	68.96±3.03	18.350*	<0.001*

F: F for One way ANOVA test

*: Statistically significant at $p \leq 0.05$

Table 4: Correlation between NYHA Classification and totals scores of quality of life

Quality of life	NYHA Classification	
	r_s	p
General health	0.056	0.602
Physical functioning	-0.024	0.822
Role limitations due to physical health	-0.150	0.159
Role limitations due to emotional health	0.015	0.889
Social Activities	-0.066	0.537
Pain	-0.066	0.539
Vitality	-0.300*	0.004*
Mental health	-0.240*	0.022*
Overall QOL	-0.278*	0.008*

r_s : Spearman coefficient

*: Statistically significant at $p \leq 0.05$

Table 5: Multivariate Linear regression analysis for the parameters affecting totals scores of QOL (n = 90) for different parameters

	#Multivariate	
	p	B (95%C.I/ LL- UL)
Age	0.508	0.031(-0.062 – 0.124)
Educational Level	0.055	0.936(-0.020 - 1.892)

concomitant disease		
Diabetes mellitus	0.280	-1.161 (-3.283 – 0.961)
Hypertension	0.015*	-2.594 (-4.681 - -0.508)
Anemia	0.002*	-4.593 (-7.384- -1.802)
BMI	0.001*	-0.355(-0.551 – -0.160)
NYHA Classification	<0.001*	-2.782 (-4.299 - -1.264)

$R^2 = 0.456$, $F = 9.813^*$, $p < 0.001^*$ B: Unstandardized Coefficients

C.I: Confidence interval LL: Lower limit UL: Upper Limit *: Statistically significant at $p \leq 0.05$

Discussion

This study was conducted to assess the quality of life in relation to degree of illness in patients with heart failure. Findings from this study show that quality of life as assessed by the short form SF-36 scores was lowest mean score for patients in NYHA functional class III, and there were significant differences in scores between NYHA functional classes, vitality, mental health domains, and overall quality of life score. These findings are in line with the findings of a two-week study of HF patients, which indicated that depression predicted both physical and emotional quality of life, whereas NYHA functional class predicted only physical quality of life [22], while, other study [23] revealed, higher levels of depression were linked to a lower quality of life. The findings of this study revealed that patients who had age less than 60 year old, were male, obese, concomitant disease related hypertension and diabetes mellitus and illiterate level of education had low mean score of quality of life, this finding inconsistent with [24]. Reduced quality of life is predicted by education level and its tight relationship with socioeconomic status [25-26]. One probable explanation is that a lack of financial resources combined with an inability to comprehend medical instructions leads to a lack of treatment adherence and, as a result, poor illness management effectiveness. In terms of age, HF patients under the age of 60 had a worse quality of life than more than 60 years old, according to the findings. Given that the risk of heart failure rises with age, researchers believe that older patients with a variety of restrictions, such as cognitive impairment, loss of personal autonomy, anxiety, or depression, will have a lower quality of life. However, [27] found no link between age, gender, and quality of life among hospitalized patients. Depressive symptoms, a higher NYHA class, lower income, and a longer duration of heart failure were also found to be independent predictors of poor quality of life in the same studies. This study discovered a link between patients age younger than 60 years old, secondary level of education, smokers and patients with concomitant disease as hypertension, renal disease, and anemia and severity level of NYHA functional class. One [28] study explored a link between ventricular function (as measured by the NYHA functional class), anxiety symptoms, male sex, age under 60, lower education, lower monthly family income, recurrent hospitalization and comorbidities (such as arterial hypertension and ischemic heart disease), and current medication use (betablockers, ACE, and furosemide) and poorer QoL in HF outpatients. Our findings corroborated previous findings [29], as NYHA functional class III exacerbated all aspects of Minnesota Living with Heart Failure, and anxiety symptoms, in combination with age under 60, influenced the occurrence of a lower score directly or indirectly. The present study found that there were only significant differences in scores between NYHA functional Classification classes, vitality, mental health domains, and Overall QOL score, while

other study found that [30] mentioned HR-QoL ratings were substantially linked with NYHA class, particularly when tested with disease-specific measures. However, HR-QoL levels varied greatly within each NYHA class. This shows that at the individual level, the NYHA class does not represent all aspects of HR-QOL. According to, multivariate linear regression analysis body mass index (BMI), NYHA functional class, concomitant disease as hypertension, anemia were independent predictors negatively associated with total quality of life score. This result consistent with [30] NYHA class has been found to be an independent predictor of HR-QoL. However, [31] explored persistent anxiety, depression, and greater levels of New York Heart Association functional class were all found to be independent predictors of both Physical and Mental Component Summary in multiple regression models. In a study by [32] found that hypertension is adjustable and has a negative relationship with QOL, raising the idea that more extensive hypertension therapy could improve QOL. A patient's experience of hypertension, on the other hand, is a combination of not just hypertension symptoms and hypertension-mediated organ damage (HMOD), but also any antihypertensive therapy side effects. Which of these is the most dominant contributor to this negative association with QOL requires a thorough study of both drug side effects and the degree of HMOD in these patients, or atrial of anti-hypertensive therapy specifically in this cohort, while [24] found that patients with additional disorders and those who had previously been hospitalized had worse physical conditions, according to the data. Comorbidities in HF patients, such as diabetes, peripheral vascular disease, and cerebrovascular illness, are linked to lower activity levels, hospitalization, and higher health-care costs [33] so that it is hoped that using NYHA functional class can improve of heart failure patients and can deliver nursing interventions in accordance with this classification

Conclusion

In conclusion, the results show that the level of quality of life of heart failure subjects deteriorates considerably with increasing severity of disease. A younger 60 years old, BMI, associated disease as hypertension, anemia also affected the heart failure subjects' QL. As a result, understanding these factors might help guide HF patients' evaluation and therapy.

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Conflict of interest

There are no competing interests declared by the author.

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