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Original article

Impact of Ejection Fraction on Health-Related Quality of Life Sub-Scales in Heart Failure Patients: A Comparative Analysis

Rokiea Abdlgader

Department of Cardiology, Albyda Medical Center, Albyda, Libya
Corresponding author. rokiea33@yahoo.com

ABSTRACT
The primary goal of this study is to identify any associations between ejection fraction and several components of HRQOL, including mental, social, and physical well-being. The study evaluated patients' quality of life (QOL) in ambulatory heart failure clinics as a component of a quality improvement intervention. We assessed the effect of heart failure on patients' quality of life using the Minnesota Living with Heart Failure Questionnaire (MLHFQ). Subjects provided their informed consent and completed questionnaires that measured quality of life and family support as part of the research. There are no statistically significant differences between patients with EF ≤ 40% and those with EF > 40% across all variables measured. Patients with EF ≤ 40% had significantly worse scores in all HRQOL subscales (Physical, emotional, and other) compared to those with EF > 40%. The higher scores in the EF ≤ 40% group suggest worse quality of life in physical, emotional, and other aspects. The study reveals a link between lower ejection fraction (EF ≤ 40%) and poorer HRQOL, which points to the importance of targeted interventions and comprehensive care approaches to improve HRQOL outcomes.
Keywords. Ejection Fraction, Health-Related Quality of Life, Heart Failure.

Introduction

Patients with heart failure with reduced ejection fraction (HFrEF) have a higher mortality rate and are hospitalized. which also hurts function and HRQoL [1]. Little is known about the impact of these therapies on HRQoL, despite the availability of several validated instruments to assess HRQoL in patients with heart failure [2]. Although the overall impact of decreased HRQOL is equivalent in both heart failure with preserved ejection fraction (HFpEF) and heart failure with reduced ejection fraction (HFrEF), the majority of health status data in heart failure is predominantly from patients who have heart failure with reduced ejection fraction (HFrEF) [2].

Quality of Life (QOL) is a broad notion regarding the extent to which a condition restricts individuals' capacity to perform typical roles. Multiple factors contribute to the reduced quality of life in this vulnerable population, including heart failure exacerbations, concurrent symptoms, frequent readmissions, bleak prognosis, inadequate self-care, low socioeconomic position, limited familial or social support, and information deficits regarding illness management. From the patients' viewpoints, the fundamental quality of life-related concerns encompass autonomy in everyday activities, physical and cognitive disabilities, symptom control, mental health, and hospital admissions [2].

Despite advances in medication and treatment choices, heart failure (HF) is still associated with a worse QOL and increased mortality rates.[3]. Clinical symptoms like dyspnea and fatigue, limitations in daily activities, and mental states like worry and sadness may all impact the health-related quality of life (HRQOL) of heart failure patients. The absence of improvement, rehospitalization, and mortality were significantly predicted by the absence of an improvement in quality of life throughout the recovery period [3].. Research by Riegel et al. (2018) found that there are many variables that affect heart failure patients' quality of life. Some of these determinants include the patient's age, gender, social support system, marital status, and duration of heart failure. Ejection percent was shown to impact quality of life in an independent study. Anderson et al.[3]. found that individuals with heart failure had a similar quality of life with preserved or reduced ejection fraction. Regardless, research suggests that HFpEF patients have a worse quality of life compared to HFrEF patients regarding heart failure [4]. The outcomes they get from the research are still all over the place. Patients with congestive heart failure (CHF) with both HFpEF and HFrEF will be studied in this study to identify the factors that impact their health-related quality of life (HRQOL).

Material and method

Study design and Patient population

A cross-sectional study was conducted among patients who were enrolled in the study and were in hospitals. As part of an effort to improve the quality of care, all patients who attended the ambulatory heart failure clinic at the hospital were strongly encouraged to fill out a questionnaire that assessed their quality of life. The left ventricular ejection fraction (LVEF) is normal when it is greater than 50%. An LVEF that falls between 40% and 50% is intermediate, while an LVEF that falls below 40% is considered to be reduced. The patients who had previously displayed echocardiographic evidence of HFrEF were identified by HF with better EF. However, their left ventricular ejection fractions (LVEFs) improved to a minimum of fifty percent by the time they visited the study clinic.

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Questionnaire design and QOL assessment

The MLHFQ comprises 21 targeted questions categorized into physical, emotional, and additional areas to assess the effects of heart failure. Each item is evaluated on a 0–5 Likert scale, with 0 representing no influence and 5 indicating a significant impact. The overall score quantifies the effect of heart failure on a patient's quality of life. The formal study operations commenced following the acquisition of approval from the relevant hospital. The information collected by the investigators regarding the ejection % that was provided to them was stored in a database. Patients who were identified as having heart failure were included in the database. The individuals who had already registered and were receiving treatment as cardiac outpatients were the ones who were visited by the researchers.

Every single patient who was eligible to participate in the study was provided with a clear summary of the research aims, procedures, and the numerous participation alternatives that were available to them. After the participants had indicated that they were willing to take part in the research project, they were given a form to fill out, which required them to give their informed consent. Questions concerning the participants' demographic information, as well as their quality of life and the support they received from their families, were included in the surveys. As soon as all of the respondents had finished filling out the questionnaire, the researcher checked their responses to make sure that they were completed correctly.

Sample size calculation

In accordance with the results of Moradi et al. 12, the sample size was computed. The sample size was established on the basis of the fact that the average score for quality of life was 44.1. A total of seventy patients were involved in this examination, as demonstrated by the conclusions of the study by the researchers. The ultimate sample size that was to be recorded for the research consisted of a total of seventy patients, as shown by the equation that is presented below. Using the following formula, the sample size was determined: At a power of 80%, the sample size is equal to Z1 a/2 2 p (1-p) /d2.

Results

Table 1 presents the demographic, social, and clinical characteristics of patients according to ejection fraction (EF), categorized as less than 40% and greater than 40%. Across all variables studied, no statistically significant differences were observed between the two groups (all p-values > 0.05). Nevertheless, several patterns emerged that may hold clinical relevance.

With respect to gender distribution, males were more prevalent in the EF < 40% group (64.5%) compared to the EF > 40% group (53.8%), whereas females were more common in the higher EF category (46.2% vs. 35.5%). Although this trend suggested a possible difference in gender composition, the association was not statistically significant (p = 0.256).

Age distribution revealed that the majority of patients in both EF groups were between 66 and 75 years, accounting for 38.7% of the EF < 40% group and 43.6% of the EF > 40% group. Younger patients aged 35–45 years were more frequently represented in the reduced EF group (12.9%) compared to the preserved EF group (2.6%), while patients aged 86–95 years were observed only in the EF > 40% category. These findings suggest potential age-related differences in EF status, though the variation was not statistically significant (p = 0.188).

Employment status showed that a larger proportion of patients in the EF < 40% group were classified as unable to work due to disability or health issues (38.7%) compared to 23.1% in the EF > 40% group. Conversely, housewives were more common in the EF > 40% group (38.5% vs. 19.4%). These differences may reflect socioeconomic or functional influences on EF status, but again, the association was not statistically significant (p = 0.364).

Educational attainment was similar across both groups, with the majority reporting some level of schooling (80.6% in EF < 40% and 76.9% in EF > 40%). A small proportion reported no education, while others indicated intermediate or higher levels. No significant differences were observed between groups (p = 0.658).

Regarding illness duration, most patients in both EF categories had disease durations between one and five years (58.1% in EF < 40% and 48.7% in EF > 40%). Interestingly, 12.8% of patients in the EF > 40% group reported illness lasting five years or more, whereas none in the EF < 40% group had such a prolonged disease history. This trend may suggest that patients with longer disease duration could have better-managed conditions or preserved EF, although the difference was not statistically significant (p = 0.116).

Finally, nearly all patients reported receiving familial assistance. In the EF < 40% group, 96.8% indicated family support, while all patients in the EF > 40% group reported such assistance. Although not statistically significant (p = 0.443), this finding highlights the high level of family involvement, which may contribute positively to adherence to therapy and emotional well-being regardless of EF status.

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Table 1. Sociodemographic characteristics, medical condition, and family support of HF patients with ejection fraction

Gender	Ejection Fraction (%)		Total (Count, %)	p
	≤ 40 %	> 40 %		
Female	11 (35.5%)	18 (46.2%)	29 (41.4%)	0.256
Male	20 (64.5%)	21 (53.8%)	41 (58.6%)	
Total	31 (44.3%)	39 (55.7%)	70 (100.0%)	
Age				
35-45	4 (12.9%)	1 (2.6%)	5 (7.1%)	0.188
46-55	5 (16.1%)	6 (15.4%)	11 (15.7%)	
56-65	5 (16.1%)	11 (28.2%)	16 (22.9%)	
66-75	12 (38.7%)	17 (43.6%)	29 (41.4%)	
76-85	5 (16.1%)	2 (5.1%)	7 (10.0%)	
86-95	0 (0.0%)	2 (5.1%)	2 (2.9%)	
TOTAL	31 (44.3%)	39 (55.7%)	70 (100.0%)	
Employment				
Teacher	9 (29.0%)	8 (20.5%)	17 (24.3%)	0.364
Housewife	6 (19.4%)	15 (38.5%)	21 (30.0%)	
Policeman	3 (9.7%)	5 (12.8%)	8 (11.4%)	
Retarded	12 (38.7%)	9 (23.1%)	21 (30.0%)	
Businessman	1 (3.2%)	2 (5.1%)	3 (4.3%)	
Total	31 (44.3%)	39 (55.7%)	70 (100.0%)	
Education				
NO	4 (12.9%)	4 (10.3%)	8 (11.4%)	0.658
YES	25 (80.6%)	30 (76.9%)	55 (78.6%)	
Male	2 (6.5%)	5 (12.8%)	7 (10%)	
Total	31 (44.3%)	39 (55.7%)	70 (100%)	
Duration				
≥1 year	13 (41.9%)	15 (38.5%)	28 (40.0%)	0.116
1-5 years	18 (58.1%)	19 (48.7%)	37 (52.9%)	
≥ 5 years	0 (0.0%)	5 (12.8%)	5 (7.1%)	
Total	31 (44.3%)	39 (55.7%)	70 (100.0%)	
Family Support				
NO	1 (3.2%)	0 (0.0%)	1 (1.4%)	0.443
YES	30 (96.8%)	39 (100.0%)	69 (98%)	
Total	31 (44.3%)	39 (55.7%)	70 (100%)	

p≤0.05 significant

Table 2 displays data comparing HRQOL sub-scales across two patient groups categorized by their Ejection Fraction (EF) levels: Patients with an ejection fraction (EF) of 40% or less exhibited markedly inferior scores across all HRQOL sub-scales (Physical, Emotional, and Other) in comparison to those with an EF exceeding 40%. The elevated scores in the EF ≤ 40% cohort indicate a diminished quality of life in physical, emotional, and various other dimensions.

Table 2. The association between HRQOL with the ejection fraction.

HRQOL Sub-Scale	Ejection Fraction (%)		T	P
	≤ 40 %	> 40 %		
physical	23.74 ± 4.11	10.90 ± 4.52	12.287	0.000*
emotional	11.74 ± 2.50	6.08 ± 2.61	9.186	0.000*
social	17.81 ± 2.98	10.33 ± 3.61	9.281	0.000*

T: independent t-test; P: ≤0.05 significant

Discussion

The present study categorizes patients according to ejection fraction (EF) and evaluates health-related quality of life (HRQOL) using the Minnesota Living with Heart Failure Questionnaire (MLHFQ). Patients with EF ≤ 40% scored substantially lower across all three HRQOL domains—physical, emotional, and other—compared to those with EF ≥ 40%. In this context, higher MLHFQ scores reflect greater impairment, indicating that reduced EF is associated with a decline in quality of life. The MLHFQ, comprising 21 items scored on a Likert scale from 0 ("not at all") to 5 ("very much"), provides a validated measure of the impact of heart failure on patients' daily lives.

Our findings are consistent with those of Chen et al. [5], who assessed HRQOL in heart failure patients using the MLHFQ and categorized participants into three EF groups: HFrEF (<40%), HFmrEF (40–49%), and

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HFpEF (≥50%). Their study demonstrated significant differences in total and subscale scores, with HFrEF patients reporting the poorest HRQOL across all domains.

Similarly, Khaidirman et al. [5] investigated the relationship between reduced EF and left ventricular diastolic dysfunction, reporting a statistically significant correlation ($p = 0.040$) between the severity of diastolic dysfunction and diminished HRQOL. Their findings highlight that higher E/A and E/e′ ratios, reflecting increased left ventricular filling pressures, are associated with poorer quality of life in patients with HFrEF.

Contrasting evidence has been reported in other studies. For example, one MLHFQ-based analysis found minimal differences in HRQOL between HFrEF and HFmrEF, while HFpEF patients demonstrated the lowest HRQOL scores [6,7]. In some cohorts, HRQOL was similarly impaired across all EF categories, with no significant differences in total or emotional scores [8,9]. These discrepancies may be attributable to variations in study design, patient populations, comorbidities, and the instruments used to assess HRQOL.

Cameli et al. [10] further explored the relationship between MLHFQ scores and left atrial function measured by speckle-tracking echocardiography. They reported a strong correlation between reduced atrial strain and poorer HRQOL ($r = -0.87$; $p < 0.0001$), although no significant associations were observed with LVEF, E/A, or E/e′ ratios. This suggests that atrial function may play an independent role in determining patient-reported outcomes.

Taken together, the literature demonstrates that HRQOL in heart failure patients is consistently impaired, though the degree of impairment varies across EF categories and study populations. Differences in assessment tools, sample sizes, and clinical characteristics likely contribute to the variability observed. These findings underscore the importance of incorporating patient-reported outcomes into clinical evaluation and highlight the need for comprehensive management strategies to mitigate the impact of heart failure on quality of life.

Conclusion

The study reveals a link between lower ejection fraction (EF ≤ 40%) and poorer HRQOL, emphasizing the need for targeted interventions and comprehensive care approaches to improve HRQOL outcomes.

References

1. Cameli M, Sciaccaluga C, Loiacono F, Sparla S, Iardino E, Valentini S, et al. The analysis of left atrial function predicts the severity of functional impairment in chronic heart failure: The FLASH multicenter study. Int J Cardiol. 2019;286:87-91.
2. Nizamitdinovich KS, Alisherovna KM. Quality of Life in Patients with Chronic Heart Failure, After Cardiac Resynchronization Therapy. Tex J Med Sci. 2022;14:168-73.
3. Anderson T, Dangl M, Anderson SD, Brooks D, Parajuli P, Gallagher R, et al. Quality of life is equally impaired in reduced and preserved ejection fraction heart failure after hospitalization. J Card Fail. 2013;19(8):S41-2.
4. Shah SJ, Kitzman DW, Borlaug BA, van Heerebeek L, Zile MR, Kass DA, et al. Phenotype-specific treatment of heart failure with preserved ejection fraction: a multiorgan roadmap. Circulation. 2016;134(1):73-90.
5. Chen X, Xin Y, Hu W, Zhao Y, Zhang Z, Zhou Y. Quality of life and outcomes in heart failure patients with ejection fractions in different ranges. PLoS One. 2019;14(6):e0218983.
6. Lawson CA, Benson L, Squire I, Seferovic PM, Daw P, Khatib R, et al. Changing health related quality of life and outcomes in heart failure by age, sex and subtype. EClinicalMedicine. 2023;64:102210.
7. Gastelurrutia P, Lupón J, Moliner P, Domingo M, Santiago-Vacas E, Zamora E, et al. Comorbidities, fragility, and quality of life in heart failure patients with midrange ejection fraction. Mayo Clin Proc Innov Qual Outcomes. 2018;2(2):176-85.
8. Lewis EF, Lamas GA, O'Meara E, Granger CB, Dunlap ME, McKelvie RS, et al. Characterization of health-related quality of life in heart failure patients with preserved versus low ejection fraction in CHARM. Eur J Heart Fail. 2007;9(1):83-91.
9. Rickenbacher P, Kaufmann BA, Maeder MT, Bernheim A, Goetschalckx K, Pfister O, et al. Heart failure with mid-range ejection fraction: a distinct clinical entity? Insights from the Trial of Intensified versus standard Medical therapy in Elderly patients with Congestive Heart Failure (TIME-CHF). Eur J Heart Fail. 2017;19(12):1586-96

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