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Research Article

A Study of the Quality of Life and Related Factors in Re-Hospitalized Patients with Heart Failure

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Abstract

Background: The factors influencing rehospitalization of heart failure patients include dietary noncompliance, medication nonadherence, lack of social support, and poor self-care behaviors, which in turn affect patient treatment adherence, socioeconomic status, quality of healthcare, and quality of life. Therefore, the purpose of this study explored the quality of life of rehospitalized heart failure patients and associated factors.

Objectives: The main purpose of this study was to explore the quality of life and associated factors of rehospitalized heart failure patients.

Methods: This study employed a cross-sectional survey design and used convenient sampling for the participant recruitment from April to June of the 113th year of the Republic of China. The study participants were rehospitalized heart failure patients from a medical center in northern Taiwan. A total of 33 participants were enrolled. Data was collected using questionnaires including basic properties, quality of life scale, social support scale, medication adherence scale and the European Heart Failure Self-Care Behavior Scale. Data analysis was conducted using the SPSS 24.0 statistical software. The statistical methods used included t-tests, Pearson's correlation analysis, and multiple linear regression and hierarchical regression analyses to assess the predictors of quality of life and their explanatory power.

Results: The results of the study indicated that the quality of life of rehospitalized heart failure patients significantly correlated with the following factors: primary caregiver ($t = -2.40$, $p < .05$), self-care ability ($t = -2.52$, $p < .01$), chronic kidney failure (including Stage III-V) ($t = 2.23$, $p < .05$) and abnormal potassium levels in hemodynamics ($t = 2.17$, $p < .05$). The quality of life showed a low, non-significant positive correlation with social support, and a low, non-significant negative correlation with medication adherence and self-care behaviors. Predictive factors for the quality of life included living situation, self-care ability, hypertension, chronic kidney failure (including Stage III-V), duration of heart failure, days since the last hospitalization, social support, and quality of life. These factors accounted for 64% of the explanatory power, and after adjustment, 54% remained ($F = 6.42$, $p < .05$). Among all the factors, days since the last hospitalization had the highest explanatory power for quality of life.

Conclusion: While causality cannot be inferred due to the study's cross-sectional design, the findings suggest that improving self-care capacity and supporting patients post-discharge may enhance QoL and potentially reduce the likelihood of readmission. It is recommended that future studies increase the sample size and conduct larger cross-sectional or longitudinal studies to verify these associations.

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Introduction

Cardiovascular disease remains the leading cause of death worldwide, with Heart Failure (HF) contributing significantly to global morbidity and mortality. According to the World Health Organization [1], approximately 8.9 million deaths were attributed to cardiovascular disease in 2019, accounting for 16% of all global deaths. In Taiwan, heart disease ranks as the second leading cause of death, with a standardized mortality rate of 47.8 per 100,000 population, and a rising trend in recent years [2].

Heart failure is a complex syndrome with multiple etiologies, often linked to coronary artery disease, myocardial infarction, and myocarditis. Globally, over 64 million individuals are living with heart failure, with 1.38 million cases in Taiwan. Compared to Western countries, heart failure patients in Asian countries tend to be younger, although hospitalization rates continue to rise [3-6], highlighting the growing public health concern of heart failure worldwide.

Readmissions due to heart failure pose a significant burden on healthcare systems and often indicate poor patient prognosis. The readmission rate for heart failure patients is notably high, with nearly 21% of patients being readmitted within 30 days and up to 50% within six months after discharge [7]. Several studies [8,9] have identified key factors contributing to rehospitalization, including poor adherence to diet and medication, insufficient social support, and inadequate self-care abilities. These factors are closely tied to patients' overall treatment adherence and, in turn, impact their socioeconomic status, healthcare quality, and quality of life.

Despite the increasing global burden of heart failure, research on the quality of life and related factors among rehospitalized heart failure patients remains limited in Taiwan. This study aimed to explore the quality of life and associated factors among patients rehospitalized for heart failure. The goal is to provide an evidence-based foundation for clinical care, helping healthcare professionals identify practical resources and interventions to enhance patients' coping strategies, improve adaptation, and ultimately reduce rehospitalization rates.

Methods

Study sites and patients

The study was conducted over a two-month period, from April to June in Minguo Year 113 (2024), using a cross-sectional design. The study participants were heart failure patients who were readmitted during their hospitalization, and were admitted to the cardiology ward or cardiac intensive care unit of a medical center in Taipei.

Sample size estimation was performed using G*Power version 3.1. A t-test was selected with a medium effect size of 0.8, an alpha level of 0.05, and a statistical power of 0.8. Based on the analysis of differences between two independent means, the required sample size was calculated to be 52 participants, as shown in Figure 1. Accounting for a potential dropout rate of 20%, the target sample size was adjusted to 63 participants.

Patients were eligible if they were aged 20 years or older, had received approval from their attending physician, and provided written informed consent after receiving a full explanation of the study. However, due to unavoidable circumstances, the recruitment period was limited to two months. In addition, the number of eligible heart failure patients who were readmitted during hospitalization was relatively low during the study period. As a result, a total of 33 hospitalized patients were ultimately enrolled.

Data collection

Based on the researcher's experience and referenced literature, a self-constructed questionnaire including basic properties (demographic variables and disease characteristics) was designed. The demographic variables included gender (male, female), age (≤ 65 years, > 65 years), body mass index (BMI) [normal (≤ 24 kg/m^2), overweight (> 24 kg/m^2)], education level [junior high school or below, high school or above], occupation (employed, unemployed), source of income (self, relatives/friends, and subsidies), marital status (single, married), living arrangement (living alone, living with family), primary caregiver (self, family, foreign caregiver) and self-care ability (independent, requires assistance). Disease characteristics included comorbidities [hypertension, diabetes, chronic kidney failure (Stage III-V), arterial diseases (including cerebrovascular disease, coronary artery disease, and peripheral arterial disease), other diseases (including

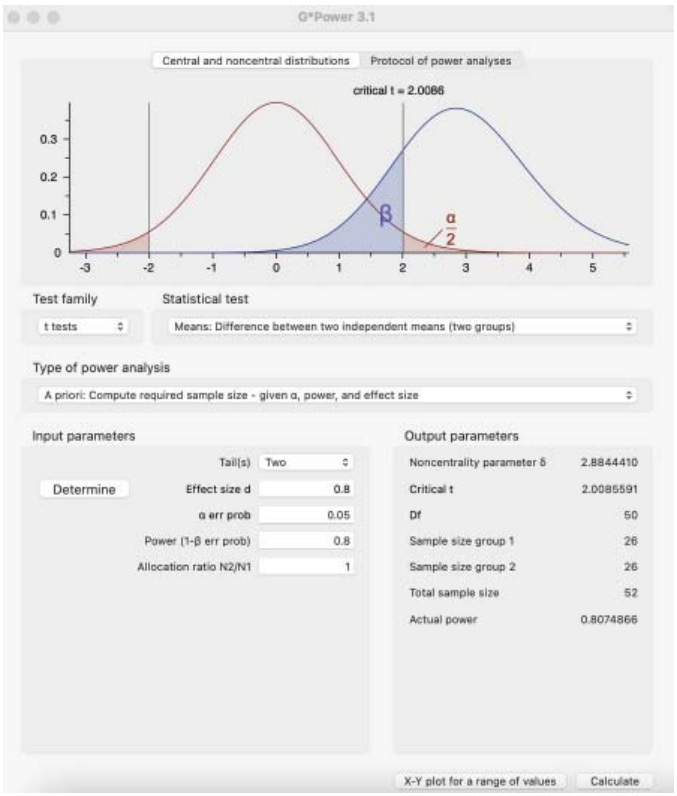

Figure 1: The analysis of differences between two independent means, the required sample size was calculated to be 52 participants.

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valvular heart disease, chronic obstructive pulmonary disease, arrhythmia, asthma, hypothyroidism)], New York Heart Association (NYHA) functional classification (Class II-III, Class IV), left ventricular ejection fraction (LVEF) (LVEF ≤ 40%, LVEF > 40%), hemodynamics (e.g., Blood Urea Nitrogen(BUN), creatinine, hemoglobin(Hb), pro B type natriuretic peptide(Pro-BNP), Sodium(Na^+), potassium(K^+)),with the normal range for potassium ions primarily between 3.5-5.1 mmol/L (McLean & Wang, 2021), duration of heart failure (≤ 1 year, > 1 year), number of hospital readmissions per year due to heart failure (≤ 1 time/year, > 1 time/year), days since last hospitalization (≤ 3 months, > 3 months), and current number of heart failure medications (≤ 4 types, > 4 types). The validity of the study questionnaire was confirmed with a Content Validity Index (CVI) of 0.98.

Quality of life was measured by the Minnesota Living with Heart Failure Questionnaire (MLHFQ). It is the most evidence-supported tool for assessing the quality of life in heart failure patients. Developed by Cohn at the University of Minnesota in 1986, it consists of 21 items, which are divided into three domains: physical (9 items), emotional (5 items), and social (7 items). The primary aim is to assess the patient's subjective feelings regarding the typical clinical symptoms and signs of heart failure and their impact on functionality and quality of life. This includes symptoms such as shortness of breath, fatigue, peripheral edema, and limitations in physical and daily activities, such as difficulty walking, climbing stairs, performing work-related tasks, or engaging in leisure activities. The items are scored using a 6-point Likert scale, where 0 indicates no impact and 5 indicates severe impact. The total score ranges from 0 to 105, with the physical domain scoring between 0 and 45, the emotional domain between 0 and 25, and the social domain between 0 and 35. A higher score indicates poorer quality of life. The Cronbach's alpha for the original scale is 0.88 [10]. A Chinese version of the MLHFQ was developed by Ho, et al. in 2007, with a Cronbach's alpha of 0.95 [11]. The Cronbach's alpha for this study's version of the questionnaire was 0.93. Since the expert-reviewed version of the questionnaire explicitly prohibits modifications to the instructions, items, scales, and item order, no validity testing was performed.

The Social Support Scale proposed by Zhao Shumei (1996) was used to assess the level of social support perceived by an individual, including support received from family members, spouses, children, relatives, friends, healthcare providers, and others. The scale consists of 10 items, covering four major aspects of functional social support: emotional support, instrumental support, evaluative support, and informational support. It uses a 5-point Likert scale for scoring: 1 = never, 2 = occasionally, 3 = sometimes, 4 = often, 5 = always. The total score ranges from 10 to 50, with higher scores indicating greater perceived social support and assistance. The Cronbach's alpha for the original scale is 0.88. In this study, the Cronbach's alpha for the questionnaire was 0.90, and the content validity index (CVI) was 0.97.

The Medication Adherence Scale (MMAS-8), developed by Hu, et al. [12] based on Morisky and Green (1986), was used in this study to assess patients' adherence to medication regimens, including the frequency, types, and dosages of medications prescribed. The scale consists of 10 items and employs a 5-point Likert scale for scoring, based on the frequency of medication adherence behaviors occurring within one week. For positively worded items, the scoring is as follows: "every day" (5 points), "5-6 days a week" (4 points), "3-4 days a week" (3 points), "1-2 days a week" (2 points), and "never" (1 point). For negatively worded items, reverse scoring is applied. The total score ranges from 10 to 50, with higher scores indicating better medication adherence. The Cronbach's alpha for the original scale is 0.76. In this study, the reliability of the questionnaire was assessed with a Cronbach's alpha of 0.77. Since the expert-reviewed version of the questionnaire explicitly prohibits modifications to the instructions, items, scales, and item order, no validity testing was performed.

Self-Care Behavior was measured by Yeh, et al. [13] translated the European Heart Failure Self-care Behaviour Scale (EHFScBS) developed by Jaarsma, et al. [14] into Chinese using Brislin's four-stage translation model. The reliability test showed a Cronbach's alpha value of 0.81, indicating good reliability. The scale consists of 10 items, including questions such as: whether the patient measures their weight daily, how they manage shortness of breath, whether they contact healthcare providers if shortness of breath increases, whether they contact healthcare providers if peripheral edema worsens, whether they contact healthcare providers if weight increases by 1.5 kg, whether they restrict fluid intake, whether they easily rest during the day, whether they contact healthcare providers when feeling fatigued, whether they follow a low-sodium diet, and whether they adhere to the prescribed medications [14]. The scale uses a 5-point Likert scale with the following options: "1. Strongly agree," "2. Agree," "3. Neutral," "4. Disagree," "5. Strongly disagree." The total score ranges from 10 to 50, where lower scores indicate better self-care behaviors, and higher scores indicate poorer self-care behaviors (1 = fully comply; 2 = comply; 3 = unsure whether to comply; 4 = do not comply; 5 = completely do not comply). The Cronbach's alpha for this study's version of the questionnaire was 0.80, and the content validity index (CVI) was 1.

Research procedures

This study adopted a cross-sectional design and recruited patients with heart failure who were readmitted to a medical center in northern Taiwan prior to their current hospitalization. A convenience sampling method was used for participant recruitment. Data were collected through questionnaire surveys and medical record reviews. Descriptive and inferential statistical analyses were conducted to explore the quality of life and its related factors among patients with heart failure who were readmitted to the hospital.

Statistical analysis

Descriptive and inferential statistical analyses were conducted to explore the quality of life of heart failure patients with readmissions and its associated factors.

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For categorical variables, the results are presented as frequencies and percentages of the sample; for continuous variables, the results are presented using mean and standard deviation, and interquartile range based on a normal distribution. A t-test was conducted to analyze the correlation between the quality of life and demographic variables, as well as disease characteristics in heart failure patients readmitted to the hospital.

Pearson's product-moment correlation analysis is used to examine the relationship between quality of life and its three dimensions, as well as factors such as social support, medication adherence, and self-care behaviors. The null hypothesis is that there is no linear correlation between the variables, while the alternative hypothesis suggests that a significant linear correlation exists. If the results show $p < .05$, this indicates a significant correlation. This analysis helps understand how psychosocial factors like social support and self-care behaviors affect patients' quality of life.

After establishing the hypotheses and analysis steps, multiple linear regression analysis is performed using the backward elimination method to identify the most predictive variables for the quality of life in heart failure patients readmitted to the hospital. The goal of the backward elimination method is to gradually remove insignificant variables, thereby enhancing the explanatory power and predictive accuracy of the model. The hypothesis testing process will be based on p-values, and if a variable's p-value is less than 0.05, it is considered to make a significant contribution to the model.

Additionally, based on the results from multiple regression and variables that were significant in univariate analysis but not in multiple linear regression, hierarchical regression analysis is conducted. This analysis helps to further reveal which factors, after controlling for other variables, explain the most variance in quality of life. Hierarchical regression aids in confirming whether certain variables, though significant in univariate analysis, still retain their significance after controlling for other factors.

Data analysis in this study is conducted using SPSS 24.0 software, performing both descriptive and inferential statistical analyses, with a significance level of $p < .05$ for inferential statistics. The choice of statistical methods is based on existing literature, which demonstrates that these methods effectively evaluate the impact of various variables on the quality of life of heart failure patients and provide reliable statistical evidence for future research.

Prior to conducting regression analyses, standard diagnostic checks were performed to assess the validity of underlying assumptions. These included tests for multicollinearity (via variance inflation factor), normality of residuals (using Q-Q plots and the Shapiro-Wilk test), homoscedasticity (via residual plots), and linearity of relationships. No major violations were observed, supporting the appropriateness of the applied regression models.

Results

A total of 33 heart failure patients readmitted to the hospital were included in this study, and their basic characteristics are shown in Table 1. The majority of the patients were male, with an average age of 66.9 years and a Body Mass Index (BMI) ranging from 16.6 to 35.5 kg/m^2. Most of the patients had an education level of high school/vocational school or higher. Regarding occupation, the majority were unemployed, with their primary source of income being self-generated. In terms of marital status, most were married. Regarding living arrangements, the majority lived with family members. The primary caregiver for most participants was themselves, and most patients were able to care for themselves independently.

The majority of the patients had chronic kidney failure (including Stage III-V). The New York Heart Association (NYHA) heart failure classification was predominantly Class IV. The left ventricular ejection fraction (LVEF) ranged from 12% to 69%, with the majority having LVEF ≤ 40%. Abnormal values in the hemodynamics included BUN, creatinine, Hb, Pro-BNP, Na^+, and K^+. Most of the patients had been living with heart failure for more than a year. The frequency of readmission due to heart failure was ≤ 1 time per year for the majority of patients. The majority of patients had been discharged for more than 3 months before their most recent hospitalization. Regarding heart failure medications, most patients were taking ≤ 4 types of medications.

Correlation analysis of the quality of life and demographic characteristics in re- hospitalized heart failure patients

Regarded demographic variables, only the type of primary caregiver ($t = -2.40$, $p < .05$) and self-care ability ($t = -2.52$, $p < .01$) were significantly associated with quality of life. Specifically, patients who were cared for by family members or foreign caregivers, as well as those requiring assistance with self-care, reported a poorer quality of life. Other demographic factors—including gender, age, Body Mass Index (BMI), education level, occupation, source of income, marital status, and living conditions—were not significantly associated with quality of life.

In terms of disease characteristics, only comorbid chronic kidney failure (including Stage III-V) ($t = 2.23$, $p < .05$) and abnormal potassium levels in hemodynamics ($t = 2.17$, $p < .05$) showed significant differences. Specifically, patients with chronic kidney failure (including Stage III-V) and abnormal potassium levels in hemodynamics had a poorer quality of life. Comorbidities such as hypertension, diabetes, arterial diseases (including cerebrovascular disease, coronary artery disease, and peripheral arterial disease), other diseases (including valvular heart disease, chronic obstructive pulmonary disease, arrhythmia, asthma, hypothyroidism), New York Heart Association (NYHA) heart function classification, left ventricular ejection fraction (LVEF), hemodynamic measurements (BUN, Creatinine, Hb, Pro-BNP, Na^+), duration of heart failure, frequency of re-hospitalizations due to heart failure, days since last hospitalization, and the number of medications for

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Table 1: Distribution of Demographic Variables (N = 33).

Variable	Frequency Percentage (%)		Mean	Standard Deviation	Range
Gender					
Male	23	69.7			
Female	10	30.3			
Age			66.9	13.92	40-99
≤ 65 years	14	42.4			
> 65 years	19	57.6			
Body Mass Index(BMI)			24.8	4.75	16.6-35.5
Normal (≤ 24 kg/m^2)	17	51.5			
Overweight (> 24 kg/m^2)	16	48.5			
Education Level Junior high school or below	13	39.4			
High school or above	20	60.6			
Occupation Employed	9	27.3			
Unemployed	24	72.7			
Variable	**Frequency Percentage (%)**		**Mean**	**Standard Deviation**	**Range**
Economic Source Self-supporting	21	63.6			
Support from relatives/friends and subsidies	12	36.4			
Marital Status Unmarried	3	9.1			
Married	30	90.9			
Living Situation Living Alone	4	12.1			
Living with Family	29	87.9			
Primary Caregiver Self-care	21	63.6			
Family and Foreign Caregivers	12	36.4			
Self-care Ability Independent	22	66.7			
Needs Assistance	11	33.3			
Measurement	**Number/ Times**	**Percentage (%)**	**Mean**	**Standard Deviation**	**Range**
Comorbidity Hypertension Yes	22	66.7			
No	11	33.3			
Diabetes Yes	15	45.5			
No	18	54.5			
Chronic kidney failure (including Stage III-V) Yes	25	75.8			
No	8	24.2			
Arterial Disease[a] Yes	22	66.7			
No	11	33.3			
Other Diseases[b] Yes	13	39.4			
No	20	60.6			
Measurement	**Number/ Times**	**Percentage (%)**	**Mean**	**Standard Deviation**	**Range**

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New York Heart Association (NYHA) Heart Function Classification Class II-III	15	45.5			
Class IV	18	54.5			
Left Ventricular Ejection Fraction (LVEF)			36.04	17.48	12-69
LVEF ≤ 40 %	20	60.6			
LVEF > 40 %	13	39.4			
Hemodynamics BUN (mg/dL)			37.91	22.4	10-99
Normal (7-25)	10	30.3			
Abnormal (< 7> 25)	23	69.7			
Measurement	**Number/ Times**	**Percentage (%)**	**Mean**	**Standard Deviation**	**Range**
Creatinine (mg/dL)			2.48	2.25	0.6-10.9
Normal (≤ 0.9)	7	21.2			
Abnormal (>0.9)	26	78.8			
Hb (g/dL)			11.64	2.82	7.6-18.1
Normal (≥ 10)	20	60.6			
Abnormal (< 10)	13	39.4			
Pro-BNP (pg/mL) Abnormal[(c)]			11639.12	11844.50	1467-35000
≤ 65 years	14	42.4	7442.44	9732.10	1467-35000
> 65 years	19	57.6	14731.42	12538.42	1835-35000
Na^+(mmol/L)			136.76	3.19	128-146
Normal (≥ 136)	23	69.7			
Abnormal (< 136)	10	30.3			
Measurement	**Number/ Times**	**Percentage (%)**	**Mean**	**Standard Deviation**	**Range**
K^+(mmol/L)			3.88	0.55	3.0-5.6
Normal (3.5-5.1)	23	78.8			
Abnormal(< 3.5 > 5.1)	7	21.2			
Duration of Heart Failure ≤ 1 year	14	42.4			
> 1 year	19	57.6			
Annual Readmission Frequency due to Heart Failure ≤ 1 time/year	22	66.7			
> 1 time/year	11	33.3			
Days Since Last Hospitalization ≤ 3 months	12	36.4			
> 3 months	21	63.6			
Measurement	**Number/ Times**	**Percentage (%)**	**Mean**	**Standard Deviation**	**Range**
Current Number of Heart Failure Medications ≤ 4 types	25	75.8			
> 4 types	8	24.2			

Note: Arterial disease (a): Includes cerebrovascular disease, coronary artery disease, and peripheral arterial disease. Other diseases (b): Includes valvular heart disease, chronic obstructive pulmonary disease, arrhythmia, asthma, and hypothyroidism. Pro-BNP (pg/mL) abnormal (c): Age ≤ 50 years > 451 pg/mL; Age 50-75 years > 901 pg/mL; Age ≥ 75 years ≥ 1801 pg/mL.

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heart failure did not reveal significant differences in quality of life ($p > .05$).

In summary, demographic variables and disease characteristics that showed significant differences in quality of life and its three dimensions included primary caregiver, self-care ability, chronic kidney failure (including Stage III-V), and abnormal potassium levels in hemodynamics.

Correlation analysis of quality of life with social support, medication adherence, and self-care behavior in re-hospitalized heart failure patients

A low positive correlation was observed between quality of life and social support ($r = 0.21$), but it did not reach statistical significance ($p > .05$), indicating that this study could not confirm a significant association between the two. However, the direction of the correlation aligns with theoretical expectations, suggesting that higher levels of social support may be associated with higher quality of life scores (which indicate poorer quality of life).

A low negative correlation was found between quality of life and medication adherence ($r = -0.02$, $p > .05$), which was also not statistically significant. This indicates that, within this sample, no significant relationship was found, but the direction suggests that better medication adherence may be associated with lower quality of life scores (indicating better quality of life).

Similarly, a low negative correlation was found between quality of life and self-care behaviors ($r = -0.26$, $p > .05$), which was likewise not statistically significant. This suggests that better self-care behaviors may be associated with lower quality of life scores, implying better quality of life, though further research is needed to verify this result.

Predictors of quality of life in re- hospitalized heart failure patients

Using multiple linear regression with backward elimination, significant factors related to quality of life were selected, alongside other factors from past studies and literature. These included demographic variables (such as BMI, education level, occupation, source of income, marital status, and living conditions), disease characteristics (including comorbidities, NYHA classification, LVEF, hemodynamic parameters, heart failure duration, frequency of re-hospitalizations, days since last hospitalization, and number of medications for heart failure), social support, medication adherence, and self-care behavior. This model explained 64% of the variance in quality of life, and after adjustment, 54% of the variance was explained ($F = 6.42$, $p < .05$).

Based on the results of multiple linear regression, hierarchical regression was performed for variables that were significant in univariate analysis but not in multiple linear regression (including primary caregiver and abnormal potassium levels in hemodynamics). In Model 1, the living situation variable was added, but it did not explain any variance in quality of life ($F = 0.00$, $p > .05$). Models 2 through 9 gradually added the variables of primary caregiver, self-care ability, hypertension, chronic kidney failure (including Stage III-V), abnormal potassium levels in hemodynamics, duration of heart failure, days since last hospitalization, and social support. The results showed that "days since last hospitalization" had the highest explanatory power for quality of life among all factors, explaining 61% of the variance, with 48% of the variance explained after adjustment ($F = 4.65$, $p < .05$). This variable contributed an additional 22% to the explanatory power, indicating that it might be the most influential predictor of quality of life in re-hospitalized heart failure patients shown in Table 2.

Discussion

This study identified several key predictors of quality of life among rehospitalized heart failure patients, with "days since the last hospitalization" emerging as the most influential factor. This finding aligns with previous studies that indicate patients remain physiologically vulnerable during the early post-discharge period, particularly within the first three months [15-17].

Self-care ability was significantly associated with quality of life in our analysis, reinforcing findings from Jaarsma, et al. [18], who emphasized the role of effective self-management in improving patient outcomes. Patients who were able to manage their daily needs independently tended to report better quality of life scores. This association may reflect the empowering effect of autonomy in managing chronic illness, as well as the ability to engage in consistent health behaviors such as medication adherence, fluid restriction, and symptom monitoring. These behaviors are known to reduce symptom burden and improve psychosocial well-being [19,20]. Nevertheless, it is important to acknowledge that self-care ability may also serve as a proxy for other health determinants, such as physical functioning, cognitive status, or availability of caregiver support, which warrants further investigation in future studies.

Chronic kidney disease (Stage III-V) emerged as a significant factor associated with lower quality of life in both univariate and multivariate analyses. This finding aligns with prior literature indicating that renal dysfunction can worsen heart failure outcomes by contributing to fluid retention and increased physiological stress.

In contrast, although abnormal potassium levels were significant in univariate analysis, they did not remain significant in the final regression model after controlling for other variables. This suggests that their effect may be mediated or confounded by other clinical conditions such as renal function or medication use.

While social support did not reach statistical significance in univariate analysis, it remained an influential factor in the final regression model. This suggests an indirect role of social support in promoting treatment adherence, symptom recognition, and timely healthcare engagement. These effects are well-documented in previous studies, including the work of Wang, et al. [21].

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Table 2: Hierarchical Regression Analysis of Predictors of Quality of Life (N = 33).

Hierarchical Variables		Model 1			Model 2			Model 3			Model 4	
	B Value	T Value	*p* Value	B Value	T Value	*p* Value	B Value	T Value	*p* Value	B Value	T Value	*p* Value
Living Situation	-0.62	-0.05	0.96	-7.88	-0.61	0.55	-8.63	-0.66	0.51	-8.92	-0.66	0.52
Primary Caregiver				17.55	1.99*	0.05	7.68	0.54	0.60	8.03	0.54	0.60
Self-Care Ability							12.74	0.88	0.39	12.88	0.87	0.39
Hypertension										1.01	0.10	0.92
F Value		0.00			1.99			1.57			1.14	
R^2		0.00			0.12			0.14			0.14	
adjusted R^2 Change		-0.03			0.06			0.05			0.02	
Hierarchical Variables		**Model 5**			**Model 6**			**Model 7**			**Model 8**	
	B Value	**T Value**	***p* Value**	**B Value**	**T Value**	***p* Value**	**B Value**	**T Value**	***p* Value**	**B Value**	**T Value**	***p* Value**
Living Situation	-10.02	-0.78	0.44	-5.20	-0.42	0.68	-3.74	-0.30	0.77	-15.35	-1.44	0.16
Primary Caregiver	7.46	0.53	0.60	6.06	0.45	0.66	8.44	0.63	0.54	-9.43	-0.78	0.44
Self-Care Ability	14.16	1.01	0.32	15.59	1.17	0.25	13.68	1.02	0.32	28.07	2.42*	0.02
Hypertension Chronic Kidney Disease	7.98	0.81	0.42	5.27	0.56	0.58	7.91	0.82	0.42	11.38	1.43	0.17
(Stage III-V) abnormal potassium	-21.01	-2.16	0.04	-16.01	-1.66	0.11	-14.30	-1.47	0.15	-18.14	-2.27*	0.03
levels				-18.55	-1.91	0.07	-18.93	-1.97	0.06	-12.02	-1.48	0.15
Duration of Heart Failure							9.40	1.16	0.26	38.18	3.71***	0.001
Days Since Last										-41.61	-3.65**	0.001
Hospitalization											*	
F Value			1.96			2.41			2.28		4.65	
R^2			0.27			0.36			0.39		0.61	
adjusted R^2 Change			0.13			0.21			0.22		0.48	
Hierarchical Variables					Model 9							
			B Value		T Value				p Value			
Living Situation			-40.74		-2.50*				0.02			
Primary Caregiver			-12.50		-1.09				0.29			
Self-Care Ability			28.20		2.57**				0.01			
Hypertension			16.89		2.10*				0.05			
Chronic Kidney Disease (Stage III-V)			-24.45		-2.98**				0.01			
abnormal potassium levels			-4.20		-0.49				0.63			
Duration of Heart Failure			38.56		3.97***				0.001			
Days Since Last Hospitalization			-42.81		-3.98***				0.001			
Social Support			1.10		1.98*				0.05			
F Value					5.08							
R^2					0.67							
adjusted R^2 Change					0.53							

*$p < .05$, **$p < .01$, ***$p < .001$

In conclusion, despite the limitations of this study—including its small sample size, convenience sampling method, and cross-sectional design—the results emphasize several modifiable clinical and psychosocial factors that influence the quality of life in rehospitalized heart failure patients. Future longitudinal and interventional studies are recommended to assess the long-term impact of these variables and to develop evidence-based strategies for improving outcomes in this high-risk population.

Limitations

This study employed a convenience sampling method, gathering data exclusively from patients at a medical center in the northern region. Some patients were not included in the study due to a diagnosis of heart failure with Pro-BNP biomarker levels remaining within the normal range, or due to changes in condition among elderly patients. Because of sample size and narrow scope, the generalizability and inferential strength of the findings may be limited. Future research may focus on larger sample sizes and utilize prospective and longitudinal study, or interventional designs to provide more comprehensive insights. Specifically, researchers could start with newly diagnosed heart failure patients and follow them post-discharge, tracking disease progression, identifying causes of readmission, and assessing long-term outcomes. These approaches will be vital for validating the associations identified in this study and informing the development of effective interventions, ultimately improving patient care and clinical outcomes.

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Conclusion

The global prevalence of heart failure is approximately 5.7 million people, with around 1 million hospitalizations each year due to heart failure. The 30-day readmission rate is 18%, the 6-month readmission rate is 50%, and the 9-month readmission rate is as high as 60% [22]. Our study found that the predictors of quality of life in rehospitalized heart failure patients include the number of days since the previous hospitalization, self-care ability, comorbid chronic kidney disease, abnormal serum potassium levels, living status, social support, duration of heart failure, and history of hypertension. These findings highlight the multifactorial nature of quality of life in rehospitalized heart failure patients and warrant further investigation. Future research should delve deeper into the relationships among these predictors and explore effective strategies to improve patient quality of life.

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