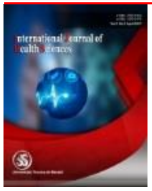

International Journal of Health Sciences
Available online at www.sciencescholar.us
Vol. 9 No. 2, August 2025, pages: 850-868
E-ISSN: 2550-696X
https://doi.org/10.53730/ijhs.v9n2.15755

Assessment of Perceived Social Support on the Quality of Life of Patients with Heart Failure: A Randomized Clinical Trial

Stergiani Petaloti [a], **Zoe Roupa** [b], **Ekaterini Lambrinou** [c], **Maria Noula** [d]

Manuscript submitted: 09 June 2025, Manuscript revised: 27 July 2025, Accepted for publication: 18 August 2025

Corresponding Author [a]

Keywords

education;
health-related quality of life;
heart failure;
nursing intervention;
social support;
telephone follow-up;

Abstract

Heart Failure (HF) patients usually have a high physical and emotional burden, due to the very intense symptoms, but also the psychological burden, at the same time as the poor Health-Related Quality of Life (HR-QoL). Studies have found that increased perceived Social Support (SS) can contribute to the improvement of symptoms and HR-QoL through its different modes of functioning. ***The aim:*** of the present study was to evaluate the effect of a dual nursing intervention, with an educational approach at the discharge of patients with HF and subsequently, structured telephone follow-up, on the perceived SS and its effect, on HR-QoL, for a period of 12 months after the patients' discharge from the hospital, in relation to usual care. **Material and Method:** This is a Randomized Clinical Trial (RCT) with an intervention and control group, conducted at the Cardiology Clinic of the General Hospital of Serres. A total of 186 hospitalized patients with HF (NYHA I-IV), who met the admission criteria and were scheduled for discharge, were randomized. The individuals randomized to the intervention group (N=93), received a personalized educational approach, with one education session and the provision of an information leaflet, before discharge from the hospital, and subsequently, telephone follow-up and support for a period of 12 months. Data were collected in five time periods, the first at discharge and followed by four post-experimental measurements over the course of one year, at the 1st week, at the 1st and 6th month, and at 12 months. The control group (N=93), did not receive any intervention, beyond usual care. The assessment of perceived SS was carried out using the Multidimensional Scale of Perceived Social Support (MSPSS), while the assessment of QoL was carried out using the Minnesota Living with Heart Failure Questionnaire (MLHFQ). For the statistical analysis of the data, for the studied parameter, the average level per time period was studied, with the effect size, difference, and Cohen's d coefficient. The analysis of the intervention's effect on QoL levels was conducted using mixed linear models and the study of the interaction coefficient. The investigation of

---

[a] Regular Outpatient Clinic, Serres General Hospital, Greece
[b] University of Nicosia, School of Sciences and Engineering, Department of Life and Health Sciences, Cyprus
[c] Cyprus University of Technology, School of Health Sciences, Nursing Department, Limassol, Cyprus
[d] University of Nicosia, School of Sciences and Engineering, Department of Life and Health Sciences, Cyprus

regulatory factors in the relationship between SS and QoL was carried out using linear regression and interaction coefficients. The statistical significance level was set at 0.05. The internal validity test for the data collected with the MSPSS scale and the MLHFQ scale was performed using the Cronbach's alpha coefficient. The statistical program SPSS-26.0 was used for the statistical analysis. **Results:** Of the N=186 randomized patients, 40.9% (38 patients) of the intervention group and 31.2% (29 patients) of the control group completed the study. The mean age of the patients was 79.2 (SD=8.6). The change in the total QoL scale score showed a significant decrease, thus an improvement for the intervention group (b=-2.1, p=0.003). The correlation of total QoL with total perceived SS was found to be negative (p<0.001). From the regression analysis, to find the clinicodemographic factors that influenced the relationship between SS and QoL, it was found that Monthly Income >600 Euros (b=-1.11, p<0.001) and EF≥40% (b=-0.89, p<0.001), moderated the above relationship, with patients with the highest Monthly Income and the highest EF having more perceived SS and better QoL. **Conclusions:** The findings of the present study indicate that higher perceived SS is associated with improved QoL in patients. It is demonstrated that SS in patients with HF not only positively supports the basic parameters that affect them, but also opens up new, innovative perspectives for supporting and addressing their difficulties through personalized, specialized nursing intervention.

Contents

1 Introduction

The demographic aging of the population has increased in chronic diseases (Raghupathi & Raghupathi, 2018), with cardiovascular events being the leading cause of death worldwide to date (GBD 2019; Viewpoint Collaborators, 2020), and HF is associated with a particularly poor prognosis. There is an urgent need to investigate nursing interventions, as non-pharmacological management of chronic HF patients, aiming to reduce the number of readmissions and the total number of days of hospitalization, by strengthening them, leading to self-efficacy, which increases their satisfaction and indirectly improves QoL, through perceived SS (Shanks, 2016). Patients with HF syndrome usually have a high physical and emotional burden, due to the very intense symptoms, but also the psychological burden, at the same time as the poor QoL. Studies have found that increased perceived SS can contribute to the improvement of symptoms and QoL, through its different modes of functioning. This RCT aimed to evaluate the effect of a dual nursing intervention, with an educational approach at the discharge of patients with HF and subsequently, structured telephone follow-up, on perceived SS and its effect on QoL, for a period of 12 months after the patients' discharge from the hospital, in relation to usual care.

2 Materials and Methods

Study population

The study population consisted of all patients with HF who were hospitalized at the Cardiology Clinic of the Secondary General Hospital of Serres and were scheduled for discharge. The entry of the first patient with HF into the study and with scheduled discharge took place in April 2019, while the last patient with HF who participated in the study was in August of the same year. This was followed by telephone contact with the above patients, which took place in 4 time periods, the 1st week, the 1st and 6th months, and at 12 months after the patients' discharge from the hospital. The study was completed in August 2020, with the recording of the last annual telephone contact of the last patient upon entry into the study.

Criteria for inclusion of patients in the study were as follows: • Patients with a documented diagnosis of HF, regardless of NYHA functional classification, • Patients aged ≥ 18 years, • Patients with HF confirmed by a cardiologist, according to the criteria of the ESC, with confirmed positive echocardiographic criteria for the structure and function of the heart, • Patients with HF who knew how to write, read and understand the Greek language. **The exclusion criteria were as follows:** Patients with active myocardial ischemia, • Patients with congenital heart disease, • Patients with planned major surgery within six months, • Patients with recent heart surgery (coronary artery angioplasty, coronary artery bypass grafting, valve replacement - valvuloplasty), • Patients who suffered from active cancer, • Patients who lived in an institution, • Patients who did not understand or speak the Greek language, • Patients with a history of psychiatric disorder, • Patients with CKD on dialysis/hemodialysis, • Patients for whom telephone contact was not possible due to lack of infrastructure, • Patients who were not informed that they suffered from HF, as well as patients with HF, who refused to participate in the study and did not sign the informed consent form, • Patients with concomitant musculoskeletal disease, which affects physical activity.

Sample size calculation

The sample size was calculated using the power analysis method using the statistical program G*Power version 3.1.9.2 (Faul et al., 2007).

Randomization

After informing and consenting to participate in the study, patients with HF were randomly assigned to two groups, the intervention and control groups. To create the random allocation of patients to each group, randomization was implemented with Matlab software, using the randperm function, which is used to distribute (permutation) numbers into groups (classes).

Ethical considerations

The research was conducted at the Cardiology Clinic of the General Hospital of Serres. Written, informed consent for participation was obtained from all patients, after an explanation of the purpose and procedure of the study. Participation was voluntary and anonymity was maintained. In addition, all participants were informed of their rights to refuse or discontinue participation, in accordance with the ethical standards of the 1983 Declaration of Helsinki.

Measurement Tools

The MSPSS was used to assess SS. The scale consists of 12 items, which are rated on a Likert-type scale. Responses range from 1 (strongly disagree) to 7 (strongly agree). The 12 items tend to be divided into three subgroups of factors, which are related to the source of SS, Family (FAM), Friends (FRIENDS) or Significant Others (SO) (Zimet et al., 1988). The scale assesses and evaluates the perceived SS from family, friends, but also some significant others, who are close to them and offer them support and empowerment (Wenn et al., 2022). The values of the subfactors are calculated from the sum of the scores, which results from the four items of each group. The total score of the questionnaire is calculated from the sum of the scores, which results from all the subfactors. The lowest value from the subscales is 4, and the highest is 28, while from the entire scale (total value), the lowest value is 12, and the highest is 84. Higher scores reflect more perceived SS (Zimet et al., 1988; Khaledi et al., 2014). The MSPSS questionnaire is valid and reliable, with adequate measurements of the perceived SS scale in patients with HF. It was found to have good to excellent internal consistency and test-retest reliability during weighing (Wenn et al., 2022).

The MLHFQ scale was used to assess the patients' QoL. The tool was developed in 1987 by Rector et al. and consists of 21 questions, ranging from 0 to 105, with two subscales (physical and emotional) and eight items, which are not grouped into one of the two subscales, which assess the impact of HF on the physical, psychological and socioeconomic dimensions of the patients' lives in the last month (Hak et al., 2004). Patients were able to answer each question on a six-point Likert-type scale. Each of the six-point scale ratings was assigned points from 0 (not at all) to 5 (very much). Higher scores indicated worse QoL for the patients. The MLHFQ tool includes the Physical/Physical dimension with 8 questions: 2-7, 12 and 13, range of scores (0-40), the Emotional dimension with 5 questions: 17-21, range of scores (0-25) and the 8 questions, as mentioned above, of the socioeconomic, psychological and physical dimension, 1,8,9,10,11,14,15,16, with range of scores (0-40). The questions concern issues such as swelling of the lower extremities, sexual activity, hospital stay, cost, and side effects of medication, emotional burden, and limitations in work and leisure (Rector et al, 1987; Franzen et al, 2007; Franzen et al., 2007; Franzen et al., 2007). The questionnaire is adapted for use in more than 32 languages and has good psychometric properties in a large number of studies. The Greek version of the tool was provided by MAPI Research Institute (MLHFQ – Greece/Greek – 28 February 2001), which holds the copyright for the translation of the tool, and has been validated in a Greek and Cypriot population with HF (Lambrinou et al., 2013; Brokalaki et al., 2015). In a Greek Cypriot population, through exploratory factor analysis to assess conceptual validity, as it was the first application in this population, three subscales (the physical aspect, the emotional aspect, and the social aspect) were found, accounting for 64.15% of the total variance (Lambrinou et al., 2013). According to Brokalaki et al. (2015), the dimensions for the Greek version of the questionnaire are two: the physical dimension (Physical Status), with questions from 1-14, and the emotional dimension (Emotional Status), with questions from 15-21 for the Greek population. Methodological as well as cultural effects may be responsible for the development of these differences. The cultural level and educational background of the individual contribute significantly to these differences (Brokalaki et al., 2015). The questionnaire is designed to be completed by the patient himself, with minimal participation of the researcher, if this is feasible. The Greek version of the questionnaire has been found to have good internal validity, high internal consistency (Cronbach's alpha equal to 0.97). It is sensitive to the type of changes in HR-QoL caused by various conditions (Brokalaki et al., 2015).

Pilot Study

Before the start of data collection for the research, a pilot study was conducted to identify problems in understanding the questions of the questionnaires, as well as to find problems due to deficiencies in the special educational form. The pilot study was carried out with the participation of 25 patients with HF.

Table 1
Descriptive Statistics of the MSPSS Scale - Pilot Study - N=25

	Mean (S.D.)	*Minimum – Maximum Observed*	*Cronbach's alpha*
Family/Significant Others (SO)	52.6 (4.9)	[40-56]	0.70
Friends	16.0 (6.0)	[4-28]	0.84
Total Social Support (MSPSS)	68.9 (7.5)	[52-84]	0.80

Table 2
Descriptive Statistics of the MLHFQ Scale - Pilot Study - N=25

	Mean (S.D.)	*Minimum – Maximum Observed*	*Cronbach's alpha*
Emotional Dimension - Health	31 (4.5)	[20-25]	0.91
Physical Dimension - Health	39.0 (9.0)	[21-40]	0.90
Socioeconomic Dimension - Health	23.1 (5.3)	[12-40]	0.89
Total Quality of Life (MLHFQ)	73.0 (15.1)	[39-105]	0.91

Procedure

Participants were selected during their hospitalization in the hospital, before discharge. An important role in the sample selection process was played by the medical and nursing staff of the Hospital's Cardiology Clinic, by providing information to the researcher regarding the clinical condition of the discharged patients (presence of comorbidities, EF, echocardiographic evidence of cardiac dysfunction). The researcher was informed about the planned discharges of stabilized patients, the time period before their discharge, at the time of preparation of the patient's informational note by their treating physician. The researcher then studied the medical file of each patient, and the nursing staff provided data from the clinic's Patient Registry on readmissions, the total number of days of hospitalization of the patients, as well as on the patients' supportive environment. The necessary information regarding echocardiographic evidence of cardiac dysfunction, HF, the presence of comorbidities, and medication was provided to the researcher by the medical staff. Subsequently, after the researcher had studied the medical file of each prospective participating patient for the existence of documented diagnosed HF and provided that the specific patients met the eligibility criteria for entry into the study, the researcher approached the patients, explaining the conduct of the specific study, its purpose and objectives. This was followed by the randomization of the patients into the intervention group and the control group. The patients who agreed to take part in the study were assigned a number, starting from 1 to 186, according to the order in which they were approached. The patients, who had given written consent to participate in the study, did not know which of the two groups they belonged to, except for the researcher and her after opening the numbered, opaque and sealed randomization envelopes. Data collection was carried out in two phases. The first phase concerned the patient's inclusion in the study (pre-measurement) and the second concerned the post-measurement, upon completion of the program at one year (1st week, 1st and 6th month and at one year). In the first phase (pre-measurement), the scale was completed by all patients who participated in the study, on the day of discharge, before the educational intervention. The completion was carried out by the patients themselves, in the presence of the researcher, who, in case of clarifications from the patient, intervened to help him. In case of weakness of the patient, due to problems, inability to read, reduced vision, severe heart failure, the completion was done by the researcher, through an interview. Also, on the day of discharge, all patients in the study were given to complete the special form recording the clinicodemographic characteristics. The collection of clinical and demographic data provided particular assistance to the researcher, during telephone communication with the patients. The clinical characteristics helped in the evaluation of the clinical condition of the patients, as they provided information on the existence of possible comorbidities. Also, the completion of demographic data, helped the researcher during the telephone interview and follow-up of the patients, in providing an individualized nursing educational approach. At the same time, with the delivery of the questionnaire and the recording forms, all patients were given the special educational printed material for the HF to be studied and subsequently, the patients in the intervention group took part in the educational process by the researcher. In the second phase, after discharge from the hospital, the data collection was carried out, through a telephone interview, by the researcher, where all patients were re-evaluated in terms of perceived SS and HR-QoL in the 1st week, in the 1st and 6th months, as well as in the 1st year, after the first recording and evaluation at their entry into the study (post-experimental measurements). Each patient, upon discharge from the hospital, received a package containing: • The special informational printed material for HF to be studied, entitled: "Learning to Live Embracing Heart Failure", • The printed material for Recording Telephone Communication Data.

Statistical Analysis

The missing values in the statements of the MSPSS, MLHFQ scales were replaced using Multiple Imputation. The distributions of the quantitative variables were checked for normality of their distribution using the Kolmogorov-Smirnov criterion. For those that were normally distributed, the Mean and Standard Deviations (SD) were used to describe them, while for those that were not normally distributed, the median and interquartile range were also used. Absolute (N) and relative (%) frequencies and percentages were used to describe the qualitative variables (categorical variables, gender, marital status, comorbidities, educational level, etc.). For quantitative variables, they were used and presented as Mean - Mean Level and Standard Deviation (SD). For the comparison of proportions, Pearson's χ2 test (Pearson Chi-Square test) was used. The correlations between the scales, MLHFQ, and MSPSS, to test the relationship, were done using the Pearson linear correlation coefficient (r). The effect size of the intervention, the Mean Level of perceived SS and QoL, per time period, was studied, with the difference size, Cohen's d coefficient. The change in the QoL scale, at the follow-up time, was tested using Linear Mixed Models (linearmixedmodels), from which the Dependence Coefficients (β) and their Standard Errors (standarderrors=SE) were obtained. The interaction between time and intervention was also tested. The possible moderating role of clinicodemographic characteristics, the investigation of the moderating factors in the relationship between QoL and perceived SS, was done using Linear Regression and interaction coefficients. The reliability of the MSPSS, MLHFQ scales was studied using the internal consistency coefficient, Cronbach's alpha. The significance levels are two-sided, and the statistical significance was set at 0.05. The SPSS 26.0 statistical program was used for the analysis.

3 Results and Discussions

3.1 Results
Sample Description

The sample consisted of 186 patients, of whom 93 (50%) belonged to the intervention group and 93 (50%) to the control group. Over time, the number of participants in both groups changed due to non-contact or patient deaths. Specifically, 36.6% of patients (34 patients) died in the intervention group and 49.5% (46 patients) in the control group.

Table 3
Number of Patients in the Study

	Group		
	Intervention	*Control*	*Total*
	N (%)	N (%)	N (%)
Discharge	93 (100)	93 (100)	186 (100)
One Week	85 (91,4)	81 (87,1)	166 (89,2)
One Month	84 (90,3)	78 (83,9)	162 (87,1)
Six Months	81 (87,1)	75 (80,6)	156 (83,9)
One Year	**38** (40,9)	**29** (31,2)	**67** (36)

Demographic Characteristics per Group

In the present study, it was found that the mean age of the patients was similar in both groups; for the intervention group, it was 79.9 years (SD=8.4) and 78.5 (SD=8.8), respectively, for the control group. The advanced age of the patients, as a finding of the present study, is in agreement with the international literature, as well as with studies from Greece, which report that the largest percentage of individuals with HF is aged >65 (Bui et al., 2011; Kollia, 2016; Klindworth et al., 2015; Stavrianopoulos, 2016; Aggelopoulou et al., 2017; Audi et al., 2017; Baert et al., 2018). The prevalence and incidence of HF, according to the literature, are increasing in developed countries, due to the effectiveness of secondary prevention interventions, the aging of the global population, and the development of advanced therapies that increase the survival rate of patients with cardiovascular diseases (Yancy et al., 2017; Wazqar & Al-Saud, 2023). The chronic syndrome affects approximately 2-5% of adults aged 65-75 years and >10% of adults aged 80 years and older (Klindworth et al., 2015; Audi et al., 2017; Wazqar & Al-Saud, 2023). The most vulnerable population is the elderly. Of the individuals who will need healthcare services due to the presence of symptoms of dyspnea, one in six, according to the ESC, will have undiagnosed HF (Ponikowski et al., 2016).

Regarding gender, the results of the present study found that most participating patients were male, 56% in the intervention group and 53% in the control group. The results are consistent with the findings of similar studies, where men predominated in the chronic syndrome of HF (Kollia, 2016; Yu et al., 2015; Wan et al., 2016; Stavrianopoulos, 2016; Baert et al., 2018). In a cross-sectional population study for the analysis and correlation of gender, sociodemographic factors, lifestyle, health characteristics, with the prevalence of HF, it was found that the factors associated with the prevalence of HF in men, in addition to age, were ischemic heart disease and comorbidities (Cesaroni et al., 2021). CHD is reported as a significant etiological factor in men, relative to women, with an age-adjusted odds ratio. The incidence of CHD increases sharply in peri- and postmenopausal women (Chamberlain, 2017). Furthermore, it was observed that gender (men, women) represents the behavioral norms applied by the male and female genders in society, which influence the daily actions, activities, expectations, as well as the experiences of individuals. It was shown that gender determines the help-seeking behavior, access to healthcare, and individual use of the healthcare system (Regitz-Zagrosek, 2020).

The majority of study participants were primary school graduates, married, and low-income, with a monthly income of <600 Euros. 67% of the intervention group were married, with this percentage in the control group reaching 56%. The findings of the present study are in agreement with an observational study by Aggelopoulou et al. (2017), as well as with the RCT of Kollia (2016). Similar findings are in the cross-sectional study by Seid et al. (2020), in which patients from rural areas were found to have a lower educational level. The level of education and the close relationship with socioeconomic status were predictors of reduced Quality of Life (QoL) and readmissions (Carlson et al., 2013). A possible explanation is that low financial resources, together with the inability to understand medical instructions, result in a lack of adherence to therapeutic pharmaceutical and dietary recommendations and, therefore, reduced effectiveness of disease management. Similar to the results of the study are those of Noori et al. (2014), where it was shown that illiterate patients are less oriented towards the importance of instructions for taking medications according to the instructions given, as well as adherence to diet and physical activity, exercise, compared to patients with a higher educational level.

From the demographic data of this study, the patient sample was residents of a large agricultural prefecture, with a geographical distribution of many small and remote communities, with a fairly large distance in kilometers from health services, which requires the loss of time, resources and financial cost, making it difficult and often impossible to provide health care support, to cover urgent and individualized health needs for chronic patients with HF, after discharge from the hospital, as was also shown by a similar study by Negarandeh et al. (2019). Most intervention and cardiac rehabilitation programs for patients with HF take place in large urban centers, making it difficult to monitor transitional intervention programs, as well as rehabilitation programs, for patients living in rural, provincial, and remote areas (Zhai et al., 2017; Gardiner et al., 2019). The following table presents the demographic data of the patients, by group:

Table 4
Demographic Characteristics by Group

	Intervention Group, N = 93	Control Group, N = 93	p-value
	N (%)	N (%)	
Sex			
Male	52 (55,9)	49 (52,7)	0,768÷
Female	41 (44,1)	44 (47,3)	

	Intervention Group, N = 93	Control Group, N = 93	p-value
	N (%)	N (%)	
Age	79,9 (8,4)	78,5 (8,8)	0,363+
Educational level			
Compulsory Education	83 (89,2)	77 (82,8)	0,439÷
Secondary Education	9 (9,7)	14 (15,1)	
Higher/Higher Education	1 (1,1)	2 (2,2)	
Family Status			
Married	62 (67)	52 (56)	0,175÷
Single (Widower, Divorced, Never Married)	31 (33)	41 (44)	
Professional Status			
Employee	0 (0)	1 (1,1)	0,368÷
Disabled	1 (1,1)	0 (0)	
Retired	92 (98,9)	92 (98,9)	
Monthly Income			
<600 Ευρώ	62 (66,7)	65 (70,7)	0,258÷
≥600 Ευρώ	31 (33,3)	27 (29,3)	

÷Pearson's X^2 test +Student's t-test

Clinical Characteristics

From the clinical data of this study, most participating patients had comorbidities, with a higher frequency of Diabetes Mellitus (DM), Chronic Kidney Disease (CKD), Arterial Hypertension, and Chronic Obstructive Pulmonary Disease (COPD). In particular, the comorbidity of DM was found to be significantly different in patients in the control group, who more frequently presented the comorbidity, at a rate of 29%, compared to patients in the intervention group (15%). The findings are in line with the international literature, where it was observed that comorbidities are strong predictors of negative outcomes (McMurray et al., 2014; Sousa et al., 2017; Baert et al., 2018). Similar results were found in the study by Audi et al. (2017), with a rate of 42.7% and comorbidities such as diabetes, peripheral vascular disease, and cerebrovascular disease being factors responsible for the reduced performance of daily activities, repeated unplanned readmissions, as well as increasing healthcare costs. Similar results were found in the study by Rahimi et al. (2014), where it was found that, in addition to age, gender, and NYHA functional class, renal function, blood pressure, sodium level, EF, natriuretic peptide level, diabetes, BMI, and exercise affect patient outcome. Also, the results of the present study are in agreement with those of Noori et al. (2014), who investigated the effect of socioeconomic status on patient readmissions and it was shown that EF<40%, poor physical activity, lack of exercise, non-adherence to medication and arterial hypertension are identified as significant independent predictors for repeated unplanned readmissions and rehospitalizations.

Marginally, with a non-significant difference for hospital admissions for HF, it appeared from the clinical characteristics of the patients, at their entry into the present study, that 55.9% (52 patients) of the control group had been admitted to the hospital in less than 1 month for HF and the corresponding percentage in the intervention group was 41.9% (39 patients). In contrast, for the period of 1-2 months, 55.9% (52 patients) of the intervention group had been admitted to the hospital, while the percentage in the control group, for the same period, was 36.6% (34 patients). For the period of more than 3 months, two patients in the intervention group, a percentage (2.2%), had rehospitalization, while the percentage in the control group was 7.5% (7 patients), for the same period. The causes of patient readmissions include clinical characteristics, laboratory findings, biochemical parameters, biomarkers, non-compliance with the HF treatment regimen, advanced age of patients, and comorbidities. From the results of the literature review studies, it has been shown that polypharmacy and low socioeconomic level are associated with readmissions (Gabet et al., 2015; Oyanguren et al., 2016; Dinatolo et al., 2018; Lahoz et al., 2020; Marques et al., 2022; Browder & Rosamond, 2023).

In the telephone contact with the researcher, up to 6 months, all the patients in the study answered the telephone calls. From 6 months to the 1st year, 22.6% (21 patients) of the intervention group did not respond to the telephone contact, and the corresponding percentage in the control group was 19.4% (18 patients). From the review of the literature, it was found that the loss of participants in the RCTs may be due to fatigue, which is caused by the long research period of 12 months. Also, some of the participants may have found it difficult to participate in the individual, personalized telephone interviews and in the telephone monitoring of each research period (Otsu & Moriyama, 2014). Similar findings of participant loss were found in the RCT of Deek et al. (2021), where 5% of the sample was lost within 30 days of the study. The ACC/AHA guidelines (2013) recommend telephone follow-up within 3 days after patients' discharge from the hospital. In our study, the first telephone contact was made on the 7th day after the patients' discharge, and up to the 6th month, there was no loss of participants in the researcher's telephone calls during each time period of the study. After the first 6 months of telephone follow-up, this period coincides with the onset of the COVID-19 pandemic. It is possible that, during this period, patients have changed their place of residence, living with their family, to manage the self-care of HF, which is demanding and difficult, due to the conditions and the adoption of emergency measures during the pandemic period, as well as in the case of possible COVID-19 disease, to receive the support of their families. The patients in the study were elderly, and a large percentage of the patients did not have a mobile phone, resulting in the researcher not being able to communicate with this portion of the patients when they changed their residence. From the literature, regarding the factors that may be responsible for the loss of participants from the RCTs, the demographic and clinical characteristics of the sample (socioeconomic and psychological factors), the severity of the disease affecting functional capacity and physical condition, psychological reasons, mental disorders (depression), change of place of residence, as well as the COVID-19 pandemic were found to be related. It was also shown that in chronic patients of low and middle income, the lack of knowledge about the chronic disease, the duration of treatment, and non-compliance with it, contributed to the loss of participants from the follow-up of chronic patients in the studies (Tong et al., 2023). The table below lists the clinical characteristics of the participants by group.

Table 5
Clinical Characteristics per Group

	Intervention Group, N = 93	Control Group, N = 93	p-value
	N (%)	N (%)	
Basic Etiology of Heart Failure			
Arterial Hypertension	14 (15)	13 (14)	0,999÷
Valvular Disease	14 (15)	16 (17)	0,842÷
Ischemic Cardiomyopathy	3 (3,2)	1 (1,1)	0,613÷
Chronic Atrial Fibrillation	30 (32)	31 (33,6)	0,479÷
Coronary Heart Disease	45 (48)	52 (56)	0,378÷
Congenital Heart Disease	3 (3,2)	1 (1,1)	0,613÷
Other Chronic Diseases -Comorbidities			
Arterial Hypertension	5 (5,4)	7 (7,5)	0,765÷
Chronic Kidney Disease	13 (14)	16 (17)	0,686÷
Pulmonary Hypertension	1 (1,1)	2 (2,2)	0,999÷
Diabetes Mellitus	14 (15)	27 (29)	**0,034÷**
Chronic Obstructive Pulmonary Disease	17 (18)	9 (9,7)	0,139÷
Other	2 (2,2)	4 (4,3)	0,689÷
Time since first diagnosis of Heart Failure			
1-2 years	5 (5,4)	4 (4,3)	0,987÷
>2 years	88 (95)	89 (96)	
Ejection Fraction			
<40%	49 (52)	52 (56)	0,598÷
>=40%	44 (48)	41 (44)	
Previous Number of Hospital Admissions for Heart Failure			
<1 month	39 (41,9)	52 (55,9)	0,057÷

1-2 months	52 (55,9)	34 (36,6)
>3 months	2 (2,2)	7 (7,5)

÷Pearson's X^2 test

Table 6
Descriptive Statistics of Quality-of-Life Scale per Group and Time Period

		Group		
	N	Intervention Mean (SD)	Control Mean (SD)	Effect size Cohen's d
Total Quality of Life				
Discharge	186	75,4 (15,9)	74,2 (15,2)	-0,1
1st Week	166	67,5 (17)	72,4 (16,8)	0,3
1st Month	162	62,7 (16,1)	69,7 (15,6)	0,4
6th Month	156	61,4 (20,7)	76,3 (19,9)	0,7
1st Year	67	64,6 (21,7)	57,4 (19,6)	-0,3
Physical Dimension of Health				
Discharge	186	39,9 (8,2)	39,7 (8,6)	-0,02
1st Week	166	35,3 (8,6)	38,4 (9,1)	0,3
1st Month	162	31,2 (9,5)	35,8 (8,5)	0,5
6th Month	156	30,6 (10)	36,9 (9,4)	0,7
1st Year	67	32,3 (10,9)	28,4 (10,5)	-0,4
Emotional Dimension of Health				
Discharge	186	23,8 (5,3)	23,5 (5,3)	-0,1
1st Week	166	21,9 (5,3)	22,8 (5,7)	0,2
1st Month	162	21,4 (5,1)	21,9 (5)	0,1
6th Month	156	18,8 (5,8)	22,3 (5,7)	0,6
1st Year	67	19,7 (6,6)	17,6 (6,8)	-0,3
Socioeconomic Dimension of Health				
Discharge	186	11,2 (5,2)	10,9 (4,9)	-0,1
1st Week	166	11,2 (5,1)	15,2 (5,2)	0,1
1st Month	162	10,9 (4,6)	16,7 (5,1)	0,3
6th Month	156	17,1 (5,3)	20,4 (4,4)	0,8
1st Year	67	18,2 (5,3)	17,1 (4,1)	-0,1

Table 7
Descriptive Statistics of Social Support Scale per Group and Time Period

		Group		
	N	Intervention	Control	Effect Size Cohen's d
Total Social Support		Μέση τιμή (SD)	Μέση τιμή (SD)	
Discharge	186	68,4 (8,5)	71,5 (7,2)	0,4
1st Week	166	70,5 (7,3)	69,8 (9,9)	-0,1
1st Month	162	70,9 (7)	70,2 (8)	-0,1

		Group		
	N	Intervention	Control	Effect Size Cohen's d
6th Month	156	68,3 (8,6)	65,1 (12)	-0,3
1st Year	67	66,8 (10,9)	66,2 (12,6)	<0,1
Family/ Significant Others				
Discharge	186	53,3 (5,7)	54,2 (5,1)	0,2
1st Week	166	54,4 (4,7)	53,5 (8,5)	-0,1
1st Month	162	53,8 (4)	53,8 (6,2)	<0,1
6th Month	156	52,4 (6)	47,7 (8,9)	-0,6
1st Year	67	50,8 (8,2)	49,9 (9,1)	-0,1
Frients				
Discharge	186	15 (6,6)	17,3 (6,3)	0,3
1st Week	166	16,1 (5,6)	16,3 (7,3)	<0,1
1st Month	162	17,1 (5,3)	16,4 (7)	-0,1
6th Month	156	15,9 (6,6)	17,5 (7,4)	0,2
1st Year	67	16 (7,5)	16,4 (8,6)	<0,1

Table 8

Mixed Linear Model for the Effect of the Intervention on Total Quality of Life

Factor	B+	95% Δ.E++	p-value
Intervention (Yes vs No)	-1,7	-6,4, 3,1	0,513
Time Period	-0,90	-1,9, 0,15	0,093
Intervention * Time Period	**-2,1**	-3,6, -0,71	**0,003**

+dependence coefficient ++95%Confidence interval

Table 9

Mixed Linear Model for the Effect of the Intervention on the Emotional Dimension/ Health of Quality of Life

Factor	B+	95% Δ.E	p-value
Intervention (Yes vs No)	-0,13	-1,6, 1,3	0,900
Time Period	-0,60	-0,91, -0,29	<0,001
Intervention * Time Period	**-0,52**	-0,94, -0,10	**0,017**

+dependence coefficient +dependence coefficient ++95%Confidence interval

Table 10

Mixed Linear Model for the Effect of the Intervention on the Physical Dimension/Health of Quality of Life

Factor	**B+**	**95% Δ.E**	**p-value**
Intervention (Yes vs No)	-1,6	-4,1, 0,85	0,190
Time Period	-1,5	-2,0, -1,0	<0,001
Intervention * Time Period	**-0,81**	-1,5, -0,08	**0,030**

+dependence coefficient +dependence coefficient ++95%Confidence interval

Table 11

Mixed Linear Model for the Effect of the Intervention on the Socioeconomic Dimension of Health Quality of Life

Factor	B+	95% Δ.Ε	p-value
Intervention (Yes vs No)	0,20	-1,1, 1,5	0,786
Time Period	1,4	1,0, 1,7	<0,001
Intervention * Time Period	**-0,75**	-1,2, -0,27	**0,002**

+dependence coefficient +dependence coefficient ++95%Confidence interval

Pearson correlation coefficients for the QoL and SS scales

			Total Social Support (MSPSS)
Total Quality of Life (MLHFQ)	r	0,69	-0,38
	p	**<0,001**	**<0,001**

Table 12

Regression Analysis for the Moderating Role of Monthly Income in the Relationship between Social Support and Quality of Life

Factor	B	SE	t	p-value
(Intercept)	84.98	11.2	7.6	<0.001
Total Social Support (MSPSS)	-0.11	0.2	-0.7	0.486
Monthly Income >600 Ευρώ	74.15	22.1	3.4	0.001
Total Social Support (MSPSS) ***X*** Monthly Income >600 Ευρώ	**-1.11**	0.3	-3.6	**<0.001**

Table 13

Regression Analysis for the Moderating Role of Ejection Fraction in the Social Support and Quality of Life Relationship

Factor	B	SE	t	p-value
(Intercept)	83.17	11.4	7.3	<0.001
Total Social Support (MSPSS)	-0.04	0.2	-0.3	0.795
Ejection Fraction >=40%	52.10	18.4	2.8	0.005
Total Social Support (MSPSS) ***X*** Ejection Fraction >=40%	**-0.89**	0.3	-3.4	**0.001**

3.2 Discussion

In the present study, it was demonstrated that at discharge, there is a moderate difference between the two groups in terms of overall perceived SS, with the intervention group reporting less perceived SS compared to the control group. It seems that this difference decreases, and in the remaining time periods, there is no difference between the two groups. Specifically, in the 1st week, an increase in overall SS was observed, which tended to increase up to the 1st month. However, in the 6th month and the 1st year, the values were found to be reduced compared to the initial overall score from the beginning of the study. Specifically, in the two groups of the study at the beginning of the study, the overall perceived SS was found to be high, with the intervention group at the end of the study, having a similar score to the initial one, while the control group, lower than the initial one, which at the beginning was higher than the intervention group. The increasing total score of the 1st week, as well as the 1st month, is likely due to the perceived SS that the patients received from the health professionals during their hospitalization in the Cardiology Clinic, but also from the perceived SS, which they may have received during the educational process. A similar picture is observed in the subfactor concerning support from Friends, while for Family/SO, the difference was moderate to high only at 6 months, where the intervention group had a greater perceived SS from Family/SO, compared to the control group. From the analysis of the data, it was found with a statistically significant difference that the increase in perceived SS resulted in an improvement in the patients' QoL. As the perceived total SS increased, it also implied an improvement in the overall QoL. The perception of support may motivate patients to better emotional adjustment, so that they can react positively to the diagnosis and management of their chronic illness. According to the literature, perceived SS is an ever-increasing motivation for self-preservation, self-management, and compliance with the treatment regimen (Kamp et al., 2019). In the study by Heo et al (2012), it was found that emotional support was significantly related to the management of symptoms in patients with HF. Emotional support appeared to be more important than visible, organic, and practical support, as well as a simple relationship. Similar findings of a strong correlation between SS and QoL were found in the cross-sectional study by Arestedt et al. (2012), where it was shown that the higher the level of perceived SS, the higher the level of QoL. Also, in the cross-sectional comparative study by Sok & Yum (2011), it was shown that older adults who lived with family members enjoyed a better level of health, due to increased perceived family support, compared to older adults who lived alone and without social resources. Patients who live alone have low to medium levels of perceived SS (Allemann et al., 2018) and higher social isolation (Saito et al., 2019). Also, single patients have higher rates of moderate/high perceived social isolation (Manemann et al., 2018). Even patients aged >60 years experience higher levels of social isolation (Obieglo et al., 2016). Chronic patients receive SS mainly from family members and friends (Allemann et al., 2018). Family/SO and Friends play a key role in supporting patients in managing their chronic illness (Graven & Grant, 2013), enhancing self-care and supporting their daily lives, resulting in improving patients' QoL (Olano-Lizaraga et al., 2021). Also, in the cross-sectional study by Unsar et al. (2016), a statistically significant positive correlation was found between the health of the elderly, the improvement of QoL, and the perceived SS by Family/SO and Friends.

Improvement in the QoL of older people was also observed in the prospective longitudinal cohort study of Naylor et al. (2016), with increasing perceived SS. Similar findings were also found in the study by Davari (2011), in which a positive outcome of perceived SS on the QoL of patients with HF was observed. The same results were also seen in the systematic literature review by Mulugeta et al. (2023), who investigated the factors that influence the QoL of patients with HF and found that reduced perceived SS is one of the factors that influence the QoL of patients with HF. The research data showed that in the social isolation of patients, particular emphasis is placed on the quality of relationships, which has a great impact on perceived SS. The benefits of perceived SS were found to be multifactorial, including personal empowerment, as well as professional guidance (Gronewold et al., 2021). In the same direction are the results of the study by Wenn et al. (2022), in which various categories of perceived SS were found to be associated with the highest level of QoL of patients, with compliance with the treatment regimen, as well as with regular attendance at their medical appointments. The study by Kashani et al. (2020), showed that SS has a positive effect on the QoL of patients with HF. As the perceived SS increased, regardless of the type of support and social network, the QoL of elderly individuals improved. The study by Liao & Brunner (2016), emphasizes the effect of perceived SS to be independent of chronic disease. It was found that the level of health in individuals with chronic diseases and a strengthened social network was better than that of elderly individuals without chronic diseases and with lower perceived SS. The social network favors the health level of individuals, as well as self-confidence, self-esteem, for their individual health. The effect is related depending on the degree of social networking of individuals. It also presents differences, depending on the social and economic status of patients, demographic factors, such as their family status, the existence of a partner, the presence of children, as well as their professional, active work status (Sarla et al., 2016). The findings of the present study demonstrate that the EF and Monthly Income regulate the relationship between perceived SS and QoL. The population of our study was mostly low-income, non-economically active. From the literature review (Megiati et al., 2022), it was found that these populations may be related to the low level of self-management, self-preservation, and self-care behavior, where self-care is undertaken by the Family/SO. Income has a significant and positive effect on the QoL of patients with HF. Finances, income are important factors that negatively affect health and contribute to the general health status of individuals. Chronic patients, who have low income, have poor QoL, as patients with HF are dependent on medical care, and chronic patients cannot afford medical expenses and living expenses due to their physical condition. Their individual health is also affected by their socioeconomic status. Low social and economic status are associated with higher levels of stress, anxiety, depression, and affects the general health status of patients (Husna et al., 2023). Similar findings of association of reduced QoL with patients' income, their socioeconomic status, reduced meaning in life, and reduced perceived SS were found in similar studies (Erceg et al., 2013; Liu et al., 2021). In addition to Monthly Income, which affects the relationship between perceived SS and QoL, EF was also found to moderate the above relationship. The increased discomfort of symptoms of dyspnea, fatigue, increased needs for additional care, reduced left ventricular EF, the improvement of which has been found by studies to be associated with improved physical condition and function, reduced fatigue of patients, as well as with the emotional dimension of health of QoL, as well as with satisfaction with their social roles and the meaning of life (Proudfoot et al., 2020; Wohlfahrt et al., 2021; Liu et al., 2021; Husna et al., 2023).

Findings from studies conducted on a sample of patients with HF, in a European and Asian population, demonstrated the positive effect of perceived SS on the QoL of chronic elderly patients, despite the cultural and cultural differences of the populations (Sok & Yun, 2011; Liao & Brunner, 2016; Unsar et al., 2016; Belanger et al., 2016). In contrast, the results of the systematic literature review by Purcell et al. (2023) found that social networking interventions, SS, did not have a clear effect on the outcome of death, hospital readmissions, or QoL. The study revealed that the diversity of programs with social networking and SS interventions, and how they were implemented and tested, was highly variable. Similar to the results of the present study were the results of the cross-sectional study by Sabet et al. (2022), which showed that patients with high perceived SS had better QoL, despite the severity of the disease and the severity of symptoms.

4 Conclusion

The findings of the study show that the dual nursing intervention has a small positive effect on the development and enhancement of the overall perceived SS of the patients in the intervention group, with an increasing trend over time, which, however, is not maintained over time until the end of the research process. A correlation between the perceived overall SS and the overall QoL of the patients was observed in the study, as the increasing overall perceived SS led to a better QoL. From the findings of the clinicodemographic factors, in the relationship between perceived overall SS and overall QoL, it was found that Monthly Income >600 Euros and Left Ventricular EF >=40% have a regulating role. It was observed that patients with the above clinicodemographic characteristics declare increased perceived overall SS and improvement in overall QoL. The loss of perceived social role is an indicator of social vulnerability, constitutes an independent predictor of future adverse events in patients with HF, and is associated with an increased risk of adverse events and negative clinical outcomes. Therefore, the assessment and evaluation of perceived SS in these patients is considered necessary, since it provides additional prognostic information and is positively associated with QoL. Due to the physical, psychosocial, spiritual, and economic needs, the assessment of perceived SS of these patients is considered necessary through continuous follow-up and communication. Specialized health professionals must ensure that they receive ongoing education on specialized topics related to patients with HF and, in particular, on those of SS.

Acknowledgments
We are grateful to two anonymous reviewers for their valuable comments on the earlier version of this paper.

References

Aggelopoulou, Z., Fotos, N. V., Chatziefstratiou, A. A., Giakoumidakis, K., Elefsiniotis, I., & Brokalaki, H. (2017). The level of anxiety, depression and quality of life among patients with heart failure in Greece. *Applied Nursing Research*, *34*, 52-56. https://doi.org/10.1016/j.apnr.2017.01.003

Allemann, H., Strömberg, A., & Thylén, I. (2018). Perceived social support in persons with heart failure living with an implantable cardioverter defibrillator: a cross-sectional explorative study. *Journal of Cardiovascular Nursing*, *33*(6), E1-E8.

Årestedt, K., Saveman, B. I., Johansson, P., & Blomqvist, K. (2013). Social support and its association with health-related quality of life among older patients with chronic heart failure. *European journal of cardiovascular nursing*, *12*(1), 69-77.

Audi, G., Korologou, A., Koutelekos, I., Vasilopoulos, G., Karakostas, K., Makrygianaki, K., & Polikandrioti, M. (2017). Factors affecting health related quality of life in hospitalized patients with heart failure. *Cardiology research and practice*, *2017*(1), 4690458.

Baert, A., De Smedt, D., De Sutter, J., De Bacquer, D., Puddu, P. E., Clays, E., & Pardaens, S. (2018). Factors associated with health-related quality of life in stable ambulatory congestive heart failure patients: Systematic review. *European journal of preventive cardiology*, *25*(5), 472-481.

Bélanger, E., Ahmed, T., Vafaei, A., Curcio, C. L., Phillips, S. P., & Zunzunegui, M. V. (2016). Sources of social support associated with health and quality of life: a cross-sectional study among Canadian and Latin American older adults. *BMJ open*, *6*(6), e011503.

Brokalaki, H., Patelarou, E., Giakoumidakis, K., Kollia, Z., Fotos, N. V., Vivilaki, V., ... & Kallikazaros, I. E. (2015). Translation and validation of the Greek "Minnesota Living with Heart Failure" questionnaire. *Hellenic J Cardiol*, *56*(1), 10-19.

Browder, S. E., & Rosamond, W. D. (2023). Preventing heart failure readmission in patients with low socioeconomic position. *Current cardiology reports*, *25*(11), 1535-1542.

Shanks, N. H. (Ed.). (2016). *Introduction to health care management*. Jones & Bartlett Publishers.

Bui, A. L., Horwich, T. B., & Fonarow, G. C. (2011). Epidemiology and risk profile of heart failure. *Nature reviews cardiology*, *8*(1), 30-41.

Carlson, B., Pozehl, B., Hertzog, M., Zimmerman, L., & Riegel, B. (2013). Predictors of overall perceived health in patients with heart failure. *Journal of Cardiovascular Nursing*, *28*(3), 206-215.

Cesaroni, G., Mureddu, G. F., Agabiti, N., Mayer, F., Stafoggia, M., Forastiere, F., ... & Boccanelli, A. (2021). Sex differences in factors associated with heart failure and diastolic left ventricular dysfunction: a cross-sectional population-based study. *BMC Public Health*, *21*(1), 415.

Chamberlain, L. (2017). Perceived social support and self-care in patients hospitalized with heart failure. *European Journal of Cardiovascular Nursing*, *16*(8), 753-761.

Davari, A. (2011). The Effect of Social Support on Quality of Life in Patients with Heart Failure Referring to the Specialized Center of Cardiology, Hamadan University of Medical Sciences, Master Thesis, 2011.

Marques, C. R. D. G., de Menezes, A. F., Ferrari, Y. A. C., Oliveira, A. S., Tavares, A. C. M., Barreto, A. S., ... & Santana-Santos, E. (2022). Educational nursing intervention in reducing hospital readmission and the mortality of patients with heart failure: a systematic review and meta-analysis. *Journal of cardiovascular development and disease*, *9*(12), 420.

Deek, H., Noureddine, S., Allam, D., Newton, P. J., & Davidson, P. M. (2021). A single educational intervention on heart failure self-care: extended follow-up from a multisite randomized controlled trial. *European Journal of Cardiovascular Nursing*, *20*(3), 212-219.

Dinatolo, E., Sciatti, E., Anker, M. S., Lombardi, C., Dasseni, N., & Metra, M. (2018). Updates in heart failure: what last year brought to us. *ESC heart failure*, *5*(6), 989.

Erceg, P., Despotovic, N., Milosevic, D. P., Soldatovic, I., Zdravkovic, S., Tomic, S., ... & Davidovic, M. (2013). Health-related quality of life in elderly patients hospitalized with chronic heart failure. *Clinical interventions in aging*, 1539-1546.

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior research methods*, *39*(2), 175-191.

Franzén, K., Saveman, B. I., & Blomqvist, K. (2007). Predictors for health related quality of life in persons 65 years or older with chronic heart failure. *European Journal of Cardiovascular Nursing*, *6*(2), 112-120.

Gabet, A., Juillière, Y., Lamarche-Vadel, A., Vernay, M., & Olié, V. (2015). National trends in rate of patients hospitalized for heart failure and heart failure mortality in France, 2000–2012. *European journal of heart failure*, *17*(6), 583-590.

Gardiner, F. W., Gale, L., Foreman, R., Potter, J., & Laverty, M. (2019). Cardiovascular disease prevention and rehabilitation in rural and remote populations. *Royal Flying Doctor Service https://www. flyingdoctor. org. au/what-we-do/research/. Published*.

Graven, L. J., & Grant, J. (2013). The impact of social support on depressive symptoms in individuals with heart failure: update and review. *Journal of Cardiovascular Nursing*, *28*(5), 429-443.

Gronewold, J., Engels, M., Van De Velde, S., Cudjoe, T. K. M., Duman, E. E., Jokisch, M., ... & Hermann, D. M. (2021). Effects of life events and social isolation on stroke and coronary heart disease. *Stroke*, *52*(2), 735-747.

Hak, T., Willems, D., Van der Wal, G., & Visser, F. (2004). A qualitative validation of the Minnesota Living with Heart Failure Questionnaire. *Quality of Life Research*, *13*(2), 417-426.

Heo, S., Moser, D. K., Chung, M. L., & Lennie, T. A. (2012). Social status, health-related quality of life, and event-free survival in patients with heart failure. *European Journal of Cardiovascular Nursing*, *11*(2), 141-149.

Husna, C., Halfiah, H., & Marlina, M. (2023). Investigating Occupation, Ejection Fraction, and Comorbidity Factors with Quality of Life in Heart Failure Patients: A Cross-sectional Study in Indonesia. *Modern Care Journal*, *20*(3).

Kamp, K. J., West, P., Holmstrom, A., Luo, Z., Wyatt, G., & Given, B. (2019). Systematic review of social support on psychological symptoms and self-management behaviors among adults with inflammatory bowel disease. *Journal of Nursing Scholarship*, *51*(4), 380-389.

Kashani, A. K., Kooshki, S., Kazemi, A. S., & Khoshli, A. K. (2020). Structural equation modeling of relationships between social support, self-efficacy, and quality of life in patients with heart failure. *Shahroud Journal of Medical Sciences*.

Khaledi, G.H., Eslami, A.A., Afza, H.R., Mostafavi, F., Hassanzadth, A., Mahboudi, M., (2014). Social Support and Self-care Behaviour among Heart Failure: Is there any Relationship? *Journal of Biology and Today's World, 3*(9),194-197.

Klindtworth, K., Oster, P., Hager, K., Krause, O., Bleidorn, J., & Schneider, N. (2015). Living with and dying from advanced heart failure: understanding the needs of older patients at the end of life. *BMC geriatrics*, *15*(1), 125.

Kollia, Z. A., Giakoumidakis, K., & Brokalaki, H. (2016). The effectiveness of nursing education on clinical outcomes of patients with heart failure: a systematic review.

Lahoz, R., Fagan, A., McSharry, M., Proudfoot, C., Corda, S., & Studer, R. (2020). Recurrent heart failure hospitalizations are associated with increased cardiovascular mortality in patients with heart failure in Clinical Practice Research Datalink. *ESC heart failure*, *7*(4), 1688-1699.

Lambrinou, E., Kalogirou, F., Lamnisos, D., Middleton, N., Sourtzi, P., Lemonidou, C., ... & Papathanassoglou, E. (2013). Evaluation of the psychometric properties of the Greek version of the Minnesota Living With Heart Failure questionnaire. *Journal of cardiopulmonary rehabilitation and prevention*, *33*(4), 229-233.

Liao, J., & Brunner, E. J. (2016). Structural and functional measures of social relationships and quality of life among older adults: does chronic disease status matter?. *Quality of Life Research*, *25*(1), 153-164.

Liu, M. H., Chiou, A. F., Wang, C. H., Yu, W. P., & Lin, M. H. (2021). Relationship of symptom stress, care needs, social support, and meaning in life to quality of life in patients with heart failure from the acute to chronic stages: a longitudinal study. *Health and Quality of Life Outcomes*, *19*(1), 252.

Manemann, S. M., Chamberlain, A. M., Roger, V. L., Griffin, J. M., Boyd, C. M., Cudjoe, T. K., ... & Finney Rutten, L. J. (2018). Perceived social isolation and outcomes in patients with heart failure. *Journal of the American Heart Association*, *7*(11), e008069.

McMurray, J. J., Gerstein, H. C., Holman, R. R., & Pfeffer, M. A. (2014). Heart failure: a cardiovascular outcome in diabetes that can no longer be ignored. *The lancet Diabetes & endocrinology*, *2*(10), 843-851.

Megiati, H. M., Grisante, D. L., D'Agostino, F., Santos, V. B., & Lopes, C. T. (2022). Relationship between perceived social support and self-care of patients with heart failure. *Acta Paulista de Enfermagem*, *35*, eAPE01296.

Mulugeta, H., Sinclair, P. M., & Wilson, A. (2023). Health-related quality of life and its influencing factors among people with heart failure in Ethiopia: using the revised Wilson and Cleary model. *Scientific reports*, *13*(1), 20241.

Naylor, M. D., Hirschman, K. B., Hanlon, A. L., Abbott, K. M., Bowles, K. H., Foust, J., ... & Zubritsky, C. (2016). Factors associated with changes in perceived quality of life among elderly recipients of long-term services and supports. *Journal of the American Medical Directors Association*, *17*(1), 44-52. https://doi.org/10.1016/j.jamda.2015.07.019

Negarandeh, R., Zolfaghari, M., Bashi, N., & Kiarsi, M. (2019). Evaluating the effect of monitoring through telephone (tele-monitoring) on self-care behaviors and readmission of patients with heart failure after discharge. *Applied clinical informatics*, *10*(02), 261-268.

Noori, A., Shokoohi, M., Baneshi, M. R., Naderi, N., Bakhshandeh, H., & Haghdoost, A. A. (2014). Impact of socio-economic status on the hospital readmission of Congestive Heart Failure patients: a prospective cohort study. *International journal of health policy and management*, *3*(5), 251.

Obiegło, M., Uchmanowicz, I., Wleklik, M., Jankowska-Polańska, B., & Kuśmierz, M. (2016). The effect of acceptance of illness on the quality of life in patients with chronic heart failure. *European journal of cardiovascular nursing*, *15*(4), 241-247.

Olano-Lizarraga, M., Wallström, S., Martín-Martín, J., & Wolf, A. (2022). Causes, experiences and consequences of the impact of chronic heart failure on the person´ s social dimension: a scoping review. *Health & social care in the community*, *30*(4), e842-e858.

Otsu, H., & Moriyama, M. (2014). 36-Month Follow-Up Study of Post-Intervention Chronic Heart Failure Patients. *Health*, *6*(7), 559-575.

Oyanguren, J., García, P. M. L., Laguna, J. T., Goya, I. L., Martín, S. R., Lafuente, E. M., & Grandes, G. (2016). Effectiveness and factors determining the success of management programs for patients with heart failure: a systematic review and meta-analysis. *Revista Española de Cardiología (English Edition)*, *69*(10), 900-914. https://doi.org/10.1016/j.rec.2016.05.012

Ponikowski, P., Voors, A. A., Anker, S. D., Bueno, H., Cleland, J. G., Coats, A. J., ... & Van Der Meer, P. (2016). 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *Polish Heart Journal (Kardiologia Polska)*, *74*(10), 1037-1147.

Proudfoot, C., Fonseca, A. F., Lahoz, R., Corda, S., Cotton, S., Jackson, J., & Studer, R. (2020). Patients with heart failure and a LVEF less than 40% present an overall lower health related quality of life than those with LVEF between 40% and 60%: a multinational real-world survey in EU. *European Heart Journal*, *41*(Supplement_2), ehaa946-0974.

Purcell, C., Dibben, G., Hilton, Boom, M., Matthews, L. et al., (2023). Do Social Support Interventions Help people with Heart Disease? Cochrane Evidence Synthesis and Methods, CD013820.

Raghupathi, W., & Raghupathi, V. (2018). An empirical study of chronic diseases in the United States: a visual analytics approach to public health. *International journal of environmental research and public health*, *15*(3), 431.

Rahimi, K., Bennett, D., Conrad, N., Williams, T. M., Basu, J., Dwight, J., ... & MacMahon, S. (2014). Risk prediction in patients with heart failure: a systematic review and analysis. *JACC: Heart Failure*, *2*(5), 440-446.

Rector, T. S. (1987). Patient's self-assessment of their congestive heart failure: content, reliability, validity of a new measure, the Minnesota living with heart failure questionnaire. *Heart failure*, *3*, 198-209.

Regitz-Zagrosek, V. (2020). Sex and gender differences in heart failure. *International journal of heart failure*, *2*(3), 157.

Sabet, R., Dehghani, S., & Jeyhooni, A. K. (2022). The relationship of social support and severity of disease with quality of life in heart failure patients. *Genel Sağlık Bilimleri Dergisi*, *4*(3), 217-225.

Saito, H., Kagiyama, N., Nagano, N., Matsumoto, K., Yoshioka, K., Endo, Y., ... & Matsue, Y. (2019). Social isolation is associated with 90-day rehospitalization due to heart failure. *European Journal of Cardiovascular Nursing*, *18*(1), 16-20.

Seid, M. A. (2020). Health-related quality of life and extent of self-care practice among heart failure patients in Ethiopia. *Health and Quality of Life Outcomes*, *18*(1), 27.

Sok, S. R., & Yun, E. K. (2011). A comparison of physical health status, self-esteem, family support and health-promoting behaviours between aged living alone and living with family in Korea. *Journal of Clinical Nursing*, *20*(11-12), 1606-1612.

Sousa, M. M. D., Oliveira, J. D. S., Soares, M. J. G. O., Bezerra, S. M. M. D. S., Araújo, A. A. D., & Oliveira, S. H. D. S. (2017). Association of social and clinical conditions to the quality of life of patients with heart failure. *Revista gaucha de enfermagem*, *38*, e65885.

Stavrianopoulos, T. (2016). Impact of a nurses-led telephone intervention program on the quality of life in patients with heart failure in a district hospital of Greece. *Health Science Journal*, *10*(4), 1.

Tong, C. Y. M., Koh, R. Y. V., & Lee, E. S. (2023). A scoping review on the factors associated with the lost to follow-up (LTFU) amongst patients with chronic disease in ambulatory care of high-income countries (HIC). *BMC health services research*, *23*(1), 883.

Unsar, S., Erol, O., & Sut, N. (2016). Social support and qualıty of life among older adults. *International Journal of Caring Sciences*, *9*(1), 249-257.

Wan, L. H., Zhang, X. P., Mo, M. M., Xiong, X. N., Ou, C. L., You, L. M., ... & Zhang, M. (2016). Effectiveness of goal-setting telephone follow-up on health behaviors of patients with ischemic stroke: a randomized controlled trial. *Journal of Stroke and Cerebrovascular Diseases*, *25*(9), 2259-2270. https://doi.org/10.1016/j.jstrokecerebrovasdis.2016.05.010

Wazqar, D. Y., & Al-Saud, N. U. A. (2023). Effect of interventional follow-up phone calls on health-related quality of life in adult patients with heart failure in Saudi Arabia: a pilot study. *Nursing in the 21st Century*, *22*(1 (82)), 20-25.

Wenn, P., Meshoyrer, D., Barber, M., Ghaffar, A., Razka, M., Jose, S., ... & Makaryus, A. N. (2022). Perceived social support and its effects on treatment compliance and quality of life in cardiac patients. *Journal of Patient Experience*, *9*, 23743735221074170.

Wohlfahrt, P., Nativi-Nicolau, J., Zhang, M., Selzman, C. H., Greene, T., Conte, J., ... & Stehlik, J. (2021). Quality of life in patients with heart failure with recovered ejection fraction. *JAMA cardiology*, *6*(8), 957-962.

Yancy, C. W., Jessup, M., Bozkurt, B., Butler, J., Casey Jr, D. E., Colvin, M. M., ... & Westlake, C. (2017). 2017 ACC/AHA/HFSA focused update of the 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Failure Society of America. *Journal of the American college of cardiology*, *70*(6), 776-803.

Yu, M., Chair, S. Y., Chan, C. W., & Choi, K. C. (2015). A health education booklet and telephone follow-ups can improve medication adherence, health-related quality of life, and psychological status of patients with heart failure. *Heart & Lung*, *44*(5), 400-407. https://doi.org/10.1016/j.hrtlng.2015.05.004

Zhai, S., Gardiner, F., Neeman, T., Jones, B., & Gawarikar, Y. (2017). The cost-effectiveness of a stroke unit in providing enhanced patient outcomes in an Australian teaching hospital. *Journal of stroke and cerebrovascular diseases*, *26*(10), 2362-2368. https://doi.org/10.1016/j.jstrokecerebrovasdis.2017.05.025

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of personality assessment*, *52*(1), 30-41.

Biography of Authors

Stergiani Petaloti
Regular Outpatient Clinics, Serres General Hospital, Greece
Email: stergpetaloti@gmail.com

Zoe Roupa
University of Nicosia, School of Sciences and Engineering, Department of Life and Health Sciences, Cyprus

Ekaterini Lambrinou
Cyprus University of Technology, School of Health Sciences, Nursing Department, Limassol, Cyprus

Maria Noula
University of Nicosia, School of Sciences and Engineering, Department of Life and Health Sciences, Cyprus