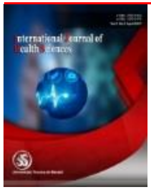

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Evaluation of the Effect of Nursing Intervention on Perceived Social Support of Patients with Heart Failure

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

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***Corresponding Author* [a]**

Abstract

Heart Failure (HF) limits the normal functions and social behaviors of patients, their daily lives, thus affecting perceived Social Support (SS) and leading to a feeling of social isolation. ***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 subsequent structured telephone follow-up, on perceived SS and its effect on the rate of readmissions, the total number of days of hospitalization and mortality, for 12 months after the patients' discharge from the hospital, about usual care. **Material - Method:** This is a Randomized Clinical Trial (RCT), with an intervention and control group, which was carried out at the Cardiology Clinic of the Secondary 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 12 months. Data were collected in five time periods, the first at discharge and followed by four post-experimental measurements over one year, at the 1st week, at the 1st and 6th months, and at 12 months. The control group (N=93) did not receive any intervention, other than usual care. The assessment of perceived social support was carried out using the Multidimensional Scale of Perceived Social Support (MSPSS). Data on the rate of readmissions, the total number of days of hospitalization, and mortality were recorded on a special form. For the statistical analysis of the data, for the studied parameter, the average level per period was studied, with the effect size, difference, and Cohen's d coefficient. The effect of perceived SS on outcomes, readmissions, length of hospitalization, and death was studied using the statistical t-test and the ANOVA test. The analysis of the effect of the intervention on mortality levels, length of hospitalization, and number of readmissions was carried out using the x^2 test. The statistical significance level was set at 0.05. The internal validity of the data collected with the MSPSS scale was tested using Cronbach's alpha. The statistical program SPSS-26.0 was used for 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). From the correlation of the level of perceived SS with the number of

Keywords

education;
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nursing intervention
social support;
telephone follow-up;

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[a] Regular Outpatient Clinics, 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

readmissions, the total number of days of hospitalization and the outcome of death, it was found that the total perceived SS and support from Friends, were associated with the lowest number of readmissions, in all periods (1st year, Friends, p=0.033, total SS, p=0.019). Also, support from Friends was found to be associated with the total number of days of hospitalization (3-5 days), (1st year, Friends, p=0.001). Furthermore, overall perceived SS and support from Friends were found to be associated with mortality (1st year, Friends, p=0.008, overall SS, p=0.038). **Conclusions:** The findings of the study demonstrate that SS in patients with HF not only positively supports the basic parameters that affect them, but also opens up new perspectives for supporting and addressing their difficulties through specialized nursing intervention.

Contents

1 Introduction

HF is a multidimensional syndrome, which has an escalating prevalence and negative impacts on individual, social and economic levels, despite the progress of optimal, advanced pharmaceutical treatments. Patients with HF have increased morbidity and mortality, with the Health Systems of each country bearing the associated and very high direct and indirect health costs (Nicholson, 2014; Ziaeian & Fonarow, 2016; Parissis et al., 2015; Mozaffarian et al., 2016; Ponikowski et al., 2016; McDonagh et al., 2021; Savarese et al., 2022). HF limits the physiological functions and social behaviors of patients, their daily lives, resulting in reduced perceived SS, social isolation, which is associated with an increased risk of morbidity, mortality and increased healthcare costs. Low perceived SS in patients with HF is associated with poor clinical outcome. Readmissions, repeated unplanned hospitalizations, long hospital stays are associated with a deterioration in independence, self-efficacy and daily activities (Shumaker et al., 2017). In the literature review by Pontisidis & Bellalis (2015), the concept and forms of HF were described, as well as its positive or negative impact on the management of chronic diseases was investigated. It was found that SS was associated with lower rates of morbidity and mortality, as it prevents the adoption of unhealthy behaviors, improving the rates of positive self-care behaviors, self-efficacy, affecting the good emotional state, increasing good mood and mental well-being, with the sense of control over stressful events. The perceived SS between chronic patients and health professionals is due to efficient collaboration, active communication, strong, solid trust and interaction between them, as well as feedback. The result of the above, the effective and long-term self-preservation, self-management of their disease (Fuertes et al., 2007). The aim of this Randomized Clinical Trial (RCT) was to evaluate the effect of a dual nursing intervention, with an educational approach at the discharge of patients with HF followed by structured telephone follow-up, on perceived SS and its effect on the rate of

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readmissions, the total number of hospital days and mortality, 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 (permute) 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, according to the ethical standards of the 1983 Declaration of Helsinki.

Measurement Tool
The Multidimensional Scale of Perceived Social Support (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).

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 questionnaire, 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	52.6 (4.9)	[40-56]	0.70
Friends((SO)	16.0 (6.0)	[4-28]	0.84
Total Social Support (MSPSS)	68.9 (7.5)	[52-84]	0.80

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, the total number of readmissions, the number of readmissions due to HF dysregulation, the total number of hospitalization days, the total number of hospitalization days due to HF dysregulation and the number of deaths, 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 MSPSS scale statements were replaced using Multiple Imputation. Using the Kolmogorov-Smirnov criterion, the distributions of the quantitative variables were checked for normality of their distribution. 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, Mean - Mean Level and Standard Deviation (SD) were used and presented. Pearson's x^2 test (Pearson Chi-Square test) was used to compare proportions. For the effect of the intervention on the levels of the clinical outcome of death, length of hospital stay/Total Number of Hospital Days and Number of Readmissions, the statistical test, X^2 test, was used. To compare the quantitative variables between the two groups, the parametric Student's t-test was used (the effect of perceived SS, in the case of two categories, Death/Survival) and with the parametric analysis of variance test, the ANOVA statistical test (the effect of perceived SS, in the case of 3+ categories, such as Total Number of Hospital Days 1-2 days, 3-5 days and >=5 days.). The effect size of the intervention, the Mean Level of Perceived SS, per time period, was studied, with the size of the difference, the Cohen's d coefficient. The reliability of the MSPSS scale 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 2
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 by 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, 2014; 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, 2014; 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 et al., 2020). 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 (2014). Similar to the findings 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, by 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 3
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)	
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., 2012; 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, when 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 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 4
Clinical Characteristics by 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÷

	Intervention Group, N = 93	Control Group, N = 93	p-value
	N (%)	N (%)	
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

Mortality by Group and per period
The table below presents the number of patients in both groups who died at each period.

Table 5
Number of Deaths per period

Group	Discharge	*One Week*	*One Months*	*Six Months*	*One Year*	Total deaths
Intervention *(N=93)*	0 (0%)	**8** (8.6%)	**1** (1.1%)	**3** (3.2%)	**22** (23.7%)	**34** (36.6%)
Control *(N=93)*	0 (0%)	**12** (12.9%)	**3** (3.2%)	**3** (3.2%)	**28** (30.1%)	**46** (49.5%)
TOTAL *(N=186)*	0 (100%)	**20** (10.8%)	**4** (2.2%)	**6** (3.2%)	**50** (26.9%)	**80** (43%)

Table 6
Number of Readmissions per period

	Group		
Number of Readmissions	Intervention N (%)	Control N (%)	p-value
1st Week			
0	76 (89)	68 (84)	0,300÷
1	9 (11)	13 (16)	
Total	**85** (100)	**81** (100)	

	Group		
Number of Readmissions	Intervention N (%)	Control N (%)	p-value
1st Month			
0	64 (76)	52 (67)	0,182÷
1	11 (13)	19 (24)	
2	9 (11)	7 (9,0)	
Total	**84** (100)	**78** (100)	
6th Month			
0	25 (31)	9 (12)	**0,015**÷
1	17 (21)	23 (31)	
2	39 (48)	43 (57)	
Total	**81** (100)	**75** (100)	
1st Year			
0	8 (21)	14 (48)	**0,023**÷
1	11 (29)	9 (31)	
2	19 (50)	6 (21)	
Total	**38** (100)	**29** (100)	

÷Pearson's X^2 test

Table 7
Descriptive Statistics of Hospital Days in Patients Who Had Readmission

	Group		
Days of Hospitalization	Intervention N(%)	Control N(%)	p-value
1st Week			
<=5	4 (44)	8 (62)	0,666÷
>5	5 (56)	5 (38)	
Total	**9** (100)	**13** (100)	
1st Month			
<=5	12 (60)	11 (42)	0,234 ÷
>5	8 (40)	15 (58)	
Total	**20** (100)	**26** (100)	
6th Month			
<=5	5 (9,1)	19 (29)	**0,007**÷
>5	50 (91)	47 (71)	
Total	55 (100)	66 (100)	
1st Year			
<=5	12 (40)	8 (53)	0,396÷
>5	18 (60)	7 (47)	
Total	30 (100)	15 (100)	

÷Pearson's X^2 test

Petaloti, S., Roupa, Z., Lambrinou, E., & Noula, M. (2025). Evaluation of the effect of nursing intervention on perceived social support of patients with heart failure. International Journal of Health Sciences, 9(2), 808–829. https://doi.org/10.53730/ijhs.v9n2.15724

Table 8
Descriptive Statistics of Social Support Scale per Group and 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
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

Social Support and Number of Readmissions

The Mean Level of Perceived SS [mean (S.D.)] is presented, per group of patients with no (0), one (1), or two (2) readmissions.

Table 9
Correlation between Level of Social Support and Number of Readmissions

Period	Social Support [Mean (S.D.)]	Number of Readmissions			
1st Week		**0 N=144**	**1 N=22**		**p-value**
	Family/ / Significant Others	54 (6.6)	53.6 (8.6)		0.848
	Friends	16.7 (6.1)	12.9 (7.6)		**0.034**
	Total Social Support (MSPSS)	70.7 (8.4)	66.5 (9.9)		0.072
1st Month		**0 N=116**	**1 N=30**	**2 N=16**	**p-value**
	Family / Significant Others	53.9 (4.5)	54.4 (3.7)	52.1 (9.9)	0.329
	Friends	17.5 (5.8)	15.1 (6.4)	14.7 (7.1)	0.056
	Total Social Support (MSPSS)	71.4 (7.4)	69.5 (6.5)	66.8 (9.1)	**0.047**
6th Month		**0 N=34**	**1 N=40**	**2 N=82**	**p-value**
	Family/ / Significant Others	54 (4.4)	47.7 (6.7)	49.7 (9)	**0.002**
	Family	19.9 (6.3)	16.8 (6.5)	15.3 (7.1)	**0.005**
	Total Social Support (MSPSS)	73.9 (7.7)	64.5 (7.2)	65 (11.5)	**<0.001**
1st Year		**0 N=22**	**1 N=20**	**2 N=25**	**p-value**

Period	Social Support [Mean (S.D.)]	Number of Readmissions			
	Family/ / Significant Others	51.5 (5.1)	51.5 (8.7)	48.5 (10.5)	0.380
	Friends	19 (8.1)	16.9 (6.8)	13.1 (8)	**0.033**
	Total Social Support (MSPSS)	70.6 (10.5)	68.3 (10.5)	61.6 (11.9)	**0.019**

Social Support and Total Number of Hospitalization Days

The Mean Level of perceived SS of patients who were readmitted is presented, per total number of days of hospitalization.

Table 10
Correlation between Level of Social Support and Total Number of Hospitalization Days

Period	Social Support [mean (S.D.)]	Number of Hospitalization Days		
1st Week		**3-5, N=12**	**>5, N=10**	**p-value**
	Family / Significant Others	56 (0)	54.8 (2.7)	0.193
	Friends	12 (6.4)	13.2 (9.1)	0.733
	Total Social Support (MSPSS)	68 (6.4)	68 (8.6)	0.999
1st Month		**3-5 N=23**	**>5 N=23**	**p-value**
	Family / Significant Others	52.9 (9)	54.1 (3.1)	0.551
	Friends	15.1 (6.9)	15.1 (6.5)	0.998
	Total Social Support (MSPSS)	68 (8.8)	69.2 (6.3)	0.599
6st Month		**3-5 N=25**	**>5 N=97**	**p-value**
	Family / Significant Others	48.4 (6.5)	49.1 (8.7)	0.633
	Friends	18 (6)	15.2 (7.1)	0.055
	Total Social Support (MSPSS)	66.4 (8.6)	64.3 (10.6)	0.327
1st Year		**3-5 N=20**	**>5 N=25**	**p-value**
	Family / Significant Others	48.6 (11.5)	50.7 (8.3)	0.504
	Friends	18.6 (6.6)	11.7 (7)	**0.001**
	Total Social Support (MSPSS)	67.3 (14.9)	62.4 (8.1)	0.196

Social Support and Mortality

It is presented whether the mean level of perceived SS of patients is correlated with the outcome of death, in each period.

Table 11
Correlation between Social Support and Mortality – 1st Week

Social Support [mean (S.D.)]	Death in the 1st Week		
Social Support	No, N = 166	Yesι, N = 20	p-value
Family / Significant Others	53.8 (5.5)	54 (4.4)	0.824
Friends	16.2 (6.5)	16.1 (7)	0.949
Total Social Support (MSPSS)	69.9 (8.1)	70 (7.6)	0.941

Table 12
Correlation between Social Support and Mortality – 1st Month

Social Support [mean (S.D.)]	Death in the 1st Month		
Social Support	No, N = 162	Yes, N = 24	p-value
Family / Significant Others	53.7 (5.6)	54.2 (4.1)	0.644
Friends	16 (6.5)	16.9 (7)	0.583
Total Social Support (MSPSS)	69.8 (8.1)	71 (7.5)	0.449

Table 13
Correlation between Social Support and Mortality – 6th Month

Social Support [mean (S.D.)]	Death in the 6th Month		
Social Support	Noι, N = 156	Yes, N = 30	p-value
Family / Significant Others	53.9 (5.4)	53 (5.6)	0.405
Friends	16 (6.5)	15.9 (6.8)	0.527
Total Social Support (MSPSS)	69.9 (8)	68.9 (7.4)	0.962

Table 14
Correlation between Social Support and Mortality – 1st Year

Social Support [mean (S.D.)]	Death in the 1st Year		
Social Support	No, N = 106	Yes, N = 80	p-value
Family / Significant Others	53.7 (5.5)	53.9 (5.5)	0.896
Friends	17.2 (6.5)	14.7 (6.3)	**0.008**
Total Social Support MSPSS)	71 (8.3)	68.5 (7.4)	**0.038**

3.2 Discussion

The objectives of the present study were to investigate the effect of perceived SS on the clinical outcome of patients with HF. In the present study, it was shown that at discharge, there is a moderate difference between the two groups in terms of total perceived SS, with the intervention group having less perceived SS, compared to the control group. It seems that this difference decreases, and in the remaining periods, there is no difference between the two groups. Specifically, in the 1st week, an increase in total SS was observed, which tended to increase until the 1st month. However, in the 6th month and in the 1st year, the values were found to be reduced, compared to the initial total score, from the beginning of the study. In particular, in both groups of the study, at the beginning of the research, the total perceived SS was found to be high, with the intervention group at the end of the study having a similar score to the initial score, while the control group, lower than the initial score, which at the beginning was higher than the intervention group. The increasing total score of the 1st week, as well as the 1st month, may be 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 higher perceived SS from the Family/SO, compared to the control group. In the cross-sectional comparative study by Sok & Yum (2011), it was demonstrated that older adults living with family members enjoyed better health, due to increased perceived family support, compared to older adults living alone and without social resources. Patients living alone have low to medium levels of perceived social isolation (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 social support mainly from family members and friends (Allemann et al., 2018). Family/Friends and Friends play a key role in supporting patients in managing their chronic illness (Graven & Grant, 2013), supporting their daily lives (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 and the perceived SS by Family, Friends and SO.

In the present study, the perceived SS from the subfactor Family/SO, upon the introduction of the patients into the study, was similarly increased in both groups, and was maintained similarly until the 1st month. However, at 6 months, a large difference was observed between the two groups, with the intervention group receiving the highest perceived support from Family/SO, which was not maintained until 12 months, but both groups of the study continued to receive a high score. Perceived SS is one of the psychosocial factors, a belief that help, support, attention and care are available from others (Family/SO, Friends) and it was found that the support they have received is more valuable for their health outcomes (Cené et al., 2013; Shahriari et al., 2016; Chamberlain, 2017). Perceived SS, as a widely used concept, refers to any intervention process through which social relationships can promote health, well-being and well-being, and refers to the social resources that individuals perceive to be available or that are provided to them by non-professional caregivers, by voluntary support groups, but also by informal support (Family/SO, Friends, neighbors, relatives) (Gronewold et al., 2021). From a study conducted in Turkey, Baratsu & Merk (2013) reported a higher score of perceived SSt from family than perceived support from Friends and SO. In the recent study by Lin et al. (2022), the results showed that perceived SS is provided more frequently by SO. The same results were also revealed by the study of Sahin et al. (2024) and AbuRuz et al. (2015), where it was found that perceived SS is provided more frequently by family members, and the researchers attributed this to the sociocultural characteristics and culture of chronic patients. Similar results were also found in an earlier study by Gunes & Altok (2009), who studied perceived SS in patients with chronic diseases, including HF, where high levels of perceived SS from the family were revealed.

From the literature review, a strong correlation was observed between perceived SS and health outcomes of patients with HF. It was found that perceived SS is a means of predicting morbidity and mortality of patients. It was shown that chronic patients, who have substantial ties with community members, receive increased social resources, have an increased social network, live longer (better prognosis), and in a qualitative way (Pontisidis & Bellali, 2015). According to the results of this study, for the clinical outcome, in terms of the total number of readmissions of the chronic patients in the study and the correlation with the perceived SS, a statistically significant difference was found, regarding the support from Friends (p=0.033), as well as the total perceived SS (p=0.019), in all periods. It was observed that the effect of the perceived SS from the Family/SO did not have a significant effect on the number of readmissions, the total days of hospitalization, and the mortality, in all patients. However, it seems that the effect of the support from Friends on the outcome of the total length of stay in the hospital is significant. A statistically significant difference was found in the 1st year of the study, with patients with <5 days of hospitalization receiving more support from Friends, compared to patients with >5 days of hospital stay (p=0.001), in all patients in the study. Regarding the relationship between perceived SS and mortality, support from Friends, as well as total SS, were found to have a statistically significant effect on the observed mortality rates of patients at 12 months of the study. The 106 patients in the study, who survived up to the 1st year, received higher perceived SS from Friends (p=0.008) and increased total SS (p=0.038), compared to patients who did not survive during the 1st year.

The finding of the present study, the perceived support from Friends, and the association with the outcomes of the chronic syndrome, converges with the results of the study by Chiaranai et al. (2013), where it was observed that patients received greater SS than Friends. This finding is likely to be assessed by the researchers as a result of the change in the structure and functioning of the family. The changes in the roles of the two genders in the context of family life, which resulted mainly from the rapid increase in the participation of women in the labor market, shaped the new social dynamics and the prevalence of new patterns of family life. In Greece, family cohesion seems to be maintained, although, in one study, it was found that a large percentage of the elderly live alone, both in urban centers and in the periphery (Sarla et al., 2016). The study's findings are likely because the research was conducted in a rural population in a region where social ties, the social fabric, and the existence of informal support networks are still strong. The perceived SS from Friends is emphasized by the findings of the international literature, where it is observed that the increasing perceived

SS from Friends in cardiovascular patients improved their health outcomes. Furthermore, in patients with HF, the higher perceived SS from Friends was found to lead to regular adherence to their medical visits (Wenn et al., 2022). Similarly, the results of the study by Shumaker et al. (2017), in which hospital readmissions were reduced and the rate of clinical outcome, mortality, was improved by high overall perceived SS and support from Friends. Also, in the cross-sectional study by Belanger et al. (2016), it was observed that individuals who had a developed social network and received increased support from Friends, as well as from their partner, showed a much better level of health. Comparing our results with the findings of other studies, regarding the effectiveness of perceived SS, on the clinical outcome of patients with HF, differences were observed. Studies were found in which the effect of perceived SS on clinical outcome was positive and other studies in which statistically significant results were not shown, as well as studies in which the importance of perceived SS on clinical outcomes remains unclear. Specifically, from the systematic review of Enard et al. (2023), which evaluated the association of clinical outcomes of HF and social determinants of health, it was found that the effect of these on clinical outcomes of HF was inconsistent, due to the great heterogeneity of data sources. For this reason, the researchers suggest the existence of common definitions and understanding of the term social determinants of health, to reduce the variability of the findings of future studies. The results of the study are also in agreement with the studies of Granewold et al. (2021) and Watanabe et al. (2022), in which the researchers attempted to investigate and evaluate the impact of the loss of perceived social role on the clinical outcomes of hospitalized elderly patients with HF and it appeared that this loss was associated with an increased risk of adverse events.

From the review of published studies, such as Gorji et al. (2019), it was found that social isolation, living alone, and poor perceived SS are associated with a 55% greater risk of readmission to the hospital in patients with HF. Similar results of the study by Heo et al. (2012), where the positive effect of perceived SS on readmissions, as well as on mortality in patients with HF, was observed. The results of Lin et al. (2022) are also similar. From their study, it was observed that high perceived SS by the SOs showed a significant correlation with the lower risk of readmission, both for any etiology and for the etiology of HF in chronic patients with the syndrome, even after controlling for possible covariates, the perceived SS from Family and Friends. In the present study, the findings showed that patients with no or one readmission at 12 months of follow-up received more SS from Friends, as well as from the total perceived SS, compared to chronic patients with two readmissions. According to Chamberlain (2017), repeated hospitalizations of patients with HF are reported as a result of inadequate self-care behaviors and skills, as well as a lack of SS. 50% of these readmissions could have been avoided with appropriate self-care support. In particular, in elderly patients with HF, symptoms such as dyspnea cause intense anxiety, making it necessary to have a support system that will help them adopt appropriate self-management and self-preservation strategies (Fry et al., 2016; Rowlands et al., 2017). Lack of social support in HF patients may be a barrier to performing daily activities, especially in older patients (De Vecchis et al., 2017; Buck et al., 2018). In general, people with a lack of social network use health services more frequently. The study by Voltarta et al. (2018) observed a relationship between lower social support in elderly chronic patients and increased readmission rates, as well as between smaller social networks and longer hospital stays. Socialization, the subjective measure of how social connections function, creates in chronic patients a feeling of relief, comfort, and companionship, helping them to remain socially connected to the social environment, even in a limited way, in overcoming social isolation (Pavlovic et al., 2022). The increasing perceived SS provided to chronic patients contributes to improving their self-confidence, empowerment, and self-efficacy. According to Paturzo et al. (2016), some of the chronic patients with deficient SS prefer to remain in the hospital, where they feel confident, companionship, relief, and can in this way avoid and cope with loneliness, the subjective negative experience related to the isolation or lack of SS, which they feel at home.

In our study, it was found that patients with HF and increased perceived social support from their friends, in the 1st year of follow-up, had a reduced risk of the clinical outcome of death, compared to chronic patients and incomplete perceived social support. Similar results of the cross-sectional study by Manemann et al. (2018), where it was shown that high perceived social isolation was associated with an increased risk of death, hospitalizations, visits to the emergency department, as well as with increased use of health services. Social isolation and loneliness are associated with an increased risk of premature death and greater cardiovascular morbidity and mortality, through behavioral, psychological, and physiological mechanisms. Loneliness and social isolation have been associated with lower self-esteem and reduced self-efficacy

(Valtorta et al., 2016). The researchers conclude that it is necessary to assess perceived social isolation during the clinical encounter of patients with a brief tool, which can help identify chronic patients with HF who are at the highest risk of the clinical outcome of death. The results of the study by Wang et al. (2024) are similar, where it was found that adequate perceived social isolation contributes to the reduction of mortality, both from all causes and cardiovascular etiology, in middle-aged and elderly chronic patients with HF. Similar to the results of the above studies are the results of the review by Pontisidis & Bellalis (2015), where it was shown that the provided SS in chronic patients with HF was associated with the lowest rates of morbidity and mortality. The researchers agree that high perceived SS prevents the adoption of unhealthy behaviors, while improving the rates of positive self-care behaviors and self-efficacy. In our study, it was observed that patients with a total hospital stay of <5 days received increased perceived SS from Friends. From the literature review, a study was found in Australia, where social health measures were evaluated as potential factors contributing to the length of stay in hospital and it appeared that the marital status of the total sample of patients was not associated with the total length of stay in hospital. The study did not evaluate social isolation, SS or loneliness as potential factors contributing to the length of stay in hospital. Also, the length of stay in the hospital was not associated with living conditions, alone versus not or married compared to whether they were single, widowed, divorced (Freak-Poli et al., 2023). As shown by the above study, perceived SS was not evaluated as a predictor of length of stay in the hospital, and this contrasts with our study, as well as the study by Valtorta et al. (2018), in which a correlation was observed between elderly chronic patients and low perceived SS and an incomplete social network, with increased readmissions, readmissions of patients, and a longer length of stay in the hospital.

It should be mentioned that in our study, the time period after the first six months of telephone follow-up coincides with the spread of the coronavirus and the COVID-19 pandemic, resulting in the imposition of all mandatory distancing measures, refraining from unnecessary outings and maintaining social distancing, to reduce the spread and spread of the virus. In our study, patients with HF, with the imposition of mandatory COVID-19 containment measures, lived alone or married with their spouse/partner and received support from informal HF networks, Friends/neighbors/distant relatives, small communities, remote communities in the region. The new lifestyle approaches had affected people in general, but even more so the chronically ill, physically, psychologically and socially. In the study by Li et al. (2021), which was conducted during the COVID-19 pandemic, it was found that high perceived informal SS was associated with appropriate self-care behavior and better outcome of chronic HF disease. It was also found to protect the mental health of chronic patients from the negative outcomes of social vulnerability and social isolation during the COVID-19 pandemic. A study in community-dwelling elderly people reported that reduced social participation due to COVID-19 was associated with reduced physical activity and the occurrence of depressive symptoms (Yamada et al., 2021). According to the researchers, HF patients are likely to have physical, social vulnerability, cognitive impairment, depressive symptoms, and the overlap of these conditions leads to adverse events. Accordingly, in the study by Shakata et al. (2023), it was found that social distancing, restriction of going out and social participation of elderly chronic patients with HF, restriction of family visits, and social isolation were associated with the development of social weakness and depression in chronic patients.

4 Conclusion

The findings of the study highlight the importance of designing effective non-pharmacological management programs, continuous contact, communication, support, Follow-up of the increased social network. Interventions that include SS, for the patients themselves, their families / caregivers, empowering them, resulting in a reduction in readmissions and long-term hospital stays, are deemed necessary. The SS of patients can be strengthened and social isolation avoided, through specialized scientists / health professionals, which will be carried out with awareness programs for the Family, the SO persons, Friends, as well as other relevant groups in the Community.

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Biography of Authors

Stergiani Petaloti (Correspondence)
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

Petaloti, S., Roupa, Z., Lambrinou, E., & Noula, M. (2025). Evaluation of the effect of nursing intervention on perceived social support of patients with heart failure. International Journal of Health Sciences, 9(2), 808–829. https://doi.org/10.53730/ijhs.v9n2.15724