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Original Article

Effectiveness of Nursing Educational Program on Self Care Heart Failure Index in Patients with Heart Failure

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ABSTRACT

Background: Heart failure is a chronic illness that lowers quality of life and causes recurrent hospital readmissions. A nursing education program can enhance quality of life, reduce stress levels, and promote self-care.
Aim: To estimate the effectiveness of a nursing educational program on self-care heart failure index in patients with heart failure.
Methods: A study at Sulaimani Cardiac Hospital enrolled 200 patients with heart failure using a convenience sampling method between August 2, 2021, and February 8, 2024. The study focused on a nursing educational program for the intervention group, and the data were collected through direct interviews. The analysis was conducted using Chi-square, independent t-tests, and SPSS version 26.
Results: The study involved participants with an average age of 68.3 years, mostly male. After the program, the intervention and control groups saw a reduction in participants due to mortality, leaving 94 and 90 participants, respectively. The intervention group showed improvements, with hospital admissions decreasing and fewer participants in the higher severity classes of heart failure (NYHA classification) after the program. Compared to the control group, the intervention group also saw considerable gains in self-care maintenance, management, and confidence, with significant differences ($p < 0.001$) noted.
Conclusions: The implementation of the nursing educational program revealed that all factors between the two groups differed in a highly significant way. The improvement of intervention group was better than control group.

Keywords: Effectiveness, Nursing, Educational Program, Self- Care Heart Failure Index, Patient, Heart Failure.

1 Introduction

Heart failure (HF) represents a clinical illness characterized by high death rates, frequent hospitalizations, reduced quality of life, multiple comorbidity, and complex treatment regimens. It causes abnormalities in the structure or function of the heart, limiting its ability to pump enough blood [1]. Heart failure, which affects an estimated 26 million people globally, is still a serious health issue despite scientific advancements [2]. According to recent forecasts in Europe, the aging of the population and increased survival rates will cause the prevalence of heart failure to climb 2-3 times over the next 20 years [3,4] large mortality and morbidity, a substantial symptom burden, and a large need for medical services are all caused by HF in 2018 [5]. A naturalistic decision-making process that influences actions that maintain physiologic stability, facilitates the perception of symptoms, and directs the management of those symptoms" is the definition of the Self-Care for Heart Failure Index (SCHFI) [6].

Self-care is acknowledged as a successful approach for managing HF and has been linked to several favourable patient outcomes, such as increased life expectancy, decreased mortality, fewer hospital admissions, and lower medical expenses [7-10]. As such, self-care is highly recommended for people with HF. For instance, patients are instructed to follow a particular diet and exercise routine, monitor symptoms, and adhere to what is

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frequently a complex pharmacological treatment plan [11]. Nevertheless, despite its benefits, individuals with HF are often reported to have inadequate self-care [12,13]; poor self-care is linked to several factors that are known to influence HF self-care, including reduced self-efficacy, higher depression, older age, cognitive impairment, and poor sleep quality [14-17]. The Self-Care Heart Failure Index is a widely used tool around the globe to measure SCHFI [18].

The condition-specific concept of SCHF is the foundation for the self-report tool known as the SCHFI [19]. The SCHFI was created initially in the US and has now been translated into 22 languages [17]. Over time, the SCHFI has experienced several adjustments and improvements [17-19]. These changes were made to ensure that the behaviours being measured are supported by evidence, enhance the psychometric properties of the instrument, and address its theoretical foundations. After introducing the new notion of symptom perception and revising the situation-specific theory of HF self-care [6], the final modification was carried out. This theoretical adjustment is reflected in the SCHFI version 7.2 [20]. The technique of health awareness is typically credited to nurses, who must recognize actual and potential health issues when performing a clinical assessment on patients. They also need to create an appropriate treatment plan that supports the improvement, preservation, and restoration of health. In addition to helping to achieve evidence-based practice, this scientific approach, when counting with standardized classifications, is led by nurses and aids in the development of nursing language and vocabulary as well as the organization of critical thinking and diagnostic reasoning [21].

2 Material and methods

2.1 Study Design

The effectiveness of the nursing education program on the SCHFI of HF patients in Cardiac Hospital in Sulaimani City was evaluated using a quantitative design (quasi-experimental study). The investigation was conducted between August 2, 2021, and February 8, 2024.

2.2 Ethical Approval

The Sulaimani Cardiac Hospital's Directorate of Health received an official agreement letter from the College of Nursing at the University of Sulaimani, approving the study protocol, asking for cooperation and facilitation in the execution of the nursing educational program.

2.3 The Study's Setting

This study at conducted at Sulaimani Cardiac Hospital which is the main hospitals for heart disease. Cardiac hospital in Sulaimani City- Iraqi Kurdistan region, serves as the primary institution for managing cardiovascular diseases.

2.4 The Study Sample

In this investigation, samples were chosen using a non-probability purposive sample technique. Cardiologists identified heart failure in patients admitted to the Cardiac Hospital, and those patients were encouraged to take part in the research. About 200 patients took part in the research. One hundred individuals were selected for the intervention group, while another hundred were assigned to the control group. Both groups collected from the same hospital and they were near in socio-demographic characteristics such as age, gender, marital stat, and education level.

2.5 Criteria for Inclusion and Exclusion

Male and female adults Age ≥ 18 with Heart Failure Reduced Ejection Fraction (HFrEF) who had received approval from a team of cardiologists at least 12 weeks earlier were enrolled in the trial. All New York Heart Association (NYHA) classes which include (I, II, III, IV) were represented among the participants, who also possessed strong communication skills. They were still free to decline or leave the study at any time. Serious mental health conditions, and severe liver and kidney disease were among the exclusion criteria.

2.6 Instruments of the Study

The research instrument consisted of two sections, each representing clinical and socio-demographic information about patients with heart failure, including age, gender, marital status, degree of education, place of residence, and financial situation, NYHA classifications, ejection fraction, number of times admitted to hospital. The last section was the tool of SCHFI, which comprises three sub-scales (22 items) of self-care maintenance, management, and confidence was the last section. There are ten items in the self-care maintenance category. Each item was given a rating on an ordinal scale from 1 to 4, where 1 denotes never or seldom adhering to self-care maintenance and 4 denotes constant adherence. The overall range of the self-care maintenance score is (10 to 40). Six components make up self-care management: symptom identification, therapy application, and treatment assessment. Six items make up the self-care confidence test; the lowest and highest scores are (6 and 24), respectively. The preceding study established the validity and reliability of this instrument, and its developer's advice assigning individual scores to each of the three sub-scales (which range from 0 to 100) as opposed to calculating a final summary score. [22]. A score of (>70) on any sub-scale denotes competent patient self-care, with higher numbers indicating outstanding patient self-care [23].

2.7 Validity of the study

Eleven specialists of experts reviewed the data to ensure the veracity of the collection process. They assessed and offered comments on the study questionnaire, which resulted in changes that improved the instrument's ultimate validity by making it more relevant and understandable.

2.8 Pilot Study

20 patients from the original study sample participated in the trial, which was done between January 15, 2022, after which they were removed from the study sample.

2.9 Reliability of the study sample

The reliability was determined by the Alpha Cronbach Correlation Coefficient and Stability (Test- retest) approach, producing a strong association (r = 0.85).

2.10 Approaches of data collection

Face-to-face interviews with the patients were used to gather data about them. The date of the data collection was March 26, 2022. The HF questionnaire took about fifteen minutes to complete.

2.11 Statistical Analysis of the study sample

The statistical Package of Social Science (SPSS) version 26 was utilized to code and file-organize the data. The data were processed using independent t test, Chi square, frequency and percentage computation, and inferential data analysis.

3 Results

Table 1: Participants' socio-demographic and clinical characteristics (the own numbers are percentages).

Variables	Intervention group F (%) N=100		Control group F (%) N=100	Total F (%)
Age	**Mean ± SD**	67.3 ± 11.5	69.2 ± 10.8	68.3 ± 11.2
Gender	Male	72	69	141 (70.5)
	Female	28	31	59 (29.5)
Educational level	Illiterate	59	65	124 (62)
	Primary & Secondary School	34	31	65 (32.5)
	Institute, College & post graduate	7	4	11 (5.5)
Marital status	Married	48	50	98 (49)
	widower	52	50	102 (51)
Occupational Status	Retired, housewife & Jobless	68	69	137 (68.5)
	Self-employee	21	21	42 (21)
	Governmental & non-governmental employee	11	10	21 (10.5)
Residency	Urban	95	87	182 (91)
	Rural	5	13	18 (9)
Living with	Alone	33	33	66 (33)
	Spouse and their children	67	67	134 (67)
Economic status	Sufficient	63	68	131(65.5)
	Barely Sufficient	29	28	57 (28.5)
	Insufficient	8	4	12 (6)

Table 1 demonstrated that the total number of HF patients was 200, their mean age (±SD) was 68.3 ± 11.2 years and the age range were between 38 – 100 years. (72%, 69%) of intervention and control groups were males respectively. (52%, 50%) of them were widowers respectively, and (67%) of both groups were lived with their spouses and their children. While, (33%) of them were lived alone. (63%,68%) of both intervention and control groups had a poor economic state. (95%, 87%) of them were from urban area.

Table (3.2) revealed that whereas pre-program (9%, 10%) of both groups did not require hospital admission, (67%) of them were admitted for heart failure (1-2) and (24%,23%) of them were admitted three times or more. After the educational program, however, only (18.1% and 11.1%) of participants were hospitalized; (70.2%, 65.6%) of participants were admitted once or twice, and (11.7%, 23.3% of participants were admitted three times or more. a significant difference between the intervention and control groups was seen.

Table 2: Comparisons between both groups regarding numbers of admitting hospital during the last 12 weeks.

Variable		Intervention group F (%)	Control group F (%)	Total F (%)	P-value*
How many times were admitted hospital during the last 12 weeks					
Pre-test	Zero	9 (9)	10 (10)	19 (9.5)	0.555
	1 -2 times	67 (67)	67 (67)	134 (67)	
	≥ 3 times	24 (24)	23 (23)	47 (23.5)	
Post-test	Zero	17 (18.1)	10 (11.1)	27 (14.7)	0.059
	1 -2 times	66 (70.2)	59(65.6)	125 (68)	
	≥ 3 times	11 (11.7)	21 (23.3)	32 (17.3)	

* Performed by Chi- square test.

Table 3 showed that the intervention and control groups were in classes II, III, and IV pre-program (39%, 44%, 50%, 44%, and 11%, 12%), respectively, whereas the post-program groups were in classes II, III, and IV (46.8%, 32.2%), (47.9%, 38.9%), (5.3%, 28.9%), and (47.9%, 32.9%), respectively. There was no discernible difference between the two groups pre-program, according to the results. After the instructional session, however, between both groups, there was a significant difference at ($P < 0.001$). The intervention group saw a decrease in class IV of NYHA classification compared to a control group.

Table 3: Comparisons between both groups concerning the NYHA classification before and after the nursing educational program.

Variable		Intervention group F (%)	Control group F (%)	Total F (%)	P-value*
Classification of NYHA					
	II	39 (39)	44 (44)	83 (83)	0.638
	III	50 (50)	44 (44)	94 (94)	
	IV	11 (11)	12 (12)	23 (23)	
Post-test	II	44 (46.8)	29 (32.2)	73 (39.7)	0.001
	III	45 (47.9)	35 (38.9)	80 (43.4)	
	IV	5 (5.3)	26 (28.9)	31 (16.9)	

* Performed by Chi- square test.

Table 4 showed that, prior to the educational program, the ejection fractions of both groups were (39%,45%), (61%,55%), respectively, located between (20-30 and 31-40) percent. However, following the program, the ejection fractions of the two groups were (32%, 37.7%) and (68%, 62.3%), respectively, located in (20-30 and 31-40) percent. There were no noticeable changes in EF between the both groups prior and following the educational program.

Table 4: Comparisons between both groups related to ejection fraction before and after the nursing educational program.

Variable		Intervention group F (%)	Control group F (%)	Total F (%)	
EF					
Pre-test	20 - 30	39 (39)	45 (45)	84 (42)	0.319*
	31 - 40	61 (61)	55 (55)	116 (58)	
	Total	100 (100)	100 (100)	200 (100)	
Post-test	20 - 30	30 (32)	34 (37.7)	64 (34.8)	0.547*
	31 - 40	64 (68)	56 (62.3)	120 (65.2)	
	Total	94 (100)	90 (100)	184 (100)	

* Performed by Chi- square test.

Table 5 revealed that the mean Self-Care Maintenance score before the nursing educational program in the group of intervention was (52.32±11.14), while in another group, it was (51.15±0.74). There was no statistically significant difference. However, after the educational program, the Self-Care Maintenance score in the intervention group was (80.45±4.62),

while in the control group, it was (60.12±0.63), and this difference was statistically significant (P ≤ 0.001).

The mean Self-Care Management score before the implementing nursing intervention program in the intervention group was (56.77±41), while in the control group, it was (56.01±64). This difference was not statistically significant. However, following the program, the intervention group's Self-Care Management score was (82.22±85), while in the control group, it was (65.04±50), and P < 0.001 indicates that this difference was statistically significant. Prior to the educational program, the intervention group's mean Self-Care Confidence score was (29.55±13.31), whereas it was (27.74±0.25) in the control group. There was no statistically significant difference. The Self-Care Confidence score was statistically significant (P < 0.001) in the intervention group after the educational program, with the score in the control group being (50.01±0.12), but it was (65.03±4.23) in the intervention group. Prior to the nursing educational program, the intervention groups mean total SCHFI score was 46.22±1.27, whereas the control group was 44.96±0.28. There was no statistically significant difference before the program. Following the instructional program, the intervention group's SCHFI score was 75.90±0.82, whereas the control group's score was 58.39±5.68, with a statistically significant difference (P < 0.001).

Table 5: Self-care Heart Failure Index comparisons of both groups prior to and during the nursing education program.

Variable	Intervention group	Control group	P-value*
Self-Care Maintenance			
Pre-test	52.32±11.14	51.15±0.74	0.871
Post-test	80.45±4.62	60.12±0.63	0.001
Self-Care Management			
Pre-test	56.77±41	56.01±64	0.09
Post-test	82.22±85	65.04±50	0.001
Self-Care Confidence			
Pre-test	29.55±13.31	27.74±0.25	0.745
Post-test	65.03±4.23	50.01±0.12	0.001
Total Heart Failure Self- Care Index			
Pre-test	46.22±1.27	44.96±0.28	0.625
Post-test	75.90±0.82	58.39±0.57	0.001

*Performed by independent t test.

4 Discussion

200 HF patients who were hospitalized in the cardiac hospital took part in the current study, 100 patients from the intervention group who received a nursing educational program and 100 patients with HF who had routine hospital care and were part of the control group. The mean age of them was (68.3 ± 11.2) years. This outcome comes along with the study of [24] in Iran in which the mean age of participants was (61.7 ± 9.4) years. Both groups in the present study were predominantly male, this goes with the study of [24,25] in Iran which mentioned that the most proportion of their participants were males.

Notably, the study observed a higher prevalence of male patients with HF in both groups, suggesting a gender-based difference in HF constitution. Existing research, such as [26] indicates that HF with preserved ejection fraction (HFPEF) is more common in females, whereas HF with reduced ejection fraction (HFrEF) is more prevalent in males. Despite these tendencies, overall HF incidence remains lower in females compared to males, with an exception for individuals aged 80 years or older. In addition, women generally receive a diagnosis at an older age than men, as highlighted by [27].

The sex-related difference aligns with the advanced age characteristic of HFPEF patients, indicating that women are not inherently at a higher risk for HFPEF, as noted by [28]. It should be noted that patients with HFrEF were only the focus of this study. According to the study's findings, almost half of the participants in the intervention group and half of the control group were married, it is in agreement with the study conducted by [25], who reported that slightly more than half of both groups were married. More than half of widower patients in both groups were lived alone, and less than quarter of them cohabited with their children. More than half of both groups were illiterate, which disagree with [24, 25, 29] because high school graduation and the elementary level was the most prevalent level of their education. Additionally, more than half of individuals of current study in both intervention and control groups experienced low economic status; which is come along with the study of [29]. The economic state findings in the present study closely resemble those reported by [24] in Iran, with more than half of participants in both studies indicating a low economic status. Regarding living arrangements, our study's results mirror those of [24] as nearly half of the participants in both studies lived with their spouses. Concerning occupation, there is an opposite agreement between current study and [24] since less than a quarter of their outcomes were employment and retirement, but the current study was falling into retired, housewife and Jobless.

The present study documented that before the educational program less than half of both the intervention and control groups had a higher range of admitted to cardiac hospital for heart disease problems 1-2 times within the last 12 weeks. While after

the program both groups decreased the percentage of this range, in contrast to the control group which did not experience a notable change in admitting hospital for zero time and three times and more compared to the intervention group. The researchers return this finding of intervention group to the observed outcome stems from the impact of a nursing educational program aimed to reducing hospital re-admission for HF issues. And the outcomes for control group returned to inappropriate use of medication, consumption of unhealthy food, elevated stress levels, and irregular physical activity. These factors are attributed to the lack of information toward the cardiac disease and affect the improvement of their quality of life. This finding aligns with [30] in Iran, wherein the implementation of teach-back training was identified to positively influence self-care behaviors, leading to a decrease in the number of re-admissions among patients with HF. Study of [31] reported that a viable teaching tactic for nursing practice such as the use of telephone for follow-up the patients with HF after following hospital discharge, showed reduce of hospital readmission and mortality rate.

According to multiple studies, 25% of patients with HF are readmitted within 30 days of hospital release, and 50% are readmitted within 6 months [32]. These re-admissions can be attributed to less-than-optimal therapeutic options, insufficient an educational strategy, poor participation in the medical regimen, deficient knowledge and inability to carry out self-care behaviors, [33]. Initially, the higher proportion of patients in both groups were in class III, before the implementation of the nursing educational program. Following the program, there was a notable shift in the distribution. Class III in both groups decreased to (47.9%, 38.9%), class II changed to (46.8%, 32.2%) in both groups respectively, and class IV further decreased to (5.3%) in intervention group but increased to more than a quarter in control group. It is noteworthy that prior to the program, between the two groups, no notable distinctions were seen. However, after the educational program, a significant difference emerged between two groups (P= 0.001). The researcher conveyed these findings to the influence of the intervention program, this aligning with the research by [34], who substantiates that educating patients with HF constitutes a pivotal strategy yielding positive outcomes. The most notable advantages manifest in heightened adherence to pharmaceutical regimens and enhanced self-care practices.

The current study's findings showed that the mean and SD of the intervention and control group before educational program regarding self-care maintenance, self-care management, and self-care confidence were (52.32±11.14, 51.15±0.74), (56.77±41, 56.01±64), and (29.55±13.31, 27.71±0.25) respectively. While after the nursing educational program, they became (80.45±4.62, 60.12±0.63), (82.22±85, 65.04±50) and (65.03±4.23, 50.01±0.12) respectively. The study sample's findings regarding the total SCHFI showed that the mean and SD deviation of the intervention and control groups were (46.22±1.27, 44.96±0.28) pre-program, while after the program the intervention group became (75.90±0.82) and the control group became (58.39±0.57). A statistically significant difference did not previously exist between the two groups. But after the program, there were highly strong significant differences observed in sub-scales at p ($P \leq 0.001$). This outcome has come along the study of [35] who reported the mean and standard deviation of overall sub-scales was (48.33 ± 5.06). While after the program, the intervention group notably improved more than control group (75.90±0.82, 58.39±0.57) respectively. However, disagree with the study done by [36] in Brazil who reported that the self-care maintenance was (45.1±14.2), self-care management was (50. 32 ± 5.99), but agree with the self-care confidence (61.8±21.7). Before the nursing educational program, the finding of the current study recognized inadequate in all self-care heart failure index sub-scales among patients with HF. This finding disagreed with the study done by [37] in India who mentioned that, Overall, patients' health-related quality of life was great, and they demonstrated good self-care confidence, management, and maintenance. But after the intervention program the intervention group in the current study experienced a notable change in all self- care sub-scales. The researcher attributes This population's low self-care is most likely a result of their ignorance of heart disease in Sulaimani city of Kurdistan Region of Iraq. Heart failure is not widely recognized in this city and lack of adequate of self-care of family members with HF. For more information, most proportion of participants in the study of [38] achieved their information from social media and other nonprofessional people regarding risk factors of heart disease, while a few of them obtained the information from physicians and nurses. More than half of the participants in the present sample were illiterate; they might have a low ability to learn which could influence their self-care practices. However, the self-care was inadequate in the sample of the current study, when comparing the self-care maintenance, and self-care management sub scale scores, was higher than the studies done by [39] in Nepal, [40] in China, and [41] in Iran. While lower than the studies of [42] in Malaysia and [43] in Taiwan. In contrast, self-care confidence was lower among samples from these countries that mentioned before. However, regarding the self-care maintenance and management, findings align closely with a study conducted in Canada by [44]. They reported maintenance and management scores of (60.8 ± 19.3) and (62.0 ± 20.7), respectively. However, a notable disparity exists in their results related to self-care confidence, which was reported as (55.9 ± 19.7). in their study of [39] mentioned that Education is crucial for SCHF since it may be linked to learning capacity and the population's capacity to identify changes in their symptoms.

The results of the current study showed a significant improvement in the subscales measuring self-care confidence, self-care management, and self-care maintenance following the nursing educational program and raised from intervention group more than control group. This outcome agreed with the studies of [45] in Jordan, [23], and [46] in Iran, who mentioned that education and self-care program raised the awareness and improved the performance of the patients with heart disease, it also improves patient's capacity for efficient self-care, prevented the readmission of patients into the hospital and helped the family economy and society. A study by [47] in Iran, highlighted the limitations to self-care among patients with HF that are personal, disease-related, and support-related. These challenges, categorized as personal obstacles, disease burden, and inadequate

support, underscore the need for targeted interventions. Healthcare stakeholders can use context-specific educational, psychological, and financial assistance strategies using these findings, aiming to enhance self-care, improve HF treatment outcomes, and elevate patients' quality of life. So, the researcher recommended teamwork between the patients with HR, staff of health care workers and family members to achieve the improvement of QoL of patients with HF is necessary to done. A positive impact of education on patients' knowledge about their disease were achieved in seven meta-analysis study of [48 – 51].

Conclusion

Based on the study findings, most HF patients were males aged 38-100, predominantly illiterate, retired, housewives, and jobless, widowed, and low economic state, living in urban areas. They were generally classified as NYHA Class III. The most proportion of them were hospitalized 1-2 times in the past 12 weeks for HF problems. The implementation of the nursing educational program showed highly significant differences between the two groups such as NYHA classification and SCHFI. The improvement of the intervention group was better and higher than the control group.

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