Effect of Instructional Scheme on Adherence to Health Recommendations among Patients with Congestive Heart Failure

Mona Hassan Ibrahim[1], Hanaa Elsayed Amin[2], Mohamed Elsayed Ahmed Allawy[3]

(1) *Associate Professor of Medical- Surgical Nursing, Faculty of Nursing, Suez Canal University, Ismailia, Egypt.*

(2) *Lecturer of Medical- Surgical Nursing, Faculty of Nursing, Suez Canal University, Ismailia, Egypt.*

(3) *Lecturer of Medical- Surgical Nursing, Faculty of Nursing, Suez Canal University, Ismailia, Egypt..*

Abstract

Background: Congestive heart failure (CHF) is a serious health threat, and poor adherence lowers patients' quality of life and increases disease burden. Poor adherence is complicated and prolonged. **This study aimed to** evaluate effect of instructional scheme on adherence to health recommendations among patients with congestive heart failure. **Materials and methods:** A quasi-experimental design was used. A convenience sample of 100 congestive heart failure patients in the outpatient cardiac clinic unit at Suez Canal University Hospital, 50 patients for the study group and 50 patients for the control group. Data were collected using a patient demographic and medical information questionnaire and the Medical outcome Study Specific Adherence Scale (MOSSAS). **Results:** There was a significant improvement in study group in compared with control group regarding adherence to taking medications as prescribed, monitoring weight regularly, low salt diet, monitoring symptoms every day, low fat diet, stopping smoking, and exercising regularly (3 times a week) with P value <.001* and effect size.63, .48, .47, .47, .35, .25, .14 respectively. **Conclusion:** There was statistically significant difference between study and control group regarding total adherence after implementation of instructional scheme. Also, there was statistically significant difference between study and control group regarding adherence to taking medications as prescribed, monitoring weight regularly, low salt diet, monitoring symptoms every day, low fat diet, stopping smoking, and exercising regularly. **Recommendations:** Instructional scheme to health recommendation should be reguraley conducted for congestive heart failure patients as they are the key for improving their total adherence.

Keywords: Congestive Heart Failure, Adherence, Health Recommendations, Instructional Scheme.

1. Introduction

Congestive heart failure (CHF) represents a significant risk to an individual's health, as it is characterized by inadequate cardiac output to meet the body's demands for blood circulation. This phenomenon may

occur when the heart is unable to adequately receive a sufficient volume of blood. This phenomenon may also occur in instances where the cardiac muscle is insufficiently strong to effectively pump blood. The phrase "heart failure" does not imply cessation of cardiac activity. Nevertheless, heart failure is a grave medical issue that necessitates professional medical attention. Congestive heart failure has the potential to cause damage to the liver or kidneys. Additional diseases that may arise as a consequence encompass pulmonary hypertension, various cardiac ailments including arrhythmias, valvular dysfunction, and the occurrence of sudden cardiac arrest. Presently, congestive heart failure is a grave medical problem that lacks a definitive remedy. Nevertheless, several interventions, including the adoption of a healthy lifestyle, administration of medications, utilization of certain medical technologies, and implementation of specific operations, have demonstrated efficacy in enhancing the overall well-being of numerous individuals **(Malik et al., 2022)**.

Heart failure (HF), also known as congestive heart failure, is a chronic and incapacitating condition that impacts a significant population of 5.7 million individuals in the United States. Heart failure incurs a substantial financial burden in the United States, amounting to $31 billion, making it one of the most costly chronic medical illnesses. Heart failure (HF) continues to be a significant healthcare concern, serving as the primary reason for hospitalization among individuals aged 65 and over in both the United States and Europe. This condition accounts for around 12% of all hospitalizations in these regions. **(Savarese et al., 2023).**

Cardiovascular disease (CVD) has emerged as the primary cause of early mortality in Egypt during the 1990s. In the year 2017, cardiovascular disease (CVD) constituted 46.2% of the total death rate in Egypt. The increasing age of the population and the advancements in prolonging the survival of those experiencing coronary events have led to heart failure (HF) becoming a significant and expanding public health concern. The occurrence of heart disease varied considerably, with rates ranging from 72.5% in Alexandria to 40.9% in Upper Egypt. **(Hassanin et al., 2020)**.

One contributing factor to the suboptimal health outcomes observed in patients with heart failure is the requirement for continuous post-acute care, which necessitates patients to acquire and sustain a multifaceted set of behavioral modifications. The recommended strategies encompass

smoking cessation, moderation of alcohol consumption, adherence to a low-sodium dietary regimen, engagement in regular physical activity, vigilant symptom monitoring, and adherence to prescribed pharmaceutical regimen. One frequently employed strategy to facilitate self-care is the implementation of patient self-care education programs. These programs have the dual objective of not only promoting patient adherence to medication, symptom monitoring, and behavioral guidelines, but also fostering patient empowerment in decision-making regarding the necessity of additional care. Furthermore, these programs seek to involve patients as active collaborators with healthcare providers in the management of their healthcare **(Dessie et al., 2021).**

Many heart failure (HF) management programs aim to promote self-care by educating patients. The benefits of these programs on readmission, expenses, and quality of life are often assessed. Since HF management is becoming more personalized, it's necessary to evaluate programs on outcomes like symptom alleviation and self-care. Heart failure patients still experience preventable consequences despite medical improvements. Assuming the patient's disease has been accurately diagnosed and appropriately treated, a therapeutic or preventive regimen can only be effective if the patient practices self-care and follows the treatment regimen **(Segovia & Manito, 2019).**

The issue of poor adherence is a matter of great concern within the nursing health domains due to its impact on the overall quality of life experienced by patients. The aforementioned factor exacerbates the overall burden of disease among the expanding population affected by coronary heart disease. The implementation of strategies aimed at maximizing patient adherence to cardiac-health enhancing suggestions by healthcare practitioners has the potential to decrease the likelihood of mortality and morbidity among individuals who have experienced a cardiovascular event. The evaluation of patient memory and adherence rate can offer valuable insights into the efficacy of patient care management and resultant outcomes. A significant majority of research on adherence has focused primarily on a single treatment modality, particularly drug adherence. There is a scarcity of observational research that investigate patient adherence to combinations of health behaviors. There is a scarcity of adherence studies conducted in Asian communities. **(Roth, et al., 2020 & Saqlain, et al., 2019).**

The role of nursing staff in the management of congestive heart failure (CHF) and the avoidance of complications is crucial, if they possess adequate knowledge, skills, and empowerment to effect change in the hospital culture. The augmentation of their cognitive abilities results in enhanced efficacy in the provision of healthcare services to patients. Patient education is undeniably a crucial responsibility of the nurse, serving as a vital approach in managing the disease progression and mitigating associated problems. The patients in question have a range of demands that encompass instruction on several aspects, such as adherence to drug treatment, awareness of drug side effects, dietary considerations, mental therapy, and compliance with established standards of care. **(Mohammed et al., 2018) & (Razu et al., 2021).**

Significance of the study:

The prevalence of heart failure, a widely seen clinical illness, is experiencing a significant global surge. Ischemic heart disease was found to be the predominant cause of heart failure throughout all regions studied, with varying prevalence rates observed. Specifically, the prevalence of ischemic heart disease as an etiological factor

ranged from 72.5% in Alexandria to 40.9% in Upper Egypt. Dilated cardiomyopathy emerged as the second most prevalent cause in the regions of Alexandria and Delta. In the city of Cairo, dilated cardiomyopathy and valvular heart disease were found to be the second most prevalent conditions. In contrast, in the region of Upper Egypt, valvular heart disease emerged as the second most common cause, accounting for around 25% of the reported cases. **(Hassanin et al., 2020)**

Persistent reports of inadequate uptake and adherence to cardiac rehabilitation or secondary prevention programs demonstrate the complexity and persistence of problems associated with poor adherence. A more realistic alternative is routine monitoring and screening of patient adherence, which allows for rapid identification of inadequate adherence and subsequent improvement or remediation. This becomes even more important when there are shifts in adherence-influencing factors that put patients at risk for relapse **(Ivers et al., 2020).** So, it is important through this study to clarify the Effect of Instructional Scheme on Adherence to

Health Recommendations among Patients with Congestive Heart Failure.

The aim of the study:

This study aimed to evaluate effect of instructional scheme on adherence to health recommendations among patients with congestive heart failure.

Research Hypothesis:

H0: There is no significant improvement in Adherence to health recommendations among patients with congestive heart failure after implementation of instructional scheme.

H1: There is significant improvement in Adherence to health recommendations among patients with congestive heart failure after implementation of instructional scheme.

2. Subject and Methods

Study design: A quasi -experimental research design was utilized in this study.

The study subjects:

A convenience sample of participants consisted of one hundred adult patients who were diagnosed with congestive heart failure one year prior, had cognitive awareness, and expressed willingness to take part in the study. Individuals who exhibited speech difficulty and mental disorders were excluded from the study.

Sample size:

$$n = \left[\frac{Z_{\alpha/2} + Z_{\beta}}{P_1 - P_2}\right]^2 (p_1 q_1 + p_2 q_2)$$

(Dawson, 2004)

Where

- n= sample size

- Z α/2 = 1.96 (The critical value that divides the central 95% of the Z distribution from the 5% in the tail)

- Zβ = 0.84 (The critical value that separates the lower 20% of the Z distribution from the upper 80%)

- p1 = proportion post intervention (.62)

- p2 = proportion pre-intervention (.20)

- q = 1-P

(Ahmed et al., 2017)

Total sample size= 50 participants (50 for study group and 50 for control group

Study Setting:

The research was carried out within the outpatient cardiac clinic unit located at Suez Canal University Hospital. The hospital buildings are situated on the right side of the premises and are organized into four rooms on the first floor. The first three rooms serve as clinics for cardiac therapy. Among these,

one room was designated for male patients and another for female patients. The lecture room, also located within this area, has a capacity to accommodate around 50 patients on a daily basis.

Tool of data collection:

Tool 1- Patients' Profile Questionnaire:

This tool was developed by the researchers based on recent literature review **(Jeffery et al., 2015) & (Elizabeth, et al., 2014).** It was used to assess patients' status .and included the following parts:

Part I: Demographic Data: It included the following data; patient's age, sex, marital status, educational level, residence and occupation.

Part II: Patient Medical Data: It included associated medical disease, date of admission & discharge, length of hospital stays by days. Health habits as smoking and exercise, causes and patient medications.

Tool II- the Medical outcome Study Specific Adherence Scale (MOSSAS):-

It was used to measure adherence to health recommendations among heart failure patients, it describes adherence to eight health recommendations related to: exercise regularly, medication

compliance, alcohol cessation, smoking cessation, low salt diet, low fat diet, weight daily, monitor symptoms. Using the MOSSAS (0=never, 1 a little of the time, 2 some of the time, 3 a good bit of the time, 4 most of the time and 5=all the time), the maximum score =40, the base cumulative score ≥32/40 (average > 80%) defined good adherence **(Marti et al., 2013).**

Validity and Reliability:

In order to ensure comprehensiveness and applicability, the knowledge of two medical professionals and three nursing professionals was utilized to assess the included items. The objective was to evaluate whether these items are comprehensive, intelligible, applicable, clear, and suitable for achieving the objectives of the study. Additionally, the process of back translation was conducted for the purpose of evaluating research tools. The Cronbach's alpha was used to measure the coefficient of reliability of the evaluation tool which was .842.

Pilot study:

A preliminary study was conducted on a subset comprising 10% of the whole study population in order to assess the comprehensibility and feasibility of the tools,

as well as to determine the time required for completion of each questionnaire. The required adjustments were made in accordance with the findings of the pilot research. The pilot subjects were excluded.

Fieldwork:

A. Preparatory Phase:-

The consent of the patient for voluntary participation was acquired; the patients were informed about the nature and goal of the study. The literature on the many facets of the issue, both past and present, local and global, were reviewed utilizing books, essays, and journals. A pilot study and an evaluation of standard and current hospital care provided to patients upon admission, throughout their stay, and upon discharge. The nursing health booklet was created based on an examination of the requirements of the actual patients. The data collecting began after the administrative approval has been obtained. After gaining their informed agreement, patients chosen in this outpatient cardiac clinic throughout the data collection period enrolled in the study.

B. Assessment phase:

The researchers conducted interviews with patients in the outpatient cardiac clinic department to gather sociodemographic data. They then asked

patients to complete a simple Arabic-language questionnaire as a pre-test for the pre-assessment of the medical outcome. Study Scale for Specific Adherence took 15 to 20 minutes to fill each tool. Based on each patient's response to the prior tools, the needs of the patients were determined. (Pre-Test Evaluation)

C. Planning and Implementation phase:

The researchers developed an educational instructional scheme with the aim of enhancing adherence to health recommendations among patients with congestive heart failure. The instructional scheme was then implemented over the course of 10 sessions. The instructional scheme for patients diagnosed with congestive heart failure disease comprised the subsequent components: This sheme provides an overview of Congestive Heart Failure (CHF), encompassing its description, the architecture and physiology of the heart, the pathophysiology and etiology of CHF, as well as the signs, symptoms, and problems associated with this condition. Furthermore, it is imperative to provide educational guidance pertaining to the following aspects: adherence to a consistent exercise routine, cessation of alcohol use, compliance with medication

regimens, adoption of a low-salt diet, daily monitoring of weight, avoidance of smoking, implementation of a low-fat diet, and effective monitoring and management of symptoms.

Following the initial assessment of both the control and study group participants, wherein they received an orientation regarding the study's content and objectives, the researchers proceeded to administer ten educational sessions to the study group participants. Out of these ten sessions, five focused on theoretical content, while the remaining five covered practical aspects. The instructional modalities employed included educational seminars, presentations, group discussions, and lectures. The instructional media employed in the training process encompassed several forms, including illustrated guides, films, computer-based resources, and booklets.

D. Evaluation phase (Post Test assessment):

Following the implementation of the instructional scheme, the researchers assessed the outcomes of the instructional scheme. This post-implementation evaluation took place in the outpatient cardiac clinic. The follow-up evaluation took place three months later and involved a comparative analysis of the adherence to health guidelines for congestive heart failure (CHF) between the control group and the study group.

Ethical considerations:

Approval from the Research/Ethics Committee of the Faculty of Nursing in Suez Canal University with ethical code (145/2021) was acquired before to recruitment and data collection. Written agreement was obtained from each participant following an explanation of the study's nature, objectives, and potential advantages. The subjects were also notified that their participation in the study is voluntary and that they have the ability to withdraw from the study at any moment without providing a justification. The preservation of confidentiality for any acquired information was achieved by employing data encryption techniques. The researchers provided reassurance to the subjects that the collected data would be utilized solely for the purpose of the research.

Statistical design:

The study was performed utilizing the Statistical Package for the Social Sciences (SPSS) Version 23 designed for the Windows operating system. Categorical measures were represented using numerical values and percentages, whereas numerical measurements were presented as numbers

and percentages. Normally distributed variables were described using the mean and standard deviation (SD). Descriptive statistics were computed to analyze the personal traits, self-management, and quality of life. The Chi-square test was employed to evaluate the disparity in people characteristics between the study and control groups, with the aim of testing the homogeneity of the two groups. This study aims to compare the mean scores of patients in the study group and control group in terms of adherence to health recommendations. The comparison will be conducted utilizing a pre-post-follow up intervention program, employing repeated measures. The analysis of variance (ANOVA) was employed to evaluate the magnitude of the difference between two groups, utilizing the measure of effect size known as partial eta squared (η2). The correction for multiple comparisons was performed using the Least Significant Difference (LSD) method, which is comparable to without making any changes. The Cohen's d effect size (d) was utilized to assess the difference between the control and study groups at each time period. The p-value is considered statistically significant when it is less than or equal to 0.05.

3. Results

Table (1) shows that there was not a statistically significant difference between study and control group regarding age groups, gender, education, marital status, and occupation, with P > .05.

Table (2) shows that there was not a statistically significant difference between study and control group regarding length of stay, New York classification system for heart failure, associated diseases, Smoking, Exercise, and Use of coffee or tea, with P > .05.

Table (3) reveals that there was a significant improvement in study group in compared with control group regarding adherence to taking medications as prescribed, monitoring weight regularly, low salt diet, monitoring symptoms every day, low fat diet, stopping smoking, and exercising regularly (3 times a week) with P value <.001* and effect size and effect size .63, .48, .47, .47, .35, .25, .14 respectively.

Table (4) reveals that there was a significant improvement in study group in compared with control group regarding total adherence with F, df, P value and effect size with values (142.19,4 (<.001), η^2(.75).Post hoc comparisons indicated that that there was no difference between the two groups at baseline regarding total adherence. There was

a significant difference between the two groups at immediately after and 3months after regarding total adherence with effect size 1.62, and 5.25 respectively.

Table (5) shows that total level of good adherence was 32%, 82% in post, and follow up respectively in compared with 2% in preintervention in study group. Also, there was statistically significant difference between level of adherence between pre intervention in compared with post, and follow up intervention and post intervention in compared with follow up intervention in study group with P value<.001*.Also, there significant difference between two groups at post, and follow up intervention with P value<.001*

4. Discussion

A serious threat to health is congestive heart failure (CHF), which is also when your heart cannot pump enough blood for your body's requirements, congestive heart failure develops. If your heart cannot pump enough blood, this may occur. It may also occur if your heart is unable to pump blood effectively. Adherence to treatment and adopting a healthy lifestyle, however, can enhance patient outcomes (Malik et al., 2022).

Poor adherence poses a serious health risk. Reduced mortality and morbidity risk among patients with cardiovascular events can be achieved by encouraging optimal patient adherence to nursing recommendations for improving cardiac health. Monitoring the rate of adherence may yield data on the efficiency of patient care management and results. In particular, medication adherence was the focus of a sizable percentage of adherence research. Few observational studies (Roth, et al., 2020 & Saqlain, et al., 2019) have looked at patient adherence to combinations of health behaviors.

If the nursing staff is knowledgeable, skilled, and given the power to change hospital culture, they can play a critical role in managing CHF and preventing complications. Their degree of knowledge is rising, which raises the standard of patient treatment. Patient education is without a doubt one of the nurse's most significant duties because it is an essential tactic for controlling the course of the disease and reducing its effects. These patients must complete educational requirements on drug side effects, food, mental counseling, and care standards (Mohammed et al., 2018; Razu et al., 2021).Therefore, this study was conducted to assess the effect of an instructional scheme on patients with

congestive heart failure's adherence to health recommendations.

Regarding demographic information, it showed that there were no statistically significant differences in age groups, gender, education levels, marital status, and occupation between the study and control groups. The current investigation also revealed that there was no statistically significant difference in the history data between the study and control group in terms of length of stay, the New York classification system for heart failure, concomitant disorders, smoking, exercise, or usage of coffee or tea. These findings corroborated those of a study conducted by **Abbasi, et al. (2018)**, which found that there were no statistically significant differences between the groups in terms of their demographic and clinical traits, indicating that they were homogeneous. These findings may be explained by the homogeneity of the study sample between the two groups (the study and the control) and the requirement that the study sample be of a similar kind or possess uniform characteristics.

The present study found that patients with congestive heart failure who followed an instructional scheme for medication, exercise, quitting smoking, low-salt and fat diet, and monitoring patient symptoms pre-post and follow-up showed a significant improvement in adherence to health recommendations.

These findings are in line with a study conducted by **Lee et al. (2018)**, which found that an increase in medication compliance and lifestyle modification compliance points to the potential existence of the healthy adherer effect in patients with post-cardiac disease. Even after further correcting for Health-Related Quality of Life, the connection persisted. Early detection of individuals with poor medication adherence, lifestyle change, and education programs to increase adherence are essential for enhancing adherence to health recommendations in patients with post-cardiac illnesses.

The current findings also agreed with those of the **Tinoco et al. (2021)** study, which showed that patients in the experimental group had better results with regard to medication adherence. The healthy adherer effect should be taken into account in clinical research, according to the data, since it has a significant favorable impact on congestive heart failure patients who follow health advice. The identification of patients

who have a higher risk of nonadherence is also advised for more focused therapy.

Additionally, these results supported **the American Heart Association (2023)** statement that regular body weight measurements can help determine whether a patient's heart failure is getting worse or whether adjustments are needed to control fluid retention. This illustrates how crucial it is for individuals with congestive heart failure to frequently monitor their weight. The first indication that your heart failure may be becoming worse is weight gain. Additionally, before experiencing discomfort or edema, individuals might put on up to 10 pounds of "extra" weight from fluid.

Furthermore, the current findings supported the American Heart Association's recommendation that CHF patients adhere to quitting smoking because smoking can lead to atherosclerosis, which is the buildup of fatty substances in the arteries. As a result, the heart may have a very difficult time pumping blood, raising blood pressure and heart rate. This may also obstruct the arteries. This justification highlights the need of smoking cessation program adherence as essential elements of care for CHF patients.

Additionally, the current findings supported the findings of **Lee et al., (2018)**

study, which showed the need of adhering to diet and activity guidelines because too much salt in the diet might lead to fluid retention. Therefore, it's important to motivate patients to cut back on high-sodium intake and switch to a diet richer in whole foods. Additionally, processed meals are frequently highly high in salt, so consuming more whole grains, fruits, and vegetables is advised. This demonstrates the significance of an educational strategy for enhancing adherence to dietary recommendations for good health.

Additionally, the current findings supported a study by **Warehime et al., (2020)** that found that encouraging CHF patients to follow exercise guidelines may depend on their perception of their health state. Additionally, it was found that following health advice to routinely exercise has a number of positive effects, despite the fact that up to 91% of people who have heart failure don't do so. Because it is crucial for enhancing circulation across the entire body to engage in regular exercise. This shows that engaging in a few sessions of aerobic exercise each week can assist to improve breathing and lower blood pressure and heart rate. People with congestive heart failure may feel extremely winded or short of breath. To prevent overworking the heart,

encourage patients to exercise at a moderate pace.

The current findings were in accordance with the study conducted by **Jaarsma et al., (2021)** and **Warehime (2020)** in regards to adherence to health recommendations toward monitoring symptoms every day among patients with congestive heart failure in the study group, which included (any shortness of breath, increased heart rate, weight gain, edema or any swelling, elevated blood pressure, Confusion or impaired thinking, chest pressure, Chest fluttering, dizziness, fatigue, or inability to sleep). The necessity of patient education and instructions for compliance with symptom monitoring and an appropriate response to potential deterioration are stressed in heart failure guidelines .

The results of the current study showed that patients with congestive heart failure in the study group adhered to health recommendations significantly better than those in the control group after the implementation of the instructional scheme, nearly twice as well as in the follow-up period. This illustrates the wide range of efficient interventions that are available and that can result in long-term enhancements in patient adherence and clinical endpoints.

Long-term success is dependent on patients taking charge of their own health, which can be accomplished with the help of coordinated efforts like patient education and consistent follow-up contacts .

Additionally, it concurred with a study conducted by **Choudhry et al., (2022)**, which described how patient interventions have been demonstrated to at least partially improve study participants' adherence to health recommendations. Moreover, the current findings supported a study by **Podvorica et al., (2021)** that advised and emphasized the need of patient education in enhancing adherence to therapy regimens. Additionally, an effective way to identify needs and reinforce information is through the instructional design and adherence to health recommendations. Patient education should ideally begin during hospitalization, and follow-up is a useful way to get in touch with patients following release and keep in touch with them .

Furthermore, the current study showed that, compared to the control group, which had a good adherence rate of only two (2) percent pre-intervention, the study group had a significantly higher overall level of excellent adherence at post and follow-up, respectively.

The current findings were in line with a study done by **Getenet et al., (2021)**, which discovered that the number of educational sessions attended had a big impact on patients' ratings on adherence. After the first session, adherent scores went up. Additionally, the current findings were in line with a study conducted by **Dessie et al., (2021),** which came to the conclusion that a patient can develop awareness and useful practical skills with continuous education. This may account for the sharp rise in adherence levels among study groups.

The current findings also corroborated a study conducted by **Kollia, et al. (2016)**, which found that adding a 1-hour teaching session delivered by a nurse educator at the time of hospital discharge led to better clinical outcomes, increased patients' measure adherence, and decreased healthcare costs in patients with systolic heart failure. Additionally, patients who received nurse education showed dramatically greater adherence.

5. Conclusion:

There was statistically significant difference between study and control group regarding total adherence after implementation of instructional scheme. Also, there was statistically significant difference between study and control group regarding adherence to taking medications as prescribed, monitoring weight regularly, low salt diet, monitoring symptoms every day, low fat diet, stopping smoking, and exercising regularly (3 times a week).

6. Recommendations:

- Instructional scheme to health recommendation should be regularly conducted for congestive heart failure patients.

- Replicate the same study on other cardiovascular diseases.

- Periodically monitoring adherence to health recommendations for congestive heart failure patients as standard of care.

- Booklets, posture in form instructional scheme should be available to congestive heart patients in outpatient cardiac clinic.

Table (1): Percentage distribution of the study and control group regarding demographic data.

Items	Study group n= 50		Control group n=50		Test used	P value
	N	%	N	%		
Age (years)						
30-	12	24.0	6	12.0	X² 2.40	.494
40-	3	6.0	6	12.0		
50-	15	30.0	20	40.0		
60-	17	34.0	17	34.0		
70-	3	6.0	1	2.0		
Mean ±SD	53.26 ± 12.28		54.78 ± 10.64		.278#	.781
Gender						
Male	44	88	46	92	X² .164	.840
Female	6	12	4	8		
Education						
Illiterate	21	42.0	20	40.0	X² .644	.547
Read and write	11	22.0	12	24.0		
Primary	7	14.0	7	14.0		
Secondary	7	14.0	6	12.0		
High	4	8.0	5	10.0		
Marital status						
Single	5	10.0	6	12.0	X² 7.21	.065
Married	25	50.0	24	48.0		
Divorced	7	14.0	8	16.0		
widowed	13	26.0	12	24.0		
occupation						
Not work	10	20.0	10	20.0	X² 1.27	.528
Farmer	14	28.0	13	26.0		
Machine operated	20	40.0	20	40.0		
Job seeker	2	4.0	2	4.0		
Office work	4	8.0	5	10.0		

X² is Pearson chi-square test; ᵐᶜ is Monte Carlo chi-square test; # is independent t test, **P** value is significant <. 05

Table (2): Percentage distribution of the study and control group regarding history data.

Items	Control group n= 50		Study group n=50		Test used	P value
	N	%	N	%		
New York classification system for heart failure						
1st	33	76.0	34	68.0	X^2 .164	.840
2nd	17	24.0	16	32.0		
Associated diseases						
None	0	0	1	2.0	2.90	.934mc
Hypertension	15	30.0	13	26.0		
Lung disease	5	10.0	5	10.0		
Renal disease	2	4.0	4	8.0		
Endocrine disease	0	0	1	2.0		
Oncology disorder	0	0	0	0		
Diabetes mellitus	8	16.0	7	14.0		
Ischemic heart disease	20	40.0	19	38.0		
Smoking						
Yes	43	86	45	90	X^2 .154	.695
No	7	14	5	10		
Exercise						
Yes	3	6	5	10	X^2 .543	.461
No	47	94	45	90		
Use of coffee or tea						
Yes	50	100	50	100	**NS**	
No	0	0	0	0		

X^2 is Pearson chi-square test; mc is Monte Carlo chi-square test; # is independent t test, **P** value is significant <. 05

Table (3): Comparison of study and control group by mean scores of patients regarding adherence to health recommendations (pre-post-follow up) intervention program (n=50).

Items subscale	Study[a]	Pre instruction (50)	Post instruction (50)	Follow instruction (50)	F (η2)	P value
	Control[b]	Mean±SD	Mean±SD	Mean±SD		
1. Exercise regularly (3 times a week)	a	1.64±0.80	3.46±0.50	4.02±1.04	15.74 (.14)	**<.001***
	b	1.58±0.84	1.64±0.88	1.42±0.67		
2. Take medications as prescribed	a	1.42±0.50	3.42±0.50	4.28±0.45	164.25 (.63)	**<.001***
	b	1.38±0.57	1.32±0.62	1.18±0.72		
3. Alcohol cessation	a	5.00±0.00	5.00±0.00	5.00±0.00	NS	NS
	b	5.00±0.00	5.00±0.00	5.00±0.00		
4. Stop smoking	a	1.81±.91	3.60±0.56	4.14±0.73	16.11 (.25)	**<.001***
	b	1.60±1.27	1.66±1.30	1.43±1.19		
5. Low salt diet	a	1.44±0.86	3.34±0.48	4.08±0.85	86.23 (.47)	**<.001***
	b	1.36±0.88	1.54±0.99	1.24±0.69		
6. Low fat diet	a	1.42±0.97	3.46±0.50	4.24±0.80	53.64 (.35)	**<.001***
	b	1.22±0.67	1.42±0.88	1.74±0.88		
7. Monitor weight regularly	a	1.66±0.87	3.52±0.50	4.12±1.02	89.56 (.48)	**<.001***
	b	1.66±0.87	1.70±0.89	1.56±0.91		
8. Monitor and manage symptoms every day	a	1.66±0.92	3.48±0.50	4.22±0.86	87.66 (.47)	**<.001***
	b	1.68±0.94	1.58±0.99	1.46±0.68		

F test is repeated measures ANOVA, P value is significant <.05, **η2** is Partial Eta Squared.

Table (4): Comparison of study and control group by total adherence (pre-immediately post, 3 month after.

Items	Study Group (n= 50)	Control Group (n=50)	Sig.[b] (d)
	Mean±SD	**Mean±SD**	
Total adherence			
Before instruction	16.08±3.31	15.08±3.54	.372 (.28)
Immediately after	29.20±2.53	15.44±3.95	**<.001***(1.62)
3 month after	34.18±3.31	15.48±3.56	**<.001***(5.25)
F, df (P value) (η2)	**142.19,4 (<.001), η²(.75)**		

F test is repeated measures ANOVA, **η2** is Partial Eta Squared, b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments); d is Cohen's d effect size; P value is significant <.05

Table (5): Comparison of two groups regarding levels of adherence to health recommendations pre and post intervention

Items	Study .G(n=40)				Control G. (n= 40)				Test [$]
	Poor		Good		Poor		Good		
	N	%	N	%	N	%	N	%	
Total adherence									
Pre instruction	49	100	1	2	49	98	1	2	NS
Post	34	68	16	32	49	98	1	2	**(<.001*)**[$]
Follow up	9	18	41	82	49	98	1	2	**(<.001*)**[$]
P value (pre versus post)	**(<.001*)** [#]				NS				
P value (pre versus follow up)	**(<.001*)** [#]				NS				
P value (post versus follow up)	**(<.001*)** [#]				NS				

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