Effect of Applying a Learning-Based Program on Self-Efficacy for Patients with Congestive Heart Failure

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Abstract:

Background: Context Congestive Heart Failure (CHF) is a complicated clinical condition resulting from the heart's inability to effectively pump blood to meet the body's metabolic demands. CHF is the predominant cause of mortality and disability globally, with greater incidence in low- and middle-income nations. Self-efficacy (SE) is a crucial factor that influences a patient's capacity to control their care by enhancing patient knowledge and practice. This study aimed to assess the impact of a competency-based learning program on SE in patients with CHF. **Research design:** A quasi-experimental research design was utilized. The experiment was conducted in outpatient cardiac clinics at Zagazig University Hospitals. **Settings:** The study sample consisted of seventy adult patients, purposefully recruited from both genders. **Tools:** Data gathering utilized three tools: a patient interviewing assessment questionnaire, an observational checklist, and the Chronic Disease SE Scale. **Results** indicated that most of the investigated patients were male, with 84.2% aged between 53 and 63 years, and 62.8% presenting with comorbidities, mostly hypertension and diabetes mellitus. Statistically substantial enhancements were observed in patients' knowledge, practices, and SE following the intervention period. Conclusion: The applied learning program positively influenced SE in patients with CHF by enhancing their knowledge and behaviors. Recommendations: Consistent follow-up for all patients with CHF to assess their health status and identify problems promptly.

Keywords: Applying Based Learning, Self-Efficacy, and CHF.

Introduction

CHF significantly affects healthcare use and life quality. Patients need to manage CHF well to maintain a satisfactory quality of life. Self-efficacy (SE) may significantly influence this aspect. **(Esther Smeulders, et al. 2021)**, CHF is a prevalent cardiovascular problem in both industrialized and developing nations, characterized as a chronic, progressive, and severe condition.- **(Nooshin Peyman, et al. 2020)**

This is a prominent behavior change theory that emphasizes the significance of people's SE in their capabilities. SE is the paramount element in Bandura's social cognitive theory, denoting people's belief in their capacity to execute a specific job **(Nooshin Peyman, et al. 2019) & (Bandura A, 2014).**

A lower SE individual is less inclined to start or change a current health activity. There is an incredible connection between SE, changing health-related behaviors, and successful health promotion. To change people's behaviors, this study looks at how educational planners might include SE theory **(Nooshin Peyman, et al. 2019)** & **(Lawrance L 1986),** and the impact of a training program based on SE theory on enhancing self-care habits among CHF patients.

In healthcare, SE denotes an individual's confidence in their capacity to handle a chronic health condition or modify a health behavior. SE significantly impacts our performance in attaining essential health or life objectives. One illustration of poor SE is that several patients recognize the need for smoking cessation for their health, however, due to past attempts, they lack the confidence to succeed in quitting. This deficiency in confidence obstructs their sense of control and may deter them from attempting to stop again until their poor SE is enhanced. **(Metwaly EA & Zatton HK, 2020)**

Education and training are significantly correlated with an individual's preparedness for the economic transition **(Luh Masdarini et al, 2024) & (Sandirasegarane et al., 2016)**. This compels several educational stakeholders,

including the government, to take action in cultivating talented, knowledgeable, and competitive graduates (**Karani, 2023; Kurish, 2020; Prihatna, 2017).**

Vocational high school represents a formal educational system that responds to modern issues by cultivating entrepreneurship as a student capability. It is considered essential to develop students into skilled and competitive graduates who can generate employment opportunities **(Nugroho et al., 2020 & Hariyanto et al., 2017)**. The entrepreneurship education program is a strategy in vocational high schools to redirect students' attention from employment searching to entrepreneurial development **(Dardiri et al., 2019)**. The effort is supported by the government, especially the Indonesian Ministry of Education and Culture, which promotes vocational high schools to equip graduates for entrepreneurship **(Sumarno & Gimin, 2019; Setiawan & Lestari, 2021)**. This study indicates that the implementation of problem-based learning is more challenging in improving SE for patients with CHF.

This study sought to estimate the impact of a competency-based learning program on SE in patients with CHF. The purpose was accomplished by the subsequent aims:

1. Evaluate patients' understanding and behaviors related to CHF.

2. Evaluate SE in patients with CHF.

3. Develop and execute a competency-based learning program focused on SE for patients with CHF.

4. Assess the impact of a competency-based learning program on SE in patients with CHF.

Research Hypothesis

This study achieved the following hypothesis:

H_1: The average knowledge scores of patients after the program application surpass those recorded before to program application.

H_2: The average practice scores of patients after implementing the program are superior to their results prior to use.

H_3: Beneficial impact of the implemented program on enhancing patients' SE.

To achieve the objective of this study, the topics and techniques were examined under the following frameworks:

1.Technical design

2.Operational design

3.Administrative design

4.Statistical design

1- Technical Design

The technical design encompasses research design, environment, subjects, and instruments for data collecting.

Research Design

To achieve the study's objective, a quasi-experimental research design with a pre-posttest was implemented. The causal connection between independent and dependent variables is the subject of quasi-experimental research design. The independent variable influences the dependent variable, while the dependent variable is the variable that is being affected. **(Loewen & Plonsky, 2016).**

Setting

The outpatient cardiology facilities of Zagazig University Hospitals, located on the first floor, were the site of the investigation. Two classrooms and a waiting area are among the facilities, which also include a stress ECG clinic, a hypertension clinic, a heart rhythm disorder clinic, an ECG clinic, a cardiac disorder clinic, and a cardiothoracic surgery clinic.

Subject

A purposive sample of 70 patients admitted to outpatient cardiac clinics across six months, diagnosed with any kind of congestive heart failure, who were aware and capable of

communication. Patients with severe illnesses, such as cancer and end-stage chronic conditions, as well as those who experienced cardiac arrest, were excluded.

▪ **Sample Size:** The sample size was selected to suggest a desirable level of knowledge, practice, and SE of 60% or higher, with an absolute accuracy of 5% at a 95% confidence level in the results. Employing the equation for single proportion with finite population adjustment (Epi info 6.04 statistical software program). n = N*X / (X + N – 1) is the formula for calculating sample size. The required sample size was 70 patients, with X = Zα2 ¬*p*(1-p) / MOE2.

Tools for Data Collection

Three Tools were used for data collection, pertinent to this study as follows:

I-The patient interviewing assessment questionnaire

II- An observational checklist.

III- Chronic Disease Self-Efficacy Scale

Tool I: Patient Interviewing Assessment Questionnaire (appendix I)

This tool was composed in straightforward Arabic to prevent misinterpretation; it was developed by the researcher following a survey of pertinent literature. **Ogobuiro et al., (2020) & Taggart &Puskas, (2021)**. The questionnaire covered three parts as the following:

Part I: Socio-demographic questions: A total of 12 queries were used to evaluate the socio-demographic characteristics of the patients, including their age, gender, educational attainment, current occupation, marital status, number of children, financial income, domicile, Body Mass Index, and congestion index.

Through the previous data, the researcher estimated the following:

A. Body Mass Index

It is calculated as an individual's weight in kilograms divided by the square of their height in meters (kg/m²).

BMI	Nutritional status
Below 18.5	Underweight
18.5–24.9	Normal weight
25.0–29.9	Pre-obesity
30.0–34.9	Obesity class I
35.0–39.9	Obesity class II
Above 40	Obesity class III

Calculation of Crowding index adopted from **(WHO, 2021)**

B. **Crowding Index**= Count of co-residents (excluding newborns) divided by the count of rooms (excluding kitchens and baths) Calculation of the Crowding Index derived from **(Melki et al., 2004)**

Part II: patients and Family Past Health History Assessment: This pertains to the evaluation of previous patients and familial medical history. It comprised eight questions as follows: Four closed-ended questions regarding past health history, including the occurrence of congestive heart failure (CHF), its onset, diagnosis, and its correlation with other chronic diseases, as well as four yes-or-no questions concerning smoking, exercise, family history of cardiac disease, and the degree of familial relationship.

Part III: Patient's Knowledge Assessment Regarding CHF: Focused on evaluating patients' understanding of CHF by pre- and post-tests for the research participants. The assessment comprised 14 multiple-choice questions that evaluated patients' knowledge regarding the definition, manifestations, diagnosis, treatment protocols, and risk factors of congestive heart failure (CHF), as well as the definition of the heart, its functions, the number of heart chambers and valves, and cardiac catheterization, including its definition, types, preparation, and complications.

Scoring System for Patient's Knowledge Assessment:

Each question is assigned a score of "zero" for an erroneous response and "one" for a right response, with the total points tallied for each patient. Patients' knowledge is categorized as satisfactory if the score is > 60% of the maximum and unsatisfactory if it is < 60%, according to statistical analysis.

Tool II: Observational Checklist (Appendix II)

It was adjusted by the researcher from an original work by **Ahmed et al. (2016)** so that it could compare patients' pre- and post-program practices of the most crucial abilities. The following thirteen procedures were outlined, totaling ninety-one steps: home oxygen therapy (7 steps), breathing and coughing exercises (7 steps), measuring pulse rate and rhythm (8 steps), evaluating jugular vein distension (5 steps), measuring fluid intake and output (11 steps), measuring daily weight (6 steps), assessing discomfort associated with activity (5 steps), pain (6 steps), measuring fatigue (4 steps), maintaining bowel elimination (5 steps), dietary regimen (9 steps), skin care (7 steps), and optimizing self-care (11 steps).

Scoring System for Patients' Practice Observational Checklist

Each step is assigned a score of "zero" for incomplete and "one" for completed; these scores are aggregated for each patient. Patients' practices are categorized as satisfied if the score is > 60% of the maximum and as unsatisfied if it is < 60%, according to statistical analysis.

Tool III: Chronic Disease SE Scale (Appendix III)

To gauge patients' self-assurance in carrying out certain tasks, the Stanford chronic illness self-management research was created and administered **(Lorig et al., 1996)**. The evaluation is divided into ten parts and contains 29 items: patients' self-assurance in exercising consistently (three items), learning about their illness (one item), receiving help from loved ones and the community (two items), talking to their doctor (three items), managing their illness in general (five items), doing daily tasks at home (three items), going out with friends and family (two items), dealing with symptoms (three items), controlling or dealing with depression (six items).

Scoring System for Chronic SE Scale

The chronic SE scale has twenty-nine items designed to evaluate patients' SE, with responses ranging from 0 to 10, where 0 indicates no confidence and 10 represents the maximum level of confidence. Patients' SE is categorized as pleased if the score is > 60% of the maximum score and unsatisfied if it is < 60%, according to statistical analysis.

2- Operational Design

The study was conducted in the following phases: preliminary, content validity assessment, reliability of instruments, pilot study, and fieldwork.

a.Preparatory Phase

Following a study of pertinent literature, the researcher designed data-collecting instruments and translated them into Arabic to assist in data gathering. The curriculum and instructional materials were developed as video resources and handouts.

b- Content Validity

A panel of five academics, comprising three medical-surgical nursing professors, one nursing administration professor, and one cardiology professor, assessed the instruments to evaluate their content validity. The tools were evaluated for clarity, relevance, comprehensiveness, application, and comprehension. No improvements were made to the tools based on the expert's revisions and the pilot study findings.

c- Tools Reliability

The reliability of the patient's knowledge and observational checklist for practice was assessed, with results of 0.75% and 0.852%, respectively. Additionally, SE was evaluated using the alpha Cronbach coefficient, which was determined to be 0.937%.

Ethical considerations

During the preliminary interview, each prospective participant was apprised of the study's nature, objectives, and advantages, and was advised that their participation was optional. The confidentiality and anonymity of the subjects were guaranteed by coding all data. The researcher guaranteed that the acquired data and information would remain anonymous and utilized solely for health improvement and study purposes, with no danger posed to study subjects throughout the research application. Ethical permission was secured from the Scientific and Ethics Committee of the Faculty of Nursing at Zagazig University.

(I.D.Z.U.NUR/0107/28/11/2023)

3- Administrative Design

Zagazig University Hospitals' general director was presented with the necessary permissions after they were obtained from the Faculty of Nursing's dean. After explaining the purpose of the study to the head of the designated setting, we were able to obtain authority to perform the research. Then, we got the patients' verbal consent to participate.

Pilot study

A pilot study was conducted to evaluate the clarity, comprehensibility, feasibility, applicability, and time efficiency of the tools. Seven patients (10%) from the whole sample population were randomly selected from cardiac units to participate in the tool testing. The patients were incorporated into the trial. No alterations were made to the tools.

Fieldwork

The study was conducted over six months, commencing in December 2023 and concluding in May 2024, during which the researcher was present 3 days a week from 9 AM to 1 PM.

Assessment phase: The researcher started to recruit participants after reviewing their eligibility. Separate interviews were conducted using the data collection form with individuals who gave their consent. The data collected served as a preliminary assessment that the researcher used to shape the learning program.

Planning phase: The researcher developed a learning program to educate patients on CHF to improve their knowledge, self-management skills, and evaluation results. A theoretical and practical component were both included in the learning program. To help patients understand and retain the information given, the researcher created an illustrated learning program in simplified Arabic.

Implementation phase: The researcher conducted individual meetings with the patients and implemented the foundational learning program across three ten-session intervals, with each session lasting 30 to 45 minutes.

The initial session was an orientation to the foundational learning curriculum. The researcher employed accessible language to align with the patient's educational level, using incentives and reinforcement to facilitate learning. A copy of the software was provided to each patient for future reference.

The subsequent four sessions were theoretical, encompassing the definition, causes, risk factors, manifestations, diagnosis, treatment protocols, complications related to the condition and its medications, as well as follow-up and SE. This was succeeded by 8 practical sessions incorporating an applied learning program encompassing essential practices such as oxygenation, breathing and coughing exercises, evaluation of heart rate and rhythms, assessment of jugular vein distention, measurement of intake and output, daily weight assessment, evaluation of discomfort levels associated with activity, monitoring for restlessness and pain, promoting self-care participation, maintaining adequate bowel function, dietary management, and integumentary care.

Evaluation phase: Every participant in the research had 2 evaluations utilizing identical data-gathering tools. This was conducted at the time of recruiting (pre-test) and after 3 months of instructional learning as a post-test.

The applying based learning program:

The pamphlet was written in Arabic by the researcher, informed by previously identified requirements of patients with CHF, and grounded on relevant literature and expert opinions **(Debra, Mariann& Jeffrey 2021)** & **(Spielmann et al. 2021)**.

4- Statistical Design

With the help of SPSS 20.0 for Windows (SPSS Inc., Chicago, IL, USA, 2011), we were able to arrange and analyze all of the data. Qualitative data were shown as absolute frequencies (number) and relative frequencies (%), whilst quantitative data were shown as the mean ± SD and median (range). Two sets of category data were compared using the McNemar test. When comparing two sets of dependent variables that do not follow a normal distribution, the Wilcoxon signed-rank test was used. When relevant, the Chi-square test or Fisher's exact test was used to compare the percentages of categorical variables. To assess the relationship between the research variables, the Spearman correlation coefficient was calculated. A positive sign signifies a direct linkage, and a negative sign an inverse correlation. High correlation is shown by values near to 1, whilst poor correlation is denoted by values close to 0. As a measure of the scales' internal consistency and thus their reliability, we calculated their Cronbach alpha coefficient. For statistical significance, a p-value below 0.05 was considered, while a p-value below 0.01 was considered extremely statistically significant. Statistical non-significant (NS) was the designation given to a p-value greater than or equal to 0.05.

The standard deviation (SD): As an indicator of variability of outcomes relative to the mean for qualitative variables.

Wilcoxon Signed Ranks test (Z test): The nonparametric test utilized to compare two sets of scores derived from the same individuals. This may happen when we want to examine variations in scores between different time points or when people experience several conditions.

Pearson Chi-square test (X^2): It is a nonparametric statistical test employed to identify the correlation between categories of two independent samples (row and column variables).

Pearson Correlation (r): It is utilized to evaluate the nature and extent of the link between two quantitative ordinal variables. The Spearman correlation coefficient (rho) is denoted as the Pearson coefficient. The coefficient's sign indicates the relationship's nature (positive or negative), while its value reflects the relationship's strength:

Weak correlation for (rho) less than 0.25, intermediate correlation is between 0.25 and 0.74, and strong correlation is between 0.75 and 0.99.

Result

Part I. Sociodemographic Characteristics of the Studied Patients

Table 1, shows the socio-demographic characteristics of the Patients. It was determined that over two-thirds of the patients (62.8%) were aged between 53 and 63 years, with a mean age of 57 ± 6 years. The majority of the patients were male and married, comprising 84.2% and 81.4%, respectively. Sixty percent of the investigated patients possessed secondary education. Moreover, less than half of the patients had more than three offspring (41.4%). Furthermore, all patients lacked sufficient income, with the majority being from rural areas (94.2%).

Figure 1, illustrates that 46% of patients with CHF had governmental work, 22% didn't work, 12% were self-employers, and 10% had office work.

Figure 2, reveals that 54% of patients with CHF were overweight, 38% had obesity class I, and only 4% had obesity class II

Part II. Medical History of patients with CHF.

The medical history of the studied patients is represented in table (2). It was found that more than half of patients had CHF from less than one year ago (54.3%). The onset of CHF was sudden for 98.5% of patients and detected when feeling some symptoms, so they went to the doctor

(95.8%). Furthermore, more than three-quarters had a history of high blood pressure and diabetes (80%). The highest percent of patients were smoking, had a family history of cardiovascular diseases, and didn't practice exercise (80%, 94.2%, and 98.5%) respectively, and about two-thirds of patients with a family history of cardiac diseases had a first degree of consanguinity (66.6%).

Part III. Knowledge of patients' pre- and post-program phase

Throughout the study stages, patients' knowledge of CHF was measured and displayed in table (3). In comparison to pre-intervention levels of 5.60±1.74, there was a highly statistically significant increase in overall satisfied patients' knowledge with a Mean± SD of 13.16±1.36 after the intervention.

Part IV. Practice of patients' pre- and post-intervention phase

Table 4, illustrates the mean differences in scores of satisfactory practice level among studied patients throughout the study phases. It was observed that there were statistically significant improvements in mean differences scores of all dimensions of studied patients' practice level regarding CHF in post-intervention compared to the pre-intervention phase with *p*-value<0.001.

Table 5 displays the total score of the patients' CHF practice level throughout the study stages. In comparison to pre-intervention levels of satisfaction (Mean± SD 35.12±10.05.), there was a very statistically significant improvement in overall patient satisfaction (Mean± SD 75.78±5.02) after the intervention.

Part V. Patients' self-efficacy pre- and post-intervention phase

Table 6, demonstrates mean differences in scores of SE level among studied patients throughout intervention phases. It was found that there were statistically significant improvements in mean differences scores of all dimensions of patients' SE in post-intervention compared to the pre-intervention phase with a *p*-value <0.001.

Table 7 showed that patients' self-efficacy, measured in terms of overall satisfaction, increased significantly after the intervention (Mean± SD 243.92±9.08) compared to before the intervention (Mean± SD 67.16±16.02).

Patients' overall scores on knowledge, practice, and SE measures were correlated throughout the study's stages, as shown in Table (8). Statistical analysis showed a favorable association (P < 0.01) between patients' SE and overall scores of their practice during the pre-intervention period. The post-intervention phase revealed, however, a favorable association (P = 0.041) between patients' overall knowledge scores and their SE.

Part I. Sociodemographic Characteristics of the Studied Patients

Table (1): Socio-demographic Characteristics of the Studied Patients (n=70).

Sociodemographic Characteristics	No	%
Age (year)		
43-<53	16	22.8
53-<63	44	62.8
>63	10	14.4
Mean± SD	57±6	
Range	43-68	
Gender		
Male	59	84.2
Female	11	15.8
Educational level		
Illiterate	12	17.1
Reads & writes	10	14.4
secondary education	42	60.0
University education	6	8.5
Marital status		
Married	57	81.4
Widow	13	18.6
Number of children		
2	10	14.4
3	31	44.2
>3	29	41.4
Income		
Not enough	70	100.0
Residence		
Rural	66	94.2
Urban	4	5.8
Crowding index		
<2	29	41.4
>2	41	58.6

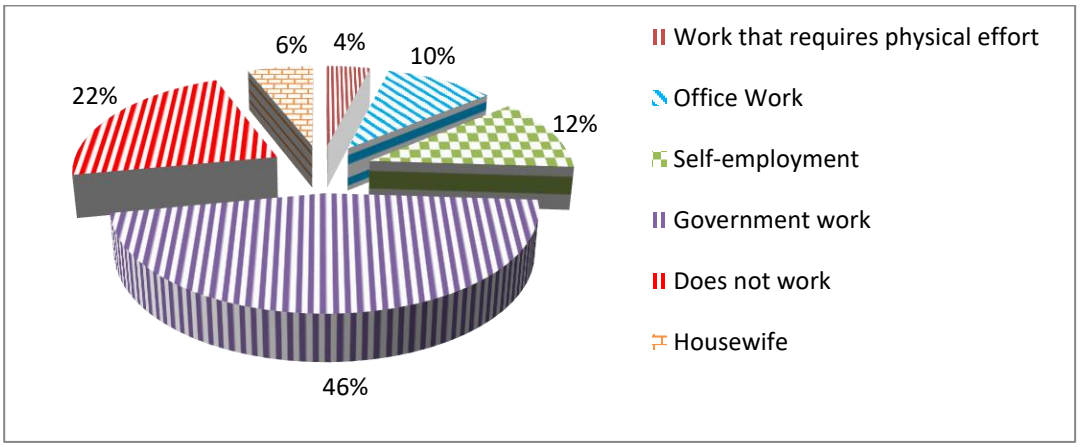

Figure (1): Pie chart showing the frequency distribution of the current job of studied patients (n=70).

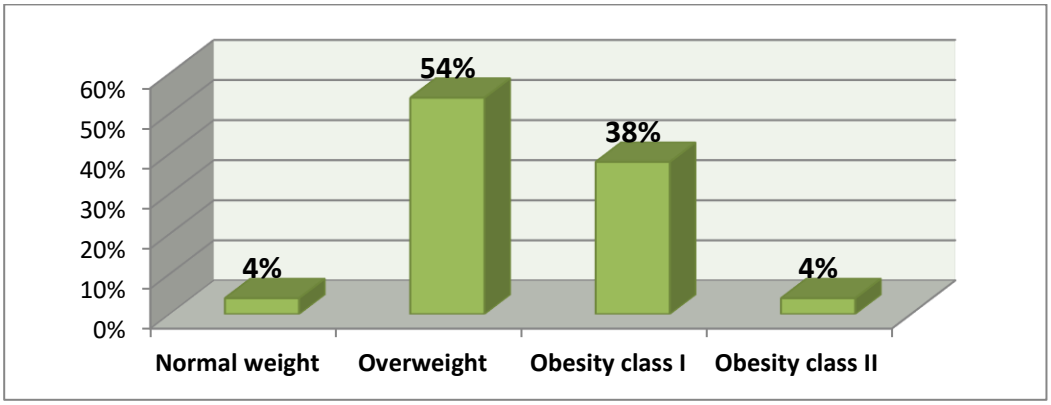

Figure (2): Bar chart showing the frequency distribution of body mass index of studied patients (n=70).

Part II. Medical History of patients with CHF.

Table (2): Medical History of Studied Patients (n=70).

Medical history items	NO	%
The Duration of CHF (years)		
Less than 1year	38	54.3
1-2 years	18	25.7
>2 years	14	20.0
Mean± SD	1.60±1.16	
Range	2 months- 5 years	
The Onset of CHF		
Sudden	69	98.5
Chronic	1	1.5
Detection of CHF		
After the patient's complains of signs and symptom	67	95.8
Upon medical checkup	3	4.2
By chance	0	0.0
History of other chronic diseases*		
High blood pressure	56	80.0
High level of cholesterol	40	57.1
Sedentary lifestyle	20	28.5
Diabetes	56	80.0
Obesity	34	48.5
Smoking		
Yes	56	80.0
No	14	20.0
Practicing exercise		
Yes	1	1.5
No	69	98.5
Family history of cardiac diseases		
Yes	66	94.2
No	4	5.8
Degree of consanguinity (n=60)		
First degree	40	66.6
Second degree	20	33.4

Part III. Knowledge of patients' pre- and post-program phase

Table (3): Total Score of Studied Patients' Knowledge level about CHF throughout Study Phases (n= 70).

Total patients' knowledge	Study phase				MC p
	Pre Intervention		Post Intervention		
	No.	%	No.	%	
Satisfactory level > 60%	7	10.0	67	95.8	< 0.001**
Un-satisfactory level<60%	63	90.0	3	4.2	
Mean± SD	5.60±1.74		13.16±1.36		
Median (range)	6(1-8)		13.5(6-14)		

MC: McNemar test **: statistically highly significant (p<0.001)

Part IV. Practice of patients' pre- and post-intervention phase

Table (4): Mean Differences Scores of Satisfactory Practice Level among Studied Patients through Pre and Post Intervention Phases (n=70).

Items of patients' practice	Study Phases		W	P-value
	Pre Intervention	Post intervention		
	Mean ± SD	Mean ± SD		
Taking Oxygen at home	3.08±1.71	5.70±**0**.89	6.129	<0.001**
Breathing and Coughing Exercises	2.54±1.69	5.82±1.90	6.229	<0.001**
Pulse counting and Regularity	5.06±2.36	7.20±0.97	5.391	<0.001**
Assess Jugular vein distension	2.88±2.43	4.96±0.20	4.398	<0.001**
Measuring fluid intake and output	1.16±2.31	8.72±1.36	6.193	<0.001**
Daily body weight	4.64±1.56	5.84±0.37	4.678	<0.001**
Evaluate the degree of discomfort associated with activity	0.70±1.25	3.88±1.32	-5.842	<0.001**
Pain assessment	2.56±1.34	5.10±1.28	5.864	<0.001**
Fatigue assessment	0.22±0.71	3.74±0.78	6.432	<0.001**
Maintenance of bowel function	2.06±1.89	4.02±1.62	5.491	<0.001**
Diet regimen	3.34±2.94	7.02±1.46	5.55	<0.001**
Skincare	2.92±1.03	5.26±0.85	6.213	<0.001**
Self-care assessment	3.96±2.06	8.52±1.64	6.145	<0.001**

W: Wilcoxon Signed Ranks Test **: statistically highly significant (p<0.001)

Table (5): Total Score of Studied Patients' Practice Level Regarding CHF throughout Study Phases (n= 70).

Total patients' practice	Study phase				MC p
	Pre Intervention		Post Intervention		
	No.	%	No.	%	
Satisfactory level> 60%	7	10.0	62	88.0	< 0.001**
Un-satisfactory level<60%	63	90.0	8	12.0	
Mean± SD	35.12±10.05		75.78±5.02		
Median (range)	36(14-58)		75(64-90)		

MC: McNemar test **: statistically highly significant (p<0.001)

Part V. Patients' self-efficacy pre- and post-intervention phase

Table (6): Mean Differences Scores of SE among Studied Patients throughout Intervention Phases (n= 70).

Items of patients' self-efficacy	Study Phases		W	P-value
	Pre Intervention	Post intervention		
	Mean ± SD	Mean ± SD		
Confidence in doing exercise regularly	7.32±2.17	25.20±1.56	6.179	<0.001**
Obtaining information about the disease	2.62±1.16	8.26±0.66	6.199	<0.001**
Obtaining support from the community, family, and friends	4.68±1.49	16.76±0.92	6.214	<0.001**
Communication with physician	7.26±2.05	25.04±1.29	6.185	<0.001**
Disease Management	11.86±3.19	42.28±1.95	6.173	<0.001**
Doing chore	7.32±2.32	25.02±1.42	6.212	<0.001**
Social/ Recreational Activities	4.50±1.46	16.50±0.99	6.198	<0.001**
Symptom Management	6.30±2.22	25.46±1.33	6.169	<0.001**
Managing Shortness of Breath	2.22±0.95	8.32±0.47	6.221	<0.001**
Control/Management of Depression	13.08±4.12	51.08±2.41	6.160	<0.001**

Table (7): Total Score of SE as Reported by Studied Patients Throughout Study Phases (n= 70).

Total patients' SE	Study phase				^{MC} p
	Pre Intervention		Post Intervention		
	No.	%	No.	%	
Satisfactory level > 60%	2	2.9	59	84.3	<0.001**
Un-satisfactory level<60%	68	97.1	11	15.7	
Mean± SD	67.16±16.02		243.92±9.08		
Median (range)	67(20-102)		243(216-270)		

MC: McNemar test **: statistically highly significant (p<0.001)

Table (8): Correlation between Total Scores of Patients' Knowledge, Practice, and SE among Studied Patients throughout Study Phases (n=50).

Parameter		patients' self-efficacy			
		Pre Intervention		Post Intervention	
		(r)	P	(r)	P
Total patients' knowledge	Pre	-0.153	0.290		
	Post			0.290	0.041*
Total patients' practice	Pre	0.538	<0.001**		
	Post			0.012	0.934

highly significant (p<0.01), r: correlation coefficient.

Discussion

It is essential to persist in conducting evidence-based research treatments that enhance outcomes in people diagnosed with CHF. Numerous research examines the costs, death rates, and morbidity associated with CHF. Nevertheless, further research is required to explore therapies that enhance understanding and habits related to CHF. **(McLeod, Tracy Bennett, 2022).** This study's findings suggest that CHF patients' treatment adherence was much improved by the SE-based training intervention.

The results of the present investigation confirmed the stated hypothesis, demonstrating that most participants were above the age of 50 years. This result is consistent with **Yu, et al., (2019)** In their latest study titled "Effect of Health Education Based on Behavioral Change Theories on SE and Self-Management Behaviors in Patients with CHF," it was found that the bulk of the study population was aged 31 to 69 years. Coronary artery problems can impact various age demographics. This finding is inconsistent with **Cheng, et al., (2019),** who Investigated the psychometric characteristics of the Hong Kong Chinese adaptation of the cardiac exercise SE instrument and discovered that one-third of the research participants were aged between 40 and 49 years.

Our study indicated that around 84.2% of the participants were male, this outcome aligns with **Peng, et al., (2018)** in their research ‘‘Home-based telehealth exercise training program in Chinese patients with heart failure: A randomized controlled trial” and they stated that most of the patients were men. However, this result is inconsistent with **Cheng, et al., (2019)**, who mentioned that the majority of the study sample was female.

This survey found that around 60.0% of the participants have a secondary education. This result is inconsistent with **Barham, Ibraheem, & Zyoud, (2019),** who evaluated the patterns of cardiac SE and quality of life in patients with coronary heart disease, noting that fewer than half of the participants possessed a primary education. As well, this result is also incongruent with **Salmoirago-Blotcher, et al., (2017)** who mentioned in their study that ‘‘Tai Chi is a promising exercise option for patients with coronary heart disease declining cardiac rehabilitation” that half of their study subjects had a college education.

In the current study, the results showed that 81.4% more than the third quadrant of the studied patients were married. This finding goes in line with **Köhle, et al., (2018)**, who assessed the level of patient empowerment and general SE in patients six to 12 months after the cardiac event and mentioned that most of their study sample were married. And also goes in line with **Saad and Asker, (2020),** who assessed the effect of digital cardiac rehabilitation programs on SE of Patients with Coronary Artery Diseases This finding also is in agreement with **Salari, et al. (2016)**, who determined the cardiac SE predictors after coronary artery angioplasty and reported that the majority of their study sample were married.

The current study results suggested that all individuals lacked sufficient income in relation to their employment status. This may be understood as the patient holding positions commensurate with their educational qualifications in either public or private sectors. This outcome aligns with **Tawalbeh (2018),** who investigated the impact of a cardiac instructional program on knowledge and self-care practices among heart failure patients, revealing that around two-thirds of the participants reported insufficient income. These results contradict the findings of **Baradaranfard et al. (2018),** who established a correlation between quality of life and cardiac SE in heart failure patients, noting that a minority of the sample were employed with sufficient income.

The current investigation revealed very statistically significant findings concerning all demographic parameters, indicating compatibility. This outcome aligns with **Maddison et al. (2018)** in their study titled "Effects and Costs of Real-Time Cardiac Telerehabilitation: Randomized Controlled Trial," which revealed that a minority of the sample population had diabetes mellitus. This contradicts the findings of **Peng et al. (2018),** who stated that there were no significant variations in demographic factors between the experimental and control groups. This result aligns with **Saad and Asker (2020),** who, in their study titled "Effects of Lifestyle Modification Program on Reduction of Risk Factors in Patients with Coronary Heart Disease," noted that there were no significant differences in the demographic characteristics of patients between the control and intervention groups.

The current investigation revealed that 80.0% of participants had diabetes mellitus, taking into account their medical history. This may be attributed to the fact that the bulk of the patients were aged over 40 and 50 years, a

demographic commonly identified as a high-risk group for diabetes mellitus. This outcome aligns with the findings of **Song et al. (2019),** who examined the impact of telemonitored exercise rehabilitation on patients with coronary heart disease in China, noting that just over fifty percent of the research participants had diabetes mellitus. Hypertension is a significant predisposing factor for coronary artery disease. This finding aligns with **Khorshid et al. (2019),** who noted in their study on "Cardiac rehabilitation after myocardial infarction: a comparison between standard and home-based cardiac rehabilitation programs" that most participants had hypertension. This finding contradicts **Park et al. (2019)** in their study titled "Comparison of the Obesity-Related Index and Exercise Capacity Between Center-Based and Home-Based Cardiac Rehabilitation Programs," which revealed that only two-fifths of the sample had hypertension.

The current study indicated that around one-third of the examined individuals were obese. This may be attributed to weight increase being a predisposing factor for coronary artery disease. This finding aligns with **Barham, Ibraheem, & Zyoud (2019),** who indicated that around one-third of the examined individuals were obese. This result contradicts **Bay et al. (2018),** who indicated that the research sample had normal body mass index measurements.

This result aligns **with Knuuti et al. (2020),** in their recent study titled "European Society of Cardiology (ESC) Guidelines for the Diagnosis and Management of Chronic Coronary Syndromes," which indicated that the lifetime risk of cardiovascular diseases is elevated in individuals who are overweight compared to those with a normal body mass index. Additionally, a study by **Khan et al. (2018),** titled "Association of Body Mass Index with the Lifetime Risk of Cardiovascular Disease and Compression of Morbidity," indicated that being overweight correlates with an earlier onset of cardiovascular diseases, thereby corroborating the researcher's explanation.

The current study findings indicate that over one-third of participants had been smokers for more than three years. This may suggest that smoking is a risk factor for coronary artery disease. This outcome aligns with the findings of **Salmoirago-Blotcher et al. (2017),** who indicated that one-fifth of their research group engaged in smoking. This result contradicts the findings of **Khorshid, Abdeltawab, Menshawy, and Zaki (2019),** who reported that the majority of their research sample were smokers.

The current study findings indicated that a minority of patients engaged in physical activity. This may result from insufficient awareness of the advantages of regular exercise. This outcome aligns with **Larsson (2019),** who, in his study titled "Cardiac SE and Fatigue One Year Post-Myocardial Infarction," noted that a minority of the individuals engaged in regular exercise. This conclusion contradicts the findings of **Song et al. (2019),** who reported that most of their respondents exhibited exercise behaviors.

The current study revealed that most participants altered their employment following a coronary artery disease event and cardiac catheterization. This result contradicts the findings of **Meng et al. (2015)** in their study titled "Evaluation of a Standardized Patient Education Program for Inpatient Cardiac Rehabilitation: impact on illness knowledge and self-management behaviors up to 1 Year," which indicated that the majority of the study participants reported a change in employment following the onset of coronary artery disease and cardiac catheterization.

As well, the results of the current study revealed that there was a highly statistically significant improvement in study group patients as compared to the result of control Group post-program implementation regarding total knowledge satisfactory scores; this might be due to the effectiveness of program implementation and the motivation of cardiac Patients to be familiar with their disease. This result goes in line with **Tawalbeh (2018),** who indicated that patients' knowledge improved significantly at 1 and 3 months after the Program application.

The current study revealed no statistically significant changes in Self Efficacy Continuous Symptoms (SECS) and Self Efficacy

Maintaining Function (SEMF) total mean scores between control and study group individuals prior to program implementation. This outcome aligns with **Borzou et al. (2018),** who indicated in their research on the "effects of the initial phase of cardiac rehabilitation training on SE among patients undergoing coronary artery bypass graft surgery" that the mean SE scores were statistically significantly different between the two groups before the intervention.

This finding contradicts **Tavakolizadeh, Tabari, & Akbari (2015),** who investigated "Academic self-efficacy: predictive role of attachment styles and metacognitive skills in Iran" and reported no statistically significant relationships between control and study group subjects concerning SECS and SEMF before program implementation.

The current investigation indicated that there were highly statistically significant differences between the study and control groups for SECS and SEMF during the execution of the program and the follow-up period. This outcome aligns with the findings of **Nur'aeni, Mirwanti, and Anastasia (2019)** in their study titled "Effect of a Workbook in Health Education on SE and Quality of Life of Patients with Coronary Heart Disease," where they reported a significant difference in patients' SE two months post-assessment. This study's findings align with those of **Boroumand and Moeini (2016)** in their research titled "The Effect of a Text Message and Telephone Follow-Up Program on Cardiac SE of Patients with Coronary Artery Disease: A Randomized Controlled Trial," which indicated significant differences in SE at 6 weeks and 6 months post-intervention.

The current investigation demonstrated highly statistically significant enhancements in the patients' total mean ratings of adequate knowledge regarding congestive heart failure following program implementation. This may be ascribed to the impact of program execution on enhancing cardiac SE in CHF patients. This finding aligns with **Yu et al. (2019),** who indicated that the SE levels of patients in the observation group receiving health education were considerably greater than those in the control group. This study's findings align with those of **Boroumand and Moeini (2016),** who reported that the mean cardiac SE ratings of the intervention group were considerably elevated compared to the control group at 3- and 4-months post-intervention.

The current study revealed that most participants exhibited strong exercise SE following the execution of the program, in relation to cardiac exercise SE and practice throughout the pre- and post-intervention phases. This may be attributed to the cardiac patient's motivation to participate in the Based Learning Program, which enhances SE for individuals with congestive heart failure (CHF). This outcome contradicts the findings of the **World Health Organization (2018),** which examined SE in individuals with coronary artery disease and reported that just one-fourth of the sample exhibited desirable exercise self-efficacy.

SE was found to be highly statistically significant in the program implementation for patients with CHF, as indicated by the current study. This outcome is consistent with the findings of **Borzou, et al. (2018),** who concluded that the exercise SE scores were substantially different between the intervention and control groups at the time of discharge and one month after the program's implementation. This result is in contrast to the recent study conducted by **Claes et al. (2020),** which demonstrated a documented decrease in exercise SE following the intervention. The study was titled "Feasibility, acceptability, and clinical effectiveness of a technology-enabled cardiac rehabilitation platform physical activity toward health" and was randomized controlled.

Gallagher et al. (2017) established that treatment adherence was inadequate among all patients, even when they were cognizant of being monitored. **Zahra and Fariba (2023) Likewise, Dunbar et al.** discovered that patients' adherence to medicine did not enhance after an intervention. A potential explanation for these varying outcomes may be the length of follow-up; in Dunbar et al.'s trial, follow-up and evaluation took place 4 and 8 months post-intervention, which may have reduced adherence to treatment protocols over time. **Dunbar et al. (2013)** Consequently, due to the prolonged therapy necessitated for individuals with heart failure, recurrent training sessions may be

exceedingly advantageous, highlighting the need for thorough teaching for this patient demographic. Prior research utilizing several intervention techniques to improve medication adherence among cardiac patients has mostly.

The findings of this study corroborated the research hypothesis that the mean knowledge and practice scores of patients after the implementation of the program are superior to those recorded before its application; additionally, there was a positive impact of the program on enhancing patients' self-efficacy.

Conclusions

In light of the current study results, there was a considerable enhancement in patients' knowledge, behaviors, and self-efficacy (SE) following the implementation of the applied learning program compared to the pre-intervention period. It can be stated that applied-based learning positively influenced the increase of SE among patients with CHF by enhancing their knowledge and behaviors. A statistically significant relationship existed between patients' SE and their total scores in knowledge and practice. The current study revealed that fostering personal drive and SE is beneficial. This underscores the significance of a comprehensive patient understanding of their condition.

Recommendations

The Based-on findings, the study recommended:

-Educational media, including booklets, handouts, movies, posters, and CDs, must be accessible to all patients at all times.

-Self-efficacy in patients with CHF should be assessed and included in the treatment plan by a competent nurse.

-Consistent monitoring of all individuals with CHF to assess their health status and identify problems promptly.

-Additional research must be conducted on a larger cohort of patients, alongside the dissemination and implementation of the study in public institutions.

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