

# Effectiveness of Nursing Educational Program on Patients with Heart Failure in Sulaimani City

Mohammed Omer Mohammed<sup>1</sup>, Kawa Wsu Hassan<sup>2</sup>, Surkew Lateef Mahmud<sup>3</sup>, Hadeel Abdulelah Ibrahim<sup>4</sup>, Bayan Omar Sharif<sup>5</sup>, Dlawar Dhufir Farhad<sup>6</sup>

1 Branch of Basic Medical Science, College of Medicine, University of Sulaimani, Kurdistan Region, Iraq

2 Directorate of Health, Dept. of Sulaymaniyah cardiac hospital

3 Branch of Basic Medical Science, College of Medicine, University of Sulaimani, Kurdistan Region, Iraq

4 Branch of Basic Medical Science, College of Medicine, University of Sulaimani, Kurdistan Region, Iraq

5 Directorate of Health, Health Development and Training Center, Sulaimani, Kurdistan Region, Iraq

6 Directorate of Health, Dept. of Sulaymaniyah cardiac hospital

## Abstract

**Background:** Heart failure, is inability of the heart to pump blood for the body's metabolic needs. Globally, nurses are pivotal in health education, enhancing positive health outcomes and overall healthcare effectiveness.

**Aim:** To evaluate the effectiveness of nursing educational program on patients with heart failure.

**Methods:** A quasi-experimental design enrolled 200 patients with heart failure at the Cardiac Specialty Hospital in Sulaimani City from (August 2 - 2021, to February 8 - 2024). Stratified into interventional (n=100) and control (n=100) groups, participants completed a comprehensive questionnaire covering socio-demographics, clinical characteristics, and various assessments. The nursing education program exclusively targeted the interventional group. Data were collected through direct interviews, and analysis used Statistical Package for the Social Sciences version 26, independent t test and Chi square.

**Results:** The average age of the participants was  $68.3 \pm 11.2$  years. The intervention and control groups were predominantly male, with 72% and 69% respectively. Each group initially had 100 patients, but the intervention group reduced to 94 and the control group to 90 due to mortalities after the educational program. In terms of family history of heart failure, 77% of the intervention group and 70% of the control group had a first-degree relative with the condition. Past medical histories of diabetes mellitus were 32% in the intervention group and 42% in the control group. Valvular heart disease was present in 37% of the intervention group and 40% of the control group.

Thyroid disorders were rare, with 93% and 94% of the intervention and control groups respectively having no thyroid issues. Dyslipidemia was found in 59% of the intervention group and 63% of the control group. Before the nursing intervention program, 37% of the intervention group and 34% of the control group were current smokers, with 12% and 11% being passive smokers, respectively. After the program, current smokers reduced to 25% in the intervention group and 26% in the control group, while passive smokers remained the same. Initially, a significant proportion of participants in both groups had no plans to quit smoking, but after the program, there was a highly significant improvement in the intervention group (P value 0.002) compared to the control group. Before the program, 44% of the intervention group and 52% of the control group had been affected by COVID-19, with only 27% and 14% respectively having received the vaccine. After the program, vaccine uptake increased to 42.6% in the intervention group and 14.4% in the control group. There were no significant differences between the groups before and after the program regarding influenza vaccination, as almost none had heard of it. Before the program, hospital admissions for heart failure were 9%, 10%, 22%, and 30% for zero, one, two, and three or more times respectively, in both groups. After the program, the intervention group showed notable improvements compared to the control group. Before the program, 50% of the intervention group and 44% of the control group were in class III heart failure, which changed to 47.9% and 38.9% respectively after the program. The intervention group saw a decrease in class IV heart failure from 11% to 5.3%, while the control group increased from 12% to 28.9%.

**Conclusions:** The implementation of the nursing educational program showed highly significant differences ( $p= 0.001$ ) between the two groups such as smoking cessation, administer COVID-19 vaccination, NYHA classification and admitting hospital during the last 3 months. The improvement of intervention group was better and higher than control group.

**Introduction:** Heart failure (HF) is a clinical syndrome marked by elevated mortality, recurrent hospitalizations, diminished quality of life, numerous comorbidities, and intricate treatment protocols. It leads to structural or functional cardiac impairments, restricting the heart's capacity to adequately fill with and eject blood during the cardiac cycle (1). At the global level, HF is considered a critical public health issue due to its extremely high morbidity and mortality rates (2) and the substantial economic and social costs it imposes on patients, their families, healthcare providers, and society in general (3) The increased prevalence of HF in recent decades is attributed, among other reasons, to population aging and higher survival rates, stemming from advancements in diagnostic and therapeutic methods (4). The extreme fatigue experienced by these patients, caused by inadequate tissue perfusion, significantly deteriorates their quality of life, personal and social roles, and leads to a progressive decline in self-care abilities (5). Consequently, a primary challenge in nursing care for HF patients is enhancing self-care, which Orem defines as the deliberate and continuous practice of activities individuals initiate and perform on their own to maintain life, development, health, and well-being (6). It is known that the primary behavior-

related risk factors for HF can be mitigated through educational programs, which over time reduce the likelihood of readmission and premature death (7). Educational interventions for HF patients encompass various strategies, such as educational meetings (8-10), distribution of printed educational materials during sessions (10), home visits (9), and telephone follow-ups (8).

## **2. Patients and Methods**

**2.1. Design of the Study :**Quantitative design a (quasi-experimental study) was used to assess effectiveness of nursing educational program on patients with heart failure at Cardiac Specialty Hospital in Sulaimani City. The study was carried out during the periods of 2nd August 2021 to 8th February 2024.

**2.2. Administrative Approval :**The protocol of the study approved by college of Nursing- University of Sulaimani, an official agreement letter from the College of Nursing - University of Sulaimani was sent to the Directorate of Health (Sulaimani Cardiac Specialty Hospital) to grant facilitation and cooperation during carrying out of Nursing educational program.

**2.3. The Study's Setting :**This study at conducted at Cardiac Specialty Hospital which is the main hospitals for heart disease. Cardiac Specialty Hospital in Sulaimani City- Iraqi Kurdistan region, serves as the primary institution for managing cardiovascular diseases.

**2.4. The Study Sample :**Non-probability purposive sample was used as a method for selecting samples in this study. Patients who were admitted to the Cardiac specialty hospital were diagnosed with heart failure by the cardiologists and they were invited to participate in the study. Out of 320 patients admitted this hospital from (15th January 2022) to (20th August 2022), 200 patients remained to participate in the study. The participants were divided into two groups 100 recruited for the interventional and 100 for the control group.

**2.5. Criteria for Inclusion and Exclusion :**The study included adults aged 18 or older diagnosed with heart failure with reduced ejection fraction (HFrEF), approved by a cardiologist team at least three months prior. Participants spanned all New York Heart Association (NYHA) classes and had effective communication abilities. They retained the right to refuse or withdraw from the study. Exclusion criteria encompassed severe mental health issues, end-stage liver or renal failure, asthma, or Chronic Obstructive Pulmonary Disease (COPD), due to potential health impediments during the study period.

**2.6. Instruments of the Study:** The study tool was composed of two parts, that represent demographic data of patients with HF such as age, gender, marital status, educational level, residential area, economic state and some risk factors for HF such as family history of HF, NYHA classifications, number of times admitted to hospital, smoking cigarette, drinking alcohol, immunization against COVID 19 and influenza virus.

**2.7. Validity of the study :**The data collection validity was established through a review process involving ten experts. They evaluated and provided feedback on the study questionnaire, leading to revisions that enhanced the instrument's final validity by making it more pertinent and comprehensible.

**2.8. Pilot Study :** It was conducted with 20 patients from the initial study sample during the period of January 15<sup>th</sup> 2022 and then they excluded from the study sample.

**2.9. Reliability of the study sample :**The reliability was determined by the Cronbach Alpha Correlation Coefficient and Stability (test- retest) approach, producing a strong association ( $r = 0.85$ ).

**2.10. Approaches of data collection :**All patients diagnosed with HF and admitted to the Cardiac Specialty hospital in Sulaimani City were included in this study sample. Data were collected through face-to-face interviews with the patients for their information. The data collection period spanned from March 26<sup>th</sup> , 2022. Completing the questionnaire about HF took approximately 15 minutes. 57 Patients did not match the inclusion criteria, 23 patients refused the participation in the study sample, finally 200 patients remained with HF for both intervention and control groups

**2.11. Statistical Analysis of the study sample :**Version 26 of the statistical package of social science (SPSS) was used to code and organize the data into computer files. The inferential data analysis, and frequency and percentage computation and qui square, independent t test, and Mann – Whitney test were used to process the data.

### **3. Results of the study**

**Table (3.1 ): Participants’ Socio-Demographic and Clinical Characteristics (the Own Numbers are Percentages)**

Variables	Interventional Group F (%) N=100	Control Group F (%) N=100	Total	P Value	
Age (Years)	38 - 50	10	3	13	0.11*
	51 - 64	26	20	46	
	65 - 80	52	65	117	
	81 - 100	12	12	24	
	Mean ± SD	67.3 ± 11.5	69.2 ± 10.8	68.3 ± 11.2	0.23 **
Gender	Male	72	69	141	0.64 *
	Female	28	31	59	
Educational Level	Illiterate	59	65	124	0.62 *
	Primary School	20	21	41	
	Secondary School	14	10	24	
	Institute & College	7	4	11	
Marital Status	Married	48	50	98	0.78 *
	Widower	52	50	102	
Occupation	Housewife	25	29	54	0.78 *
	Retired	22	20	42	
	Self-Employee	21	21	42	
	Jobless	21	20	41	
	Governmental Employee	7	7	14	
	Non- Governmental Employee	4	3	7	
Residency	Urban	95	87	182	0.048 *
	Rural	5	13	18	
Living With	Alone	33	33	66	0.90 *
	Son, Daughter	19	17	36	
	Husband / Wife	48	50	98	
Economic Status	Income < Expenditures	63	68	131	0.46 *
	Income = Expenditures	29	28	57	
	Income > Expenditures	8	4	12	

Table (3.1) demonstrated that the total number of HF patients were 200, their mean age ( $\pm$ SD) was  $68.3 \pm 11.2$  years and the age range were between 38 – 100 years. No significant differences were detected in the age distribution or the mean age of the two study groups ( $p = 0.23$  and  $0.11$  respectively). More than half of the intervention and control group (72%, 69%), respectively, were males. Half of intervention and control group (52%, 50%), respectively were widower, and they live alone or with their children. While others were married and live with their wives or their husbands. The proportion of illiterate patients was higher in the control group than the intervention group (65% and 59%), respectively, while the proportion of secondary school and college graduates was higher in the intervention than the control group (14, 7%). In control group housewife was slightly more than interventional group (25%, 29%). Almost all of the patients of the intervention group (95%) were living in urban areas compared to (87%) of patients of the control group.

**Table (3.2): Participant’s family history of heart failure**

<b>Variable</b>	<b>Interventional Group F</b>		<b>Control Group F</b>		<b>Total F (%)</b>	<b>P Value</b>
	<b>(%)</b>	<b>N=100</b>	<b>(%)</b>	<b>N=100</b>		
<b>Family History Of HF (1<sup>st</sup> Degree)</b>	<b>Yes</b>	<b>77</b>	<b>70</b>		<b>147 (73.5)</b>	<b>0.26*</b>
	<b>No</b>	<b>20</b>	<b>22</b>		<b>42(21)</b>	
	<b>I Don’t Know</b>	<b>3</b>	<b>8</b>		<b>11 (5.5)</b>	

Table (3.2) showed that more than half of both interventional and control group had a first-degree family history y of HF (77%,70%), respectively. There were no significant differences between both groups. there were no significant differences between both groups.

**Table (3.3 )Participant’s past medical history for other disease**

Past Medical History	Interventional Group F (%) N=100		Control Group F (%) N=100		Total	P Value
Diabetes Mellitus	No		52	43	95	0.20*
	Yes		48 (48)	57	105	
	Duration (Years)	1-5	16 (33.3)	15 (26.3)	31	0.43*
		> 5	32 (66.7)	42 (73.7)	74	
Hypertension	No		27	18	45	0.13*
	Yes		73	82	155	
	Duration (Years)	1-5	23 (31.6)	22 (26.9)	45	0.43*
		> 5	50 (68.4)	60 (73.1)	110	
Valvular Heart Disease	No		63	60	123	0.66*
	Yes		37	40	77	
	Duration (Years)	1-5	17 (46)	10 (25)	27	0.01*
		> 5	20 (54)	30 (75)	50	
Thyroid Disorder (Hypothyroidism)	No		93	94	187	0.77*
	Yes		7	6	13	
	Duration (Years)	1-5	1 (14.2)	2 ((33.3)	3	0.42**
		> 5	6 (85.8)	4 (66.7)	10	
Dyslipidemia	No		41	37	78	0.56*
	Yes		59	63	122	
	Duration (Years)	1-5	20 (33.9)	19 (30.1)	39	0.66*
		> 5	39 (66.1)	44 (69.9)	83	
Coronary Heart Disease	No		46	51	97	0.48*
	Yes		54	49	103	
	Duration (Years)	1-5	23(42.6)	30 (61.2)	53	0.06*
		> 5	31(57.4)	19 (38.8)	50	
> 3 Times		5 (10.2)	2 (4.1)	7		

Table (3.3) documented that (32%, 42%) of intervention and control groups for more than five years had a past medical history of DM (48%, 57%) and (50%, 60%) of intervention and control groups for more than 5 years had hypertension (73%, 82%), respectively. Less than half of both intervention and control groups has a Valvular heart disease (37%, 40%) for more than 5 years duration (20%, 30%) respectively. The results detected that nearly almost of the participants in

both intervention and control groups had no thyroid disorder (93%, 94%), respectively; but only (7%,6%) had a Hypothyroidism for more than 5 years (6%, 4%), respectively. More than half of intervention and control groups had dyslipidemia (59%, 63%), for more than 5 years duration (39%, 44%) respectively. The duration and level of coronary heart disease slightly higher in intervention group (31%, 19%) than control group (54%, 49%) respectively.



**Table (3.4): Comparisons between both groups of the participants regarding smoking cigarette and drinking alcohol before and after the nursing educational program**

Variables		Interventional Group	Control Group	P Value
<b>Smoking Cigarette</b>		<b>F (%)</b>		
<b>Pretest</b>	<b>Current Smoker</b>	<b>37(37)</b>	<b>34(34)</b>	<b>0.630</b>
	<b>Passive Smoker</b>	<b>12(12)</b>	<b>11(11)</b>	
	<b>Ex Smoker</b>	<b>25(25)</b>	<b>23(23)</b>	
	<b>Never Smoker</b>	<b>26(26)</b>	<b>32(32)</b>	
<b>Posttest</b>	<b>Current Smoker</b>	<b>25(26.6)</b>	<b>26(28.9)</b>	<b>0.000</b>
	<b>Passive Smoker</b>	<b>12(12.8)</b>	<b>11(12.2)</b>	
	<b>Ex Smoker</b>	<b>31(33.0)</b>	<b>23(25.6)</b>	
	<b>Never Smoker</b>	<b>26(27.7)</b>	<b>30(33.3)</b>	
<b>P. Value</b>		<b>0.001</b>	<b>0.717</b>	
<b>If Current Smoke, How Many Cigarettes/Days?</b>		<b>F (%)</b>		
<b>Pre Test</b>	<b>≤20</b>	<b>16(43.3)</b>	<b>20 (58.8)</b>	<b>0.299</b>
	<b>21- 40</b>	<b>15(40.5)</b>	<b>7(20.6)</b>	
	<b>&gt; 40</b>	<b>6(16.2)</b>	<b>7(20.6)</b>	
<b>Post Test</b>	<b>≤20</b>	<b>24(96)</b>	<b>15(57.7)</b>	<b>0.000</b>
	<b>21- 40</b>	<b>0(0)</b>	<b>8(30.7)</b>	
	<b>&gt; 40</b>	<b>1(4)</b>	<b>3(11.6)</b>	
<b>P. Value</b>		<b>0.005</b>	<b>0.214</b>	
<b>Do You Have A Plan To Give Up Cigarette Smoking?</b>		<b>F (%)</b>		
<b>Pre Test</b>	<b>Yes</b>	<b>1 (2.7)</b>	<b>1(3)</b>	<b>0.315</b>
	<b>No</b>	<b>17 (46)</b>	<b>14(41)</b>	
	<b>I Still No Decided</b>	<b>19 (51.3)</b>	<b>19(56)</b>	
<b>Post Test</b>	<b>Yes</b>	<b>19 (76)</b>	<b>0</b>	<b>0.034</b>
	<b>No</b>	<b>6 (24)</b>	<b>10(38.4)</b>	
	<b>I Still No Decided</b>	<b>0</b>	<b>16(61.6)</b>	
<b>P. Value</b>		<b>0.002</b>	<b>0.407</b>	
<b>Do You Drink Alcohol?</b>		<b>F (%)</b>		
<b>Pre Test</b>	<b>Yes</b>	<b>97 (97)</b>	<b>99 (99)</b>	<b>0.621</b>
	<b>No</b>	<b>3 (3)</b>	<b>1 (1)</b>	
<b>Post Test</b>	<b>Yes</b>	<b>94 (94)</b>	<b>90 (90)</b>	<b>1</b>
	<b>No</b>	<b>0</b>	<b>0</b>	

Table (3.4) indicated that current smoker and passive smoker of intervention and control groups before nursing intervention program was (37%,34%), (12%,11%), respectively, but after the program, the current smoker became (25%, 26%) (12%,11%) respectively. Furthermore, the majority of individuals in both groups were smoking ( $\leq 20$ ) cigarettes per day. Subsequent to the program, the control group exhibited a reduction in the daily number of cigarettes smoked, decreasing from (20 to 15 cigarettes/day). In contrast, the intervention group experienced an increase in this metric, rising from (16 to 24 cigarettes/day). Notably, individuals in the (21-40 cigarettes/day) category reduced to zero percent, and those smoking from 6 cigarettes a day diminished to a solitary participant in the intervention group, contrasting to an increase in the control group. Statistical analysis revealed no significant difference between the two groups ( $P \geq 0.05$ ). Moreover, prior to the program, a significant proportion in both groups had not formulated plans to quit smoking, however, after implementing the program there was a highly significant differences among the participants in intervention group at P value (0.002), compared to control group. Significant differences were notably observed within the intervention group when comparing the pre- and post-nursing interventional program, with a P-value less than or equal to 0.005 for variables such as smoking cigarettes, the number of cigarettes smoked per day, and the intention to quit smoking as a compared to control group. This outcome due to the nursing educational program. The study also showed that nearly all participants of both intervention and control groups did not drink alcohol preprogram, while after program no participant in both groups drank it, because all alcoholic patient died in both groups after the educational program.

**Table (3.5): Comparisons between both groups regarding COVID19 vaccine before and after the educational program**

Variable		Interventional Group F (%)	Control Group F (%)	P-Value*
<b>Have You Had Corona Virus Disease?</b>				
Classes	Yes	44 (44)	52 (52)	0.22 *
	No	52 (52)	41 (41)	
	I Don't Know	4 (4)	7 (7)	
<b>Did You Receive A Vaccine Of COVID19?</b>				
Pre-Test	Yes	27 (27)	14 (14)	1
	No	73(73)	86 (86)	
Post-Test	Yes	40 (42.6)	13 (14.4)	0.014
	No	54 (57.4)	77 (85.6)	
<b>If No, Why?</b>				
Pre-Test	I Didn't Hear It	0	0	0.555
	I Am Afraid Of It	48 (65.8)	44 (51)	
	I Am Not Believing It	25 (34.2)	42 (49)	
Post-Test	I Didn't Hear It	0	0	0.016
	I Am Afraid Of It	36 (66.7)	39 (50.7)	
	I Am Not Believing It	18 (33.3)	38 (49.3)	

Table (3.5) demonstrated that before implementing the educational program (44%, 52%) of both groups were affected corona virus disease respectively. Only (27%, 14%) of them were received a vaccine of COVID19, but after the program (42.6%, 14.4%) of them were received the vaccine respectively. There were no significantly different between the intervention and control groups before and after the program. The results also indicated that the reason for receiving the vaccine after the educational program differed significantly between the patients in the intervention group and those in the control group ( $P \leq 0.016$ ).

**Table (3.6): Comparisons between both groups regarding Influenza vaccine before and after the nursing educational program**

Variable		Interventional Group F (%)	Control Group F (%)	P-Value*
<b>Did You Receive A Vaccine For Influenza?</b>				
Pre-Test	Yes	0	0	1
	No	100 (100)	100 (100)	
Post-Test	Yes	0	0	1
	No	94 (94)	90 (90)	
<b>If No, Why?</b>				
Pre-Test	I Didn't Hear It	96 (96)	91 (91)	0.116
	I Am Afraid Of It	2 (2)	1 (1)	
	I Am Not Believing It	2 (2)	8 (8)	
	There Is No Influenza Vaccine Now	0	0	
Post-Test	I Didn't Hear It	0	81 (90)	0.324
	I Am Afraid Of It	22 (23.4)	1(1)	
	I Am Not Believing It	16 (17)	8(9)	
	There Is No Influenza Vaccine Now	56 (59.6)	0	
<b>If Not Vaccinated, Do You Have A Plan To Take Them?</b>				
Pre-Test	No	53 (53)	59 (59)	0.385
	Yes	28 (28)	12 (12)	
	I Still No Decided	12 (12)	29 (29)	
Post-Test	No	23 (24.4)	52 (57.8)	0.001
	Yes	45 (48)	9 (10)	
	I Still No Decided	26 (27.6)	29 (32.2)	

Table (3.6) showed that pre interventional program no patients in both groups received a vaccine for Influenza because nearly almost of them did not hear it, while after the program more than half

returned the cause of non-vaccination to that there is no Influenza vaccine now, and less that quarter of them were afraid and not believe the vaccinations. Furthermore, more than half of both groups had no plan to receive the vaccination before the program, but after the program (24.4%, 57.8%) in both groups had no plan to receive the vaccination respectively. There were no significant differences in vaccination history, vaccine type, and reasons for not receiving the vaccine between the intervention and control groups. However, the results showed a significant difference in the presence of a plan to take the vaccine if not vaccinated after the intervention between the intervention and control groups ( $P \leq 0.001$ ).

**Table (3.7): Comparisons between both groups regarding numbers of admitting hospital during the last 3 months**

Variable		Interventional Group			
		F (%)			
<b>How Many Times Were Admitted Hospital During The Last 12 Weeks</b>					
<b>Pre-Test</b>	<b>Zero</b>	<b>9 (9)</b>	<b>10 (10)</b>	<b>19 (19)</b>	<b>0.555</b>
	<b>1 Time</b>	<b>22 (22)</b>	<b>30 (30)</b>	<b>52 (52)</b>	
	<b>2 Time</b>	<b>45 (45)</b>	<b>37 (37)</b>	<b>82 (82)</b>	
	<b>≥ 3 Times</b>	<b>24 (24)</b>	<b>23 (23)</b>	<b>47 (47)</b>	
<b>Post-Test</b>	<b>Zero</b>	<b>17 (18.1)</b>	<b>10 (11.1)</b>	<b>27 (13.5)</b>	<b>0.059</b>
	<b>1 Time</b>	<b>39 (41.5)</b>	<b>27 (30)</b>	<b>66 (33)</b>	
	<b>2 Time</b>	<b>27 (28.7)</b>	<b>32 (35.6)</b>	<b>59 (29.5)</b>	
	<b>≥ 3 Times</b>	<b>11 (11.7)</b>	<b>21 (23.3)</b>	<b>32 (16)</b>	

Table (3.7) demonstrated that preprogram (9%, 10%, 22%, 30%, 45%, 37%, 24%, 23%) of both intervention and control groups were admitted to hospital for HF problems zero, 1 time, 2 times, and  $\geq 3$  times respectively. While after the intervention program a notable change observed in interventional group compared to control group, because (18.1%, 11.1%, 41.5%, 30%, 28.7%, 35.6%, and 11.7%, 23.3% respectively. The comparison between the intervention and control groups regarding the variable "admitted to the hospital during the last 3 months did not show a significant difference before and after the educational program.

**Table (3.8): Comparisons between both groups concerning the severity of heart failure according to New York Heart Association (NYHA) classification before and after the nursing educational program**

Variable		Interventional Group F (%)	Control Group F (%)	Total F (%)	P-Value*
<b>Severity Of HF According To (NYHA) Classification</b>					
<b>Pre- Test</b>	<b>I</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0.638</b>
	<b>II</b>	<b>39 (39)</b>	<b>44 (44)</b>	<b>83 (83)</b>	
	<b>III</b>	<b>50 (50)</b>	<b>44 (44)</b>	<b>94 (94)</b>	
	<b>IV</b>	<b>11 (11)</b>	<b>12 (12)</b>	<b>23 (23)</b>	
<b>Post- Test</b>	<b>I</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0 (0)</b>	<b>0.001</b>
	<b>II</b>	<b>44 (46.8)</b>	<b>29 (32.2)</b>	<b>73 (39.7)</b>	
	<b>III</b>	<b>45 (47.9)</b>	<b>35 (38.9)</b>	<b>80 (43.4)</b>	
	<b>IV</b>	<b>5 (5.3)</b>	<b>26 (28.9)</b>	<b>31 (16.9)</b>	

Table (3.8) demonstrated that preprogram (50%, 44%) of both intervention and control groups respectively in class (III) of HF, while after program (47.9%, 38.9%) of both groups was in class (III) respectively. But class (IV) in intervention group decreased from (11% to 5.3%), while control group increased from (12% to 28.9%). the results showed no significant difference between the two groups preprogram. However, after the educational program, a significant difference was found between the patients in the intervention group and those in the control group ( $P \leq 0.001$ ).

## 4. Discussion

**4.1. Socio-demographic data:** In the present study, 200 patients with HF participated, 100 patients with HF who received nursing educational program made up the participants. 100 individuals with HF who were admitted to the cardiac Teaching hospital and received routine hospital care comprised the control group. In both groups, patients with HF were predominately between the ages of 65 and 80. The mean age were ( $68.3 \pm 11.2$ ) years, and the ranges were between (38– 100) years. This outcome comes along with the study of Lakdizaji et al, (2013) [11] in Iran in which their mean age of participants was ( $61.7 \pm 9.4$ ) years. The participants in both the interventional and control groups of the current study were predominantly male, this goes with the study of Stavrianopoulos, (2016) [12] in Greece, and Lakdizaji et al, (2013) [11] in Iran who 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 phenotypes. Existing research, such as Guo, (2016) [13] 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 Meyer et al, (2013) [14] and Daubert and Douglas, (2019) [15]. The study revealed that half of HF patients have HFPEF, with females being overrepresented among this group. This 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 Dunlay et al, (2017) [16]. It is important to note that in the present study, the focus was only on patients with HFrEF.

The findings of the present study were revealed that nearly half of participants in intervention group and half of control group were married, it is in agreement with the study conducted by Stavrianopoulos (2016) [12] in Greece, 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 Lakdizaji et al, (2013) Stavrianopoulos (2016) and Akbari et al, (2019) [11,12,17]; 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 (Income less than expenditures) which is come along with the study of Akbari et al, (2019) [17] in Tehran.

The economic state findings in the present study closely resemble those reported by Lakdizaji et al, (2013) [11] 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 Lakdizaji et al, (2013) [11] as nearly half of the participants in both studies lived with their spouses.

Concerning occupation, there is an agreement between current study and Lakdizaji et al, (2013) [11] since less than a quarter of their outcomes and the current study were falling into self-employment and retirement.

**4.2 Family history of patients with heart disease :**As well as, Table 4.2 illustrated that, three quarter percent of the current study had a family history of heart disease, this outcome is higher than the study of Akbari et al., (2019), because more than half of their participants had a family history of heart disease in both intervention and control groups. There is strong epidemiologic evidence for the familial aggregation of CVD. Researchers from the Framingham study reported that having CVD in at least one parent has doubled the 8- year risk of CVD among men and has increased the risk among women by 70% Imes, and Lewis (2014) [18].

**4.3 Past medical history of the study sample :**The present study demonstrated that nearly half and more than half of both intervention and control groups had history of DM, and nearly three quarter and majority of both intervention and control groups had hypertension, and more than half and nearly half of them had CHD respectively. This finding is come along with the study of

Lakdizji et al., (2013) [11] who reported that (50%, 45%), (72.7%, 63.6%), and (50%, 27.3%) had history of DM, hypertension and coronary heart disease respectively.

Moreover, both intervention and control groups in the current study had a history of CAD (54%,49%) for more than five years (31%,19%), and nearly half of them performed coronary angiography (1-3 times) for more than 5 years (20%,17%) respectively. Whereas, more than half of both groups had a history of dyslipidemia and nearly half of the participants in both groups were still consumed lard, skin weekly, and more than half of them ate hydrogenated fat daily, and butter, cream and margarine weekly.

The prevalence of HF risk factors in Middle Eastern countries is increasing, including CAD, HTN, DM, and obesity. Patients in the Middle East tend to develop HF 10 years earlier than those in the West, mainly due to earlier onset of CAD that the primary HF causes. A systematic review of 42 studies in low- and middle-income countries (1995-2014) showed that ischemic heart disease and HTN were the primary HF causes, Callender et al, (2014), Al-Shamiri (2013) [19, 20].

**4.4 Cigarette smoking and Drinking alcohol :**Current study illustrated that less than half of both groups were current smoke, passive, EX smoke and never smoke before nursing educational program were (37%,34%) (12%,11%) (25 %, 23%), (26%, 32%), respectively, but after the program they became (26.5%, 28.9%) (12.8%,12.2%), (33%, 25.6%), (27.7%, 33.3%), respectively. There was a significant difference ( $P= 0.006$ ) between two groups. Furthermore, the majority of individuals in both groups were smoking ( $\leq 20$ ) cigarettes/day. Statistical analysis revealed no significant difference between the two groups preprogram ( $P = 0.630$ ) but a significant difference noted between two groups and among intervention group itself at ( $P= 0.001$ ) compared to control group. Moreover, before the program, a significant proportion in both groups had not formulated plans to quit smoking. Following the nursing educational program, the intervention group reported a noteworthy shift, indicating an intention to quit smoking, in contrast to the control group. there were no significant differences between two groups in pre and post program, while there is a significant difference among intervention group before and after the program at ( $P= 0.002$ ), These underscores show the effectiveness of the nursing educational program.

The current outcome regarding number of participants in current smoke is disagreed with the study of Arruda et al, (2018) [21] in Brazil, who indicated (8.8%, 19.6%) of their participants in intervention and control group, respectively were current smoker while the present result was higher than their outcome.

Cigarette smoking is widely acknowledged as a significant risk factor for CVD. It has a strong association with coronary heart disease. A study revealed that cigarette smoking is linked to an increased mean left ventricular mass index and LV mass/volume. It emerges as a potent risk factor for elevated left ventricular mass and systolic dysfunction, leading to incident HF hospitalization Kamimura et al, (2018) [22]. Concerning drinking alcohol, the present study indicated that almost of both intervention and control group did not drink alcohol, while only (2%) of them drank it before implementing the nursing educational program. All variables were statistically significant

before the nursing educational program. The researcher returned this outcome to religious factor since all of the participants in this society are Muslim. The results of the current study reported that there was no any patient in both groups drink alcohol because all of them died after implementing the educational program.

**4.5 COVID- 19 and its vaccines :**The current study focused on COVID-19 incidence and vaccination rates in the intervention and control groups. Before the program, less than half and more than half of intervention and control groups were affected COVID-19, and less than quarter of them vaccinated respectively. While after educational program, more than quarter of the intervention group and less than quarter of the control group were vaccinated. Before the program, there was no significant observed; however, a significant difference in vaccination rates became apparent after the program at (P 0.014). The primary reason for non-vaccination was fear of COVID-19 vaccination, with over half of both groups have provided their fear. Following the nursing educational program, a significant contrast between both groups was observed (P 0.016). The present study revealed that more than half of both groups had the past medical history of DM, hypertension, dyslipidemia, and coronary heart disease. According to Feras et al, (2021) [23], individuals with pre-existing comorbidities, including HF, face a notably elevated risk of morbidity and mortality associated with COVID-19 infection. The researcher returns the pre-program result for some points such as insufficient health awareness of population regarding this virus, lack of prevention and social isolation, insufficient using of personal protective equipment (PPE), especially face mask; also, obtaining health education from the social media. It is worth mentioning, health education is one of the crucial responsibilities of the Ministry of Health and college on nursing and medicine and every health care provider.

**4.6 Influenza virus and its vaccine :**This study revealed that there was nobody in both intervention and control groups received influenza vaccine preprogram, due to that nearly all of them never heard this vaccine. While after the nursing educational program more than half of the intervention group attributed the reason of non-taking influenza vaccine to that, there is no Influenza vaccine now, but still, most patients of the control group did not hear it. Before the program more than half of both groups had no plan to receive the vaccination, while after implementing the program nearly half of intervention group and less than a quarter of control group had a plan to give this vaccine. There was a significant difference between both groups (P 0.001). The findings indicate that a significant number of individuals primarily acquire information about vaccines from non-professional sources and social media, contributing to a heightened apprehension towards vaccinations. Therefore, individuals diagnosed with HF require a dedicated team to provide them with an accurate and targeted information about their condition, aiming to enhance their overall QoL.

**4.7 Admitted hospital during the last 3 months for heart failure problems :**The present study documented that before educational program less than half of both intervention and control group had a higher range of admitting to cardiac teaching hospital to heart disease problem two times within the last three months. While after program the interventional group decreased the



percentage of this range especially two times and three times and more, in contrast to the control group which did not experience a notable change. The researcher returns this finding of interventional group to the observed outcome stems from the impact of a nursing educational program aimed to reducing hospital readmissions for HF issues. And this 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 knowledge about the heart disease and affect the improvement of their QoL. This finding aligns with Mesbahi et al, (2020) [24] 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 readmissions among patients with HF. Study of Marques et., (2022) [25] mentioned that telephone contact for patient follow-up after hospital discharge for HF decompensation contribute to a reduction in hospital readmission and mortality which is a potential educational strategy for nursing practice.

Depending on the functional classification and severity of the symptoms, patients with HF may benefit from taking their drugs appropriately leads to enhance outcomes and lowers hospitalizations, Ziaecian, and Fonarow, (2016) [26].

Several studies have estimated that a quarter of patients with HF are readmitted within 30 days after discharge from hospital, and half of them are readmitted within 6 months of hospital discharge Bogaev (2010); Casimir et al, (2013) [27, 28]. These readmissions can be attributed to less-than-optimal therapeutic options, insufficient educational strategies, poor participation in the medical regimen, deficient knowledge and inability to carry out self-care behaviors, Yehle & Plake (2010)[29].

**Severity of heart failure according to New York Heart Association (NYHA) :**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%), 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, there was no significant difference observed between the two groups. However, after the program, a significant difference emerged between two groups ( $P= 0.001$ ).

A positive impact of education on patients' knowledge about their disease were achieved in seven meta-analysis study, Loghmani (2018); Boyde (2018); Wang (2017); Kato (2016); Hägglund (2015); Boyne (2014); Mussi (2013). The researcher conveyed these findings to the influence of the interventional program, this aligning with the research by Świątoniowska-Lonc et al, (2020), 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.

Based on the study findings, most HF patients were males aged 38-100, predominantly illiterate, retired or self-employed, widowed, and low-income, living in urban areas. They were generally classified as NYHA Class III and had a family history of HF, diabetes, hypertension, CAD, dyslipidemia, and COVID-19. They were hospitalized twice in the past three months for HF, with few smokers. Post-nursing educational program, vaccination rates and HF knowledge increased in the intervention group compared to the control group. The program significantly reduced HF mortality and morbidity, evidenced by fewer hospital readmissions and reduced economic burden on families and the healthcare system.

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