

Effect of Clinical Nursing Pathway on Heart Failure Patients' Outcomes Rates in Cardiac Care Units and Early Readmission

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ABSTRACT

Background: The global population has a high morbidity and mortality rate associated with heart failure (HF). Whereas, Hospital readmissions consume significant resources and lead to a financial burden. **Aim:** To evaluate the effect of a clinical nursing pathway on heart failure patients' outcomes and early readmission rates in the cardiac care units. **Subjects and method: Design:** A Quasi-experimental was used. **Setting:** This study was conducted at Cardiac Care Units in Port Said Governorate: El-Salam Hospital, Al-Hayat Hospital, El-Zohoer Hospital, and Al-Shifa Medical Complex Hospital. **Subjects:** A purposive sample of 145 heart failure patients was included. **Tools of data collection:** Four tools were used, patient assessment, patient anxiety level assessment, patient satisfaction, and patient variance with the clinical nursing pathway intervention. **Results:** There was a significant difference ($P=0.000^{**}$) between pre and post-applying clinical nursing pathway intervention regarding length of hospital stay with readmission rate among studied heart failure patients with a mean (9.789 ± 2.59), (4.12 ± 2.61) respectively, and there was a positive effect on the improvement of signs and symptoms of studied heart failure post-applying clinical nursing pathway intervention with a p-value ranged from 0.000 to 0.05, also there was a significant improvement on the anxiety and satisfaction levels of heart failure patients post-applying clinical nursing pathway intervention. **Conclusion:** The clinical nursing pathway had a positive effect on heart failure patients' outcomes and length of stay and decreased the readmission rate after discharge. **Recommendations:** The application of the clinical nursing pathway intervention for patients with heart failure was recommended.

Keywords: Cardiac Care, Clinical nursing pathway, Health outcomes, Heart failure, Readmission Rates.

INTRODUCTION

More than 64 million people worldwide are affected by the global pandemic of heart failure (HF), which is becoming more common. Heart failure is a complex and potentially fatal illness marked by high costs, severe morbidity and mortality, poor functional capacity and Alphanumeric quality of life. Despite improvements in the treatment of HF over the past few decades, the 5-year mortality rate remains high at about 50%, and 20% to 25% of patients are readmitted within 30 days of discharge (Odegaard, Hallén, Lirhus, Melberg & Halvorsen, 2020).

In Egypt, around 1.5 million Egyptians have heart failure, and the number of new cases is 111,937 per year. Furthermore, according to the WHO, 23% of recorded deaths in Egypt in 2014 were attributable to heart failure (Mohamed, Alaa EL-Deen, Ali, & Ibrahim, 2019). According to reports, 1-2% of adults in affluent nations have HF, and that number rises to $\geq 10\%$ for those over the age of 70 (McDonagh et al., 2021).

Heart failure is an illness that arises when the heart is unable to incapable of performing its job. The body might not obtain enough oxygen. Heart failure is a critical ailment for which there is typically no cure. However, many people with heart failure live long, fulfilling lives when their illness is treated with drugs for heart failure and good lifestyle modifications (American Heart Association, 2023). Certain medical problems, such as coronary artery disease (CAD) and heart attacks, might raise the risk of heart failure. Diabetes, High blood pressure, obesity, and other factors associated with heart disease: Tobacco use, consuming foods heavy in fat, cholesterol, and sodium, Inactivity, as well as excessive alcoholic beverage use, are all risk factors for valvular heart disease (Muntner et al., 2019).

Shortness of breath during daily activities, difficulty breathing when lying down, weight increase with edema in the feet, legs, ankles, or stomach, and general tiredness or weakness are also common symptoms of HF (Ewald, Ewald, Thakkestian, & Attia, 2020). Many healthcare providers are often involved in the management of HF, from the initial interaction with the emergency room through the physician of the admitting ward (Kotecha et al., 2022).

Clinical pathways (CPs) are a multidisciplinary therapy method for a specific set of patients with a predictable medical course, in which the numerous actions by the

professionals involved in the patient's care are coordinated (Pitt et al., 2019). When used with heart failure patients, clinical pathways tend to lower costs, increase compliance with recommendations, and reduce therapy variance (Conrad et al., 2018).

The coordination of care across the severity of HF's spectrum may be the secret to the success of multidisciplinary HF programs directed by cardiologists and supported by doctors and specially trained nurses (Joseph, Gopichandran, Seth & Tirwa, 2020). Nursing education is a critical element that must be addressed before CPs are implemented. When the CPs are implemented through the education program for nurses in an interactive environment, nurses have the opportunity to study and apply the scenarios before entering clinical practice. Nursing involvement and its application are essential to the success of CPs (Nurses USA, 2022). When patients receive well-coordinated care tailored to their individual needs, they may experience reduced anxiety and higher satisfaction levels (Thompson, Cook, Masterman, Parkinson, & Bainbridge, 2022).

Significance of the study

Clinical pathways are new ideas in the delivery of healthcare. These pathways work best when a team of specialist nurses and doctors, in addition to a multidisciplinary approach, provide inpatient education, proper discharge planning, and dedicated care routes. Reducing readmission also involves providing the patient's main care physician with excellent discharge instructions and improving primary care follow-up. To improve care, a multidisciplinary strategy makes use of case management, nursing, pharmacy, patient education, and medical management (Thaker et al., 2022).

In Egypt, from clinical experience, observations, reviewing the medical records, and statistical data made in the cardiac care unit, the researcher concluded that there are more heart failure patients being referred to emergency rooms and being readmitted and that this trend is correlated with the population's aging. So, it is important to evaluate the effect of implementing a clinical nursing pathway on the rates of early readmission in cardiac care units for heart failure patients.

AIM OF THE STUDY

The study aim was to evaluate the effect of a clinical nursing pathway on heart failure patients' outcomes and early readmission rates in the cardiac care units.

Study Hypotheses

- Heart failure patient outcomes, including improvements in physical symptoms, anxiety levels, and satisfaction, and the variation of the patient will differ after using a clinical nursing pathway.
- Early readmission rates will be decreased after implementation of a clinical nursing pathway on heart failure patients in the cardiac care units.

Operational definition

Patient outcomes that encompass physical symptoms, anxiety, and satisfaction

SUBJECTS AND METHOD

A. Technical design

Research design

A Quasi-experimental design (one group pre and post-test) was utilized in this study.

Study Setting

This study was conducted at Cardiac Care Units in Al-Salam Hospital, Al-Hayat Hospital, El-Zohoer Hospital, and Al-Shifa Medical Complex which affiliated to Egypt health care authority hospitals in port said governorate . Al-Salam Hospital the Cardiac Care Unit (CCU) contains 19 beds divided into two main units: The first CCU and the second care unit. Al-Hayat Hospital contains 8 beds in the CCU unit. El-Zohoer Hospital contains 8 beds in the CCU unit. Al-Shifa Medical Complex Hospital contains 4 beds in the CCU unit.

Subjects

Purposive sample of 145 adult patients with heart failure.

Inclusion criteria were:

- Class I (No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea (shortness of breath), Class II (Slight limitation on activities of daily living (ADLs) Patient reports no symptoms at rest but increased physical activity will cause symptoms) and Class III (Marked limitation on ADLs Patient feels comfortable at rest but less than ordinary activity will cause symptoms) of Heart Failure according to New York Heart Association Classification.
- Adult patients.
- Capable of communicating.
- Emotionally stable, no psychiatric conditions.

Exclusion criteria were:

The patients suffer from renal failure, hepatic failure and malignancy

Sample size

The average numbers of patients with heart failure admitted to cardiac care units in in governmental Port Said general hospitals were named; Al-Salam Hospital, Al-Hayat Hospital El-Zohoer Hospital, and Al-Shifa Medical Complex Hospital in 2015, 2016 & 2017 was (10%,11%, 8%), (11%,13.5%, 10%), (16.3%, 13%, 9%), and (3.9%,2.5%, 2%), respectively in relation to the total number of cardiac patients admitted in cardiac care units in each setting (Statistical administration and medical records department at cardiac care units in Al-Salam Hospital, Al- Hayat Hospital, El-Zohoer Hospital, & Al-Shifa Medical Complex Hospital, 2018).

The sample size was calculated by using openepi.com. Openepi.com is free, open-source software that could be used to calculate epidemiologic statistics (Dean, Sullivan, & Soe, 2013). Utilizing the following formula:

$$\text{Sample size } n = \frac{DEFF * N_p (1-p)}{[(d^2 / Z^2_{1-\alpha/2} * (N-1) + p * (1-p))]}$$

Population size (for finite population correction factor or FPC) (N): 265

Hypothesized % frequency of outcome factor in the population (p): 29% \pm 5

Confidence limits as % of 100 (absolute \pm %) (d): 5%

Design effect (for cluster surveys-DEFF): 1

The final sample size was 145 heart failure patients at a confidence level of 95%.

Tools of data collection:

Four tools were utilized to collect data for this study:

Tool I: Patient Assessment

It was developed by the researcher in an Arabic language on the basis of a study of recent publications in the field by Chaplin, (2019); Hernandez, Barker, and Denise, (2022); Hollenberg et al., (2019); Long et al., (2019); Pobrotyn, Mazur, Kałużna-Oleksy, Uchmanowicz, and Lomper, (2021); Spiegel et al., (2018); Taylor, Moore and O'Flynn, N. (2019); It was used to assess patients' health status. It was used to assess the following parts:

- **Part 1: Personal data:** It includes data related to sex, age, phone number, educational level, occupation, and marital status.
- **Part 2: Patient medical history:** It includes data related to the length of hospital stays by days through the past history of repeated admission with the same patients, signs and symptoms of heart failure (HF).
- **Part 3: Physical Assessment:** It was assessed by the researcher to assess patients' presence or absence of chest pain, hepatojugular reflux, level of dyspnea, fatigue scale, edema measurement.

Tool II: Patient Anxiety Level Assessment

Heart failure patient anxiety level assessment was done using the State-Trait Anxiety Inventory (STAI) by Spielberger et al, (1977) which was translated into Arabic and retranslated to English to ensure clarity and standardized for Egyptians by Abd-Elkhlek, (1992). This inventory assesses two aspects of anxiety: anxiety as a mood and

anxiety as a characteristic. Each inventory aspect has 20 items. Regarding present feelings in Likert format, ranging from (1) for strongly agree to (4) for strongly disagree.

Scoring system for Patient Anxiety Level

Participants were asked to rate their feelings on a 4-point scale, ranging from (1) for 'Not at all' to (4) for 'Very much so.' a 20-40 score means low anxiety and an above 40 score means high anxiety. The total score value ranges from 20 to 80; the higher the score, the greater the anxiety level.

Tool III: Patient Satisfaction with the caring process:

This tool aimed to assess patients' satisfaction with the caring process. The tool was developed by Salisbury et al, (2005), in an English language and was then translated into Arabic, and tested for validity and reliability by Rashad, (2011). It consists of 15 items related to the admission process. Every participant was asked to express his satisfaction with the caring process on a 5-point Likert scale ranging from 1 to 5; a score of (1) mean very dissatisfied, (2) mean dissatisfied, (3) mean neutral, (4) mean satisfied, and (5) for very satisfied.

Scoring system for Patient Satisfaction

Every participant was asked to express his satisfaction with the caring process on a 5-point Likert scale ranging from 1 to 5; a score of (1) mean very dissatisfied, (2) mean dissatisfied, (3) mean neutral, (4) mean satisfied, and (5) for very satisfied. A score of 4 or higher indicates a significant level of satisfaction.

Tool IV: Patient Variance Sheet

It was developed by Mohamed et al. (2019) in the English language to evaluate the variation of the pathway. An observational checklist was created to elicit variations in patients who do not adhere to the strategy indicated in the pathway based on the following factors:

1. Patient/ Family

This comprised a change in the patient's status that included (edema of the lower extremities, hepatomegaly, ascites, tachycardia, increased fatigability, progress dyspnea level, positive hepatojugular reflux, increased anxiety level, less patient satisfaction, admission for more than 8 days, and others) and patient/ family refuse care decision.

2. Health care Providers

This involves decisions by providers, physician orders, care not done within a specified time frame, care done incorrectly, and care wasn't done.

3. Facilities

This includes equipment that may be unavailable or inefficient, qualifications for staffing numbers, and inter-departmental (x-ray, laboratory, dietary) delays.

Clinical Nursing Pathway Protocol

This protocol was developed by the researcher based on a recent literature review by Morris & Chen, (2019); & American Heart Association, (2018). Then it was adjusted after the agreement of the collaborative pathway team. timetable is organized into the following three phases: phase one at admission to day one, phase two at day 2 to day 3, and phase three at day 4 and at discharge. The activities outlined in rows to cover each phase includes patient outcomes, assessment/monitoring, physical needs, psychosocial needs, and patient/family education and nursing. A discharge criterion is the final item in a pathway that was developed to help staff when a patient is discharged from the hospital. These criteria as follow: performance indicators, assessment, stability in laboratory investigations, medications, and psychosocial support/education.

B- Operational design

The following phases were followed in the study field of work:

Tools' Validity

The validity of (Tool I: patient assessment and clinical nursing pathway protocol) was tested by seven experts from the faculty of nursing in the field of Medical-

Surgical Nursing and cardiologist. The heart failure patient assessment questionnaire was revised according to the experts' opinions and recommendations.

Tools' Reliability

Cronbach's alpha coefficient was used to assess the reliability of the developed tools through their internal consistency. The reliability of the developed tool (Tool I: patient assessment and clinical nursing pathway protocol) was tested and the correlation coefficient was (0.91).

Field work

The director of each setting and the head of the cardiac care units of the hospitals selected provided official written permission for the study's conduct, and the data was collected over a six-month period, starting in October 2021 and ending in March 2022. Each hospital's data was collected three times per week (alternating Saturday, Sunday, and Monday at Al-Salam Hospital and Al-Hayat Hospital, and Tuesday, Wednesday, and Thursday at El-Zohoer Hospital and Al-Shifa Medical Complex Hospital) during the morning shift from 8:00 am to 2:00 pm. The study covered all heart failure patients who had been in the cardiac care units within the data collecting period and met the subject selection criteria.

The total subjects consisted of 145 adult patients with heart failure included in the study, they were one group included in four phases of the clinical nursing pathway.

Phase I: Assessment phase (pre-intervention phase)

The researcher interviewed the heart failure patients and introduced herself then invited them to participate the study. After their agreements to participate, written consent was obtained. To gain their cooperation, the researcher explained the purpose of the study. Each heart failure patients who met the inclusion criteria was interviewed separately. After that, the researcher explained to the participants the tools which include structured interview sheet regarding heart failure assessment, anxiety and satisfaction level, and asks them to answer the tools as consider a pre-intervention assessment.

Phase II: Planning

During this phase, the procedure and the tools for data collection were prepared. The study protocol was created following a thorough assessment of the literature using books, articles, and periodical journals to establish tools for gathering data. It was reviewed by a panel of Medical-Surgical nursing and cardiologist experts. Then, the tools of data collection were constructed and analyzed by a panel of seven experts.

Phase III: Clinical nursing pathway implementation

The development of care procedures guideline checklist for heart failure patient. This guideline checklist contains the recommended nursing care procedures for patients with HF to be used with clinical nursing pathway as a guide for detailed procedure steps. It was prepared by the researcher using relevant literatures and tested for content validity by jury members. It included HF patient education, teaching patient deep breathing exercise, diet, exercise, teaching medication regimen, follow up, warning signs, cardiovascular system assessment, assess peripheral pulse, and assess respiration, brachial artery blood pressure and insertion intravenous line.

The development of HF Illustrated educational materials included a power point presentation and videos developed by the researcher in Arabic language to teach patient and family about anatomy and physiology of cardiovascular, pathophysiology and causes of HF, signs, symptoms and complications of HF, treatment modalities for HF, diet, exercise, medication regimen, warning signs, follow up, salt/fluid restriction and daily weights. A handout in a form of an illustrated colored educational booklet for patient was developed in Arabic language by the researcher to help the patient and his family to know what would be expected post discharge and to reinforce the oral materials taught.

Phase IV: Evaluation (post-intervention phase)

Upon the completion of the clinical pathway implementation, the post-applying clinical nursing pathway intervention will be after discharge through the outpatient to evaluate the outcomes was done using the same pre intervention tools.

Pilot Study

After the tools have been developed, they were tested through a pilot study, which was carried out on 10.0% of heart failure patients representing 15 patients of the total study sample of patients from the previously mentioned selected settings; it was conducted over a period of one month before embarking on the fieldwork of the study. The final form was developed after the necessary adjustments were made based on the pilot study's findings. The patients selected for the pilot study were included in the main study.

Ethical Considerations

Approval was taken from a faculty of nursing Port Said University ethical committee and the code number is NUR (٢٨) on ٦/٨/20٢٢ which is the approval of hospital directors for the previously mentioned study setting, and patients. Before inviting them to participate in the study, directors, doctors, staff nurses, and patients at the cardiac care units of the involved hospitals were given a brief explanation of its purpose, emphasizing the confidentiality of the data gathered. Each participant (patient) was given verbal consent to participate in the study after being made aware of its nature and purpose. The study confidentially was ensured, and the researcher underlined that participation was completely optional and that each patient had the ability to leave the study at any stage without providing a reason.

C- Administrative design

An official letter was directed from the dean of the Faculty of Nursing, Port Said University to the hospital administrators. After describing the goal of the study and gaining their cooperation during the study period, the directors of each setting and the heads of cardiac care units of the selected hospitals gave written permission to perform the study.

D. Statistical design

Data were sorted, organized, coded, and transferred into specially designed formats for computer entry. SPSS version 28 was used for the statistical analysis. Descriptive statistics were used to display data in the form of frequencies and percentages

for qualitative variables and means and standard deviations for quantitative variables. The chi-square test (χ^2) was used to test whether two categorical variables were related to each other. A comparison of means was performed using a paired-sample t-test. A significant level value was regarded when $p\text{-value} \leq 0.05$, and a highly significant level value was considered when $p\text{-value} \leq 0.001$, whereas $p\text{-value} > 0.05$ indicated non-significant results.

RESULTS

Table (1) states the personal data characteristics of studied heart failure patients stated that 80% of studied patients were males and 65% were females, and 94% of their ages ranged from 50 to less than 60 years old. While of 21% their age ranged from 40 to less than 50 with a mean age of 55.91 ± 5.69 . Moreover, 64% of studied patients had secondary school, while only 3% were illiterate. Concerning occupation, 53% of studied patients were employed, while 5% had another work. Otherwise, 70% of the studied patients were married, while 16% were single. Furthermore, 47% of studied patients were supported by a husband or a wife, and only 6% were supported by their father.

Table (2) indicates a statistically significant difference whereas ($P=0.000^{**}$) between pre- and post-applying clinical nursing pathway intervention regarding length of hospital stay among studied heart failure patients with repeated admission with a mean length of hospital stay (9.789 ± 2.59), (4.12 ± 2.61) respectively.

Table (3) states a statistically significant difference between pre-and and post applying clinical nursing pathway intervention concerning all signs and symptoms of Heart failure with a p-value ranged from **0.000 to 0.05**.

Table (4) illustrates a statistically significant difference between pre-and and post applying clinical nursing pathway intervention regarding the presence of chest pain, hepatojugular reflux, level of dyspnea, fatigue scale, and edema measurement of studied heart failure patients whereas ($P=0.000^{**}$).

Table (5) describes a statistically significant difference whereas ($P=0.000^{**}$) between pre-and post-applying clinical nursing pathway intervention regarding the anxiety level of studied heart failure patients with mean anxiety levels (63.51), (37.95) respectively.

Table (6) illustrates a statistically significant difference between pre-and and post applying clinical nursing pathway intervention concerning satisfaction level (from question 1 to question 15) with p-value whereas (**P=0.000****) with a total mean (2.85), (3.69) respectively.

Table (7) describes that all of the studied heart failure patients had no variances in post applying clinical nursing pathway intervention.

Table (1): Personal data characteristics of studied heart failure patients (n=145)

Personal Characteristics		N	%
Sex	Male	80	55.2
	Female	65	44.8
Age	40- <50	21	14.5
	50- <60	94	64.8
	Geriatric group	30	20.7
	Mean ± SD	55.91 ± 5.69	
Level of education	Illiterate	3	2.1
	Read and write	9	6.2
	Basic education	34	23.4
	Secondary school	64	44.1
	University	35	24.1
Occupation	Not-working	28	19.3
	Worker	23	15.9
	housewife	36	24.8
	Employed (officer)	53	36.6
	Others	5	3.4
Marital status	Single	16	11.0
	Married	70	48.3
	Divorced	27	18.6
	Widow	32	22.1
The family supports the patient	None	21	14.5
	Husband/wife	47	32.4
	Father	6	4.1
	Mother	11	7.6
	Daughter	34	23.4
	Son	13	9.0

Table (2): Length of hospital stay among studied heart failure patients with repeated admission pre-and post-applying clinical nursing pathway intervention (n=145)

Length of stay	Pre				Post				Test of significance
	1-7 days		More than 7 days		1-7 days		More than 7 days		
	N	%	N	%	N	%	N	%	
	22	15.2	123	84.8	97	66.9	0	0	X ² =161.25 P=0.000**
Mean SD	9.789±2.59				4.12±2.61				
Readmission rate	Readmission within 30 days		Readmission within 6 months		Readmission within 30 days		Readmission within 6 months		Test of significance
	N	%	N	%	N	%	N	%	
		91	62.8	54	37.2	37	25.5	60	41.4

X²: Chi-Square test

*significant at P≤0.05

Table (3): The signs and symptoms among studied heart failure patients pre (during hospitalization) and post-applying clinical nursing pathway intervention (n=145)

Signs and symptoms of HF	Pre				Post				Test of significance
	Yes		No		Yes		No		
	N	%	N	%	N	%	N	%	
Dyspnea	145	100	0	0	45	31	100	69	$X^2=152.6$ $P=0.000^{**}$
Cough	69	47.6	76	52.4	29	20	116	80	$X^2=24.6$ $P=0.000^{**}$
Orthopnea	67	46.2	78	53.8	38	26.2	107	73.8	$X^2=12.5$ $P=0.000^{**}$
Oliguria	99	68.3	46	31.7	36	24.8	109	75.2	$X^2=55.01$ $P=0.000^{**}$
Dizziness, restlessness	71	49	74	51	32	22.1	113	77.9	$X^2=22.9$ $P=0.000^{**}$
Altered digestion	32	22.1	113	77.9	18	12.4	127	87.6	$X^2=4.73$ $P=0.03^*$
Insomnia	57	39.3	88	60.7	34	23.4	111	76.6	$X^2=8.47$ $P=0.004^*$
Edema of the lower extremities	130	89.7	15	10.3	83	57.2	62	42.8	$X^2=39.1$ $P=0.000^{**}$
Hepatomegaly	29	20	116	80	13	9	132	91	$X^2=7.12$ $P=0.008^*$
Distended jugular veins	71	49	74	51	41	28.3	104	71.7	$X^2=13.1$ $P=0.000^{**}$
Ascites	29	20	116	80	13	9	132	91	$X^2=7.12$ $P=0.008^*$
Weakness	49	33.8	96	66.2	21	14.5	124	85.5	$X^2=14.76$ $P=0.000^{**}$
Nausea	43	29.7	102	70.3	12	8.3	133	91.7	$X^2=21.56$ $P=0.000^{**}$
Weight gain	145	100	0	0	97	66.9	48	33.1	$X^2=57.5$ $P=0.000^{**}$
Fatigue	145	100	0	0	92	63.4	53	36.6	$X^2=54.6$ $P=0.000^{**}$

Not mutual answers were excluded

 X^2 : Chi-Square test*significant at $P \leq 0.05$

Table (4): physical assessment among studied heart failure patients pre-and post-applying clinical nursing pathway intervention (n=145)

Physical assessment		Pre		Post		Test of significance
		N	%	N	%	
Presence of chest pain	Present	81	55.9	39	26.9	X²=25.07 P=0.000**
	Absent	64	44.1	106	73.1	
Hepatojugular reflux	Positive	55	37.9	23	15.9	X²=17.9 P=0.000**
	Negative	90	62.1	122	84.1	
Level of dyspnea	None at rest, some on vigorous exercise.	13	9	59	40.7	X²=108.02 P=0.000**
	none at rest, breathless on moderate exertion	48	33.1	81	55.9	
	mild breathlessness at rest, worse on mild exertion	79	54.5	5	3.4	
	significant breathlessness at rest and worse on even slight exertion (the patient is frequently bedridden)	5	3.4	0	0	
Fatigue scale	No fatigue	0	0	23	15.9	X²=130.53 P=0.000**
	Mild fatigue	34	23.4	51	35.2	
	Moderate fatigue	59	40.9	39	22.1	
	Severe fatigue	52	35.9	32	26.9	
Edema measurement	No Edema	15	10.3	62	42.8	X²=77.7 P=0.000**
	1+: 2mm depression, barely detectable. Immediate rebound.	18	12.4	37	25.5	
	2+: 4mm deep pit, a few seconds to rebound.	47	32.4	36	24.8	
	3+: 6mm deep pit.10-12 seconds to rebound.	56	38.6	10	6.9	
	4+: 8mm: very deep pit. >20 seconds to rebound 14	9	6.2	0	0	

*X²: Chi-Square test***significant at P≤0.05*

Table (5): Anxiety level among studied heart failure patients pre-and post-applying clinical nursing pathway intervention (n=145)

Anxiety level	pre		post		T-test	P
	Mean	Std. Deviation	Mean	Std. Deviation		
	63.51	± 7.58	37.95	± 2.10	T=12.60	P=0.000**

T: Paired t-test

*significant at $P \leq 0.05$ **Table (6): Satisfaction assessment among studied heart failure patients pre and post-applying clinical nursing pathway intervention (n=145)**

Satisfaction level	Pre		Post		T-test	P
	Mean	Std. Deviation	Mean	Std. Deviation		
Admission process (q1-2)	2.25	± 0.77	3.52	± 0.36	T= 17.27	P=0.000**
Adequacy of information to patients and family; coordination of care (q3-7)	2.62	± 0.33	3.65	± 0.28	T= 27.1	P=0.000**
Adequacy of nurse and physician knowledge; explanation about the caring process (q8-12)	3.13	± 0.35	3.75	± 0.27	T= 16.67	P=0.000**
Proper arrangement timing of discharge instruction, and adequacy of overall quality of care and service (q13-15)	3.17	±0.51	3.74	±0.31	T= 12.50	P=0.000**
Total	2.85	± 0.24	3.69	± 0.14	T= 38.70	P=0.000**

T: Paired t-test

*significant at $P \leq 0.05$

q: question number

Table (7): Variances of clinical pathway among studied heart failure patients pre- and post-applying clinical nursing pathway intervention (n=145)

Variances		(n=145)	
Variances codes		NO	%
1. Patient/ Family	.1. Change in the Patient's status		
	1.1.1. Edema of lower extremities	0	0
	1.1.2. Hepatomegaly	0	0
	1.1.3. Ascites	0	0
	1.1.4. Tachycardia	0	0
	1.1.5. Increase fatigability	0	0
	1.1.6. Progress dyspnea level	0	0
	1.1.7. Positive hepatojugular reflux	0	0
	1.1.8. Increase anxiety level.	0	0
	1.1.9. Less Patient satisfaction	0	0
	1.1.10. Admission more than 8 days	0	0
	1.2. Patient/ Family refuses care decision	0	0
2. Health care Providers	2.1. Decision by providers	0	0
	2.2. Physician orders	0	0
	2.3. Care not done within a time frame	0	0
	2.4. Care done incorrectly	0	0
	2.5. Care not done	0	0
3. Facilities	3.1. Equipment:	0	0
	3.2. Staffing:	0	0
	3.3. Inter-department (x-ray, laboratory, dietary)	0	0

X²: Chi-Square test

*significant at P≤0.05

DISCUSSION

Heart failure is a chronic cardiovascular disease that progresses over time and has a high morbidity and mortality rate (Morris & Chen, 2019). In each stage of heart failure, therapeutic approaches are designed to manage associated risks (stage A), manage risk and structural heart disease to prevent heart failure (stage B) and lessen symptoms, morbidity, and mortality (stages C and D) (Heidenreich et al., 2022). Contrarily, clinical pathways used with patients who have heart failure tend to reduce therapy variance, increase adherence to recommendations, and lower costs (Conrad et al., 2018).

In regards to socio-demographic characteristics of the studied heart failure patients were married males and most of them were supported by their wives. While their

age group falls between 50 and 60 years old, and more than half of the patients studied were secondary school certificates and employed (office work). This may cause cardiovascular diseases with the increase of the progressive aging of the Egyptian population

This result goes in agreement with the study performed by Mohamed et al., (2017) who found that most of the studied patients were married males and their age approximately 50 years old. While regarding occupation half of them were employed and had secondary school certificates. While Gorlicki et al. (2020) reported that the mean age of the study subjects was 78 years and less than half of them were women. According to Zhang et al. (2021) cardiovascular diseases is the leading cause of disability and death in people aged 50 till to 60. First, because older people have unique needs, it's important to pay attention to any psychological changes they may be experiencing and actively take action to address them. Second, health education is challenging for the elderly because they frequently have diminished comprehension and learning capacity.

Concerning length of hospital stay with repeated admission among studied heart failure patients, the present results revealed a significant difference between pre-and post-nursing pathway intervention. This is an indication of the effectiveness of the clinical pathway intervention in improving heart failure patients' condition and relieving symptoms and decreased the readmission rate after discharge. This result was in agreement with studies conducted by Tanjung et al. (2019); and Zhang et al. (2019) who prove that there was a reduction in hospital days and total hospital costs after applying the clinical pathway. Additionally, Xiao, Xiao, and Yu, (2022) found that clinical nursing pathway and humanized nursing have been demonstrated to be effective in reducing inpatient days, lowering hospitalization costs, and enhancing daily functioning and limb motor function. Meanwhile, it can reduce the probability of complications and recurrence rates, as well as improve nursing satisfaction.

Concerning signs and symptoms among studied heart failure patients, the current results found a significant difference between pre (on admission) and post-nursing pathway intervention (during follow up) concerning all signs and symptoms with heart failure. From the point of view of the researcher, these may be related to the implementation of multi-disciplinary therapies such as pulmonary and psychological rehabilitation practices, coughing and breathing exercise, and information and

instructions provided to studied patients. This result was obtained goes in agreement with the studies performed by Lawson et al. (2018) and; Wagenaar et al., (2019), who found that the studied group had improved heart failure signs and symptoms. Furthermore, the study by Mohamed et al. (2017) revealed a significant difference between the study and control group patients concerning their signs and symptoms post-intervention; however, during follow-up, it was discovered that only a small portion of the study group had dyspnea, whereas all of the patients in the control group had dyspnea. In the same line, it was found that less than one-fifth of study patients had orthopnea, but more than two-thirds of control patients had orthopnea.

Considering physical assessment among studied heart failure patients, the present results revealed a significant difference between pre-and post-clinical nursing pathway intervention concerning the presence of chest pain, these findings are in agreement with the studies conducted by Sharp et al. (2019) revealed that implementing of heart pathway to risk determine chest pain patients can enhance the efficiency and quality of therapy. Sweeney et al. (2020) reported that the implementation of a heart failure pathway for the management of patients presenting with chest pain led to a decrease in hospital admissions and length of stay, which led to a yearly savings of 3,500 bed days, or 1.1 million dollars.

Furthermore, the current findings revealed a significant difference between the pre-and post-clinical nursing pathway intervention for hepatojugular reflux of studied heart failure patients. This result may be indicated for improved blood flow in the right heart chambers that lead to lower jugular venous pressure (JVP). This result was supported by Mohamed et al. (2019), which noted a significant difference between the study group and the control group, and found that the majority of the study group had negative hepatojugular reflux whereas more than three-quarters of the control group had positive hepatojugular reflux.

Also, the current results showed that there was a significant difference between pre-and post-clinical nursing pathway intervention regarding the level of dyspnea of studied heart failure patients. Additionally, there was a significant difference between pre-and post-clinical nursing pathway intervention concerning length of hospital stay among studied heart failure patients, the present results revealed a significant difference between pre-and post-nursing pathway intervention. the fatigue scale of studied heart

failure patients. Furthermore, there was a significant difference between pre-and post-clinical nursing pathway intervention regarding edema measurement of studied heart failure patients. This result may be a predictor of a good prognosis of studied heart failure patients and improvement of their health outcomes.

This finding is consistent with Hollenberg's (2019) findings that the majority of patients report an early improvement in congestion-related symptoms, particularly dyspnea, fatigue, swelling, or peripheral edema. After the integration of a cardiac route, the clinical symptoms of congestion have typically disappeared in 50% to 70% of patients before discharge.

These findings are consistent with those of Mohamed et al. (2019), who observed that every patient in the study group had level I dyspnea, compared to almost three-fourths of patients in the control group who had level III dyspnea. Furthermore, more than two-thirds of the study group reported mild fatigue, but more than three-quarters of the control group reported moderate fatigue. Additionally, the majority of the study group had no edema, but two-thirds of the control group had a 6mm deep pit of edema that required 10–12 seconds to rebound.

Additionally, these findings are in accordance with Mohamed et al. (2019) who noticed all of the study group patients had level I dyspnea, but approximately three-quarters of the control group patients had level III dyspnea. Furthermore, more than two-thirds of the study group reported mild fatigue, but more than three-quarters of the control group reported moderate fatigue. Also, the majority of the study group was had no edema compared to two third of the control group had a 6mm deep pit of 10-12 seconds to rebound edema.

Concerning anxiety level among studied heart failure patients, the present results illustrated that there was a significant difference between pre-and post-nursing pathway intervention concerning anxiety level items of self-confidence and feeling nervous. This may be due to decreased painful symptoms and more given attention through the application of clinical pathway interventions.

Additionally, Lawson et al. (2018) research found a direct correlation between pain and poorer patient ratings of health as well as between depression or anxiety and worse patient ratings of health. This showed that in order for the health of heart failure

patients to improve, pain and depression or anxiety management must be a regular aspect of care that is guided by guidelines. Furthermore, Mohamed et al. (2018) discovered that the study group patients experienced a significant improvement in decreasing anxiety levels on the fourth- and sixth-days following intervention is noteworthy.

Concerning satisfaction level among studied heart failure patients, the present study found a significant difference between pre and post nursing pathway intervention concerning patient satisfaction level in all items of care.

The current findings are consistent with previous studies demonstrating that the clinical pathway's application improved patients' satisfaction with heart failure patients. According to Tanjung and Nurwahyuni (2019), the use of the clinical pathway led to an increase in patient satisfaction. Additionally, the current study's findings supported with Mohamed et al., (2018) that reported a significant difference between the control and study patients' group regarding all aspects of patient satisfaction. Furthermore, there was a significant improvement in psychological status and a reduction in anxiety level, both of which contributed to enhanced patient satisfaction.

Regarding variances of clinical pathway post-intervention, the present results described that all of the studied heart failure patients' group had no variances in post-intervention. This finding aligns with the finding of Mohamed et al. (2017); and Mohamed et al. (2019) who revealed that all the studied heart failure patients had no variances.

CONCLUSION

According to the study's findings, it can be concluded that:

Clinical nursing pathway had a positive effect on heart failure patients' signs and symptoms, hepatojugular reflux, fatigue scale, level of dyspnea and length of stay and decreased the readmission rate after discharge, and thus will reduce the burden of costs. Additionally, a positive correlation between the application of the clinical nursing pathway and the level of satisfaction of patients with heart failure and reducing their level of anxiety was reported.

RECOMMENDATIONS

According to the study's findings, the following recommendations were suggested:

The application of the clinical pathway intervention for patients with heart failure was recommended. In addition, assess the level of patient satisfaction from admission to discharge from the hospital. Use patient feedback to identify areas for improvement and implement necessary changes.

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تأثير المسار التمريضي السريري على مخرجات مرضى الفشل القلبي ومعدلات دخولهم المبكر في وحدات العناية القلبية

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الخلاصة

يُعتبر مرض الفشل القلبي مشكلة رئيسية للصحة العامة في جميع أنحاء العالم، مما يؤدي إلى ارتفاع معدلات المرض والوفيات. في حين أن زيادة معدلات الدخول المبكر لمرضى الفشل القلبي في المستشفى تستهلك موارد كبيرة وتؤدي إلى عبء مالي. لهذا تهدف الدراسة الحالية إلى تقييم تأثير المسار التمريضي السريري على مخرجات مرضى الفشل القلبي ومعدلات دخولهم المبكر في وحدات العناية القلبية. تم استخدام تصميم بحثي شبه تجريبي لإجراء الدراسة في وحدات عناية القلب في أربعة مستشفيات بمحافظة بورسعيد: مستشفى السلام، مستشفى الحياة، مستشفى الزهور، ومستشفى الشفاء الطبي المركزي. وقد اشتملت عينة الدراسة على ١٤٥ مريض من مرضى الفشل القلبي. هذا وقد تم جمع البيانات باستخدام أربعة أدوات: تقييم المريض، تقييم مستوى القلق للمريض، رضا المريض، وتباين المرض مع تدخل المسار التمريضي السريري. وقد أظهرت نتائج الدراسة وجود فروق ذات دلالة إحصائية بين قبل وبعد تطبيق المسار التمريضي السريري فيما يتعلق بمدة الإقامة بالمستشفى مع معدلات الدخول المبكر لمرضى الفشل القلبي في وحدات العناية القلبية بمتوسط (٩.٧٨٩ ± ٢.٥٩)، (٤.١٢ ± ٢.٦١) على التوالي، وكان هناك تأثير إيجابي على تحسين علامات وأعراض مرضى الفشل القلبي الخاضعين للدراسة، وكان هناك أيضًا تحسن كبير في مستويات القلق والرضا لدى مرضى الفشل القلبي بعد تطبيق المسار التمريضي السريري. وقد أوصت هذه الدراسة بتطبيق المسار التمريضي السريري لمرضى الفشل القلبي.

الكلمات المرشدة: وحدات الرعاية القلبية، المسار التمريضي السريري، المخرجات الصحية، الفشل القلبي، معدلات الدخول المبكر