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Effect of Nursing Discharge Instructions on Outcomes for Patients Undergoing Primary Percutaneous Coronary Intervention

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Abstract:
Background: Primary Percutaneous coronary intervention is a non-surgical, invasive procedure used to treat blockage or narrowing of the coronary artery and improve blood supply to the ischemic tissue. **Aim:** to investigate the effect of nursing discharge instructions on outcomes for patients undergoing primary percutaneous coronary intervention. **Subjects and Methods: Research design:** A quasi-experimental design. **Sample:** 200 adult patients who were admitted for percutaneous coronary intervention. Patients divided equally into two groups study and control (100 for each). **Setting:** the cardiac catheterization unit and Cardiovascular Medicine Department at Assiut University Heart Hospital. **Tools:** Patients assessment sheet, readmission risk assessment, complications assessment sheet, and re-admission rate assessment sheet**. Results:** a statistically significant difference between study and control group post application of nursing discharge instructions regarding knowledge, and complications was (<0.001**). LACE index was moderate for both study and control group. The main cause of re-admission for both study and control group was myocardial infarction (50%**,** and 46.2) respectively. **Conclusion:** Nursing discharge instructions significantly improve patients' knowledge and reduce complications and readmission rate among patients undergoing percutaneous coronary intervention. **Recommendation:** Nursing discharge instructions (brochure) should be used in hospitals for patients with primary percutaneous coronary intervention.

Keywords: Nursing discharge instructions, Outcomes & Primary percutaneous coronary intervention

Introduction:
Coronary artery disease (CAD) is heart disease caused by narrowing of the coronary arteries as a result of spasm or atherosclerosis or both. Acute coronary syndrome (ACS) is a serious coronary artery disease that threatens life because it may cause sudden death**.** The World Health Organization reported 18 million deaths from cardiovascular diseases in 2008 and was estimated to reach 23 million by 2030 **(Mahmood et al., 2021 & Anggreni., 2021)**

One kind of acute myocardial infarction is known as ST segment elevation myocardial infarction (STEMI), blood flow to the myocardium is obstructed and leads to necrosis or damage to the heart muscle. primary percutaneous coronary intervention (PCI) is a non-surgical, invasive procedure with the goal of releasing the narrowing or blockage of the coronary artery and improve blood supply to the ischemic tissue by balloon angioplasty, coronary stents or aspiration thrombectomy It has been discovered that primary PCI greatly reduce mortality, reinfarction and stroke compared to fibrinolysis so it considers the best treatment. **(Broughton et al., 2023).**

Access to the blood stream is attained through either the radial or femoral artery. Real-time X-ray fluoroscopy is used to visualize the site of the catheter and tissues. The catheter is advanced to the ascending aorta. Coronary arteries are involved using different catheters for the right and left coronary arteries. IV contrast is introduced in the coronary artery to allocate the anatomy. Images of coronary arteries are taken from various angles to view the nature of the narrowing **(Ahmad et al., 2023)**

The problem of readmission within 30 days after heart surgery is extremely challenging and expensive, with rates ranging from 8% to 21%. Readmissions are considered a quality-of-care indicator, as incomplete treatment, and lack of coordination of health services at time of discharge and ongoing care may result in readmissions. Unplanned readmissions may be considered an adverse result for patients and may be related to complications from their PCI procedure or in-hospital management. Furthermore, re-hospitalizations are costly to healthcare services **(Kwok et al., 2021)**

After PCI many patients have chest tightness, fatigue, and other uncomfortable symptoms due to various factors, such as the lack of knowledge of coronary heart disease (CHD), fear of the operation, anxiety and depression which get huge troubles to their lives. As a result, it's critical for patients after PCI to obtain efficient nursing education mode for postoperative rehabilitation **(Cao et al., 2021 &Yang et al., 2022).**

Because PCI technology has advanced so much in recent years, more and more researchers are

attempting to use empowerment education as a nursing modality in PCI postoperative education to help patients better understand their condition, enhance their quality of life, and prevent complications from occurring, which will lower the risk of readmission. **(Sun et al., 2022)**

Nursing instructions has an important role in improving the healthcare services and raising patients' satisfaction post-PCI through enhanced patient education and follow up. In this context, risk reduction, psychological improvement, and quality of life are the three primary dimensions in which nursing-led intervention has demonstrated some success. To improve the quality of care, immediate efforts are required to develop an organized follow-up with an expanded nurse role in post-PCI treatment. **(Zhang & Qi., 2021)**

Significance of the study:

Based on the researcher's clinical background, it has been noted that after primary PCI, the patient has many risks and complications which increase readmission with morbidity and mortality of patients. According to Assiut University Heart Hospital records (2021) 500 patients were admitted performing PCI, therefore, this study was carried out in an attempt to reduce readmission rate and occurrence of complications for patients with primary percutaneous coronary intervention through nursing discharge instructions for these patients.

General aim: Study aimed to investigate the effect of nursing discharge instructions on outcomes for patients undergoing primary percutaneous coronary intervention.

Specific objectives:

1. To assess knowledge for patients undergoing primary percutaneous coronary intervention
2. To assess readmission risk index for patients undergoing primary percutaneous coronary intervention.
3. To develop nursing discharge instructions for patients undergoing primary percutaneous coronary intervention.
4. To evaluate the impact of nursing discharge instructions on readmission rate with complications for patients undergoing primary percutaneous coronary intervention.

Research hypothesis:

1. Knowledge level will be improved for study group after application of nursing discharge instructions.
2. Readmission rate and complications will be lesser among the study group than among the control group ones.
3. Readmission rate will be correlated positively with readmission risk.

Operational definitions:

Patients' outcomes: It included knowledge level, readmission rate, and complications.

Patients and Method:

Research design:

In this research, a quasi-experimental design was used.

Study variables:

Independent variables" nursing discharge instructions, dependent variables" patient's knowledge, readmission rate and post primary PCI complications"

Technical design:

Setting of the study:

This study was conducted at Assiut University Heart Hospital, in the cardiac catheterization unit and Cardiovascular Medicine Department at first floor.

It is the largest specialized hospital for heart surgery and cardiovascular disease in Upper Egypt and the leader in providing high –quality health services.

Patients:

A sample of 200 adult patients undergoing PCI. Patients divided randomly into two groups of equal size study and control (100 for each),"odd" numbers considered control group and "even number considered study group. The study group provided nursing discharge instructions while the control group received routine hospital care.

Sample size:

Depending on number patients admitted the cardiac catheterization unit and undergoing Primary PCI, a sample size has been calculated using

$$n = \frac{N \times p(1-p)}{\left[\left[N-1\times\left(d^2 \div z^2\right)\right] + p(1-p)\right]}$$

The sample size was conducted to be 200 patient **(Steven, K and Thompson, 2012)**.

Inclusion criteria:

- Adult patients between 18-65 years of both sexes.
- Patients undergoing Primary PCI.
- Patients agreed and were able to participate.

Study tools:

Data were collected, through using the following tools:

Tool (1): Patients assessment sheet, it was developed by researchers and consisted of three parts:

Part (1): Demographic data of the studied patients: It was assessed before the nursing discharge instructions were put into practice. Included (code, age, gender, telephone number, marital status, residence, education level, and occupation).

Part (2): Clinical Data: Its goal was to assess the patient's clinical conditions. It contained (date of admission, date of discharge, presence of chronic disease, date, and reason of readmission)

Part (3): Patients' knowledge about post primary PCI instructions. This included questions about (physical and sexual activities, diet and fluid, care of insertion site, time for calling a doctor, time of taking shower, potential complications)

Scoring system:

Each item scored as follows:

- Complete correct = 2
- In complete correct = 1
- Incorrect or unknown = 0

Total score is a sum of six questions.12 degrees.

Tool (II): Readmission risk assessment: by using (L.A.C.E scale). It was developed by **van et al., 2010**. It scores a patient on four variables with a final score predictive of unplanned readmission or death within 30 days after hospital discharge in medical and surgical patients.

L.A.C.E is an acronym for, (L): length of patients stay at hospital, (A) acuity of admission of patients, (C): comorbidity, (E): emergency visit.

Total scores range from 1-19

Score system

0-4: low risk

5-9: moderate risk

>9: high risk

Tool (III): Complications assessment sheet: It was developed by researchers based on reviews of literature. It is used to assess occurrence of complications weekly for one month following primary PCI. It includes (local, circulatory, respiratory, gastrointestinal, and urinary complications).

Tool (IV): Re-admission rate assessment sheet:

The researchers designed using national and international literature review **(Kwok et al., 2020 & Biswas et al., 2020)** to assess readmission regarding:

1- Frequency of readmissions.

2- Period from discharge to readmission in days.

3- Causes of re-admission.

Nursing discharge instructions:

Researchers designed an Arabic brochure after updating recent national and international literature **(Daniel & Wagner., 2021 & Chen et al., 2021)**.; it included instructions followed PCI such as (physical and sexual activities, diet and fluid, care of insertion site, dangerous signs and symptoms of infection, time for calling a doctor, time of taking shower, and potential complications)

Procedure:

Preparatory phase:

- **Nursing discharge instructions** were prepared in simple Arabic language, with photo illustrations based on local and international related literature.
- **Content validity and Reliability:** A panel of five experts reviewed the tools and Arabic brochure for clarity, relevance, thoroughness, understandability, application, and ease of administration. Expert professors in the fields of medical-surgical nursing and cardiovascular medicine reviewed the tools content, and corrections were completed as necessary. Reliability for readmission risk assessment tool was 95% confidence interval.
- **Pilot study:** To assess the viability and applicability of the tool, a pilot study with 10% (20 patients) was done. The tool was then adjusted in light of the findings of the pilot research. The actual study included these patients.

Ethical considerations:

Approval to conduct the study was granted by the Assiut University Faculty of Nursing's ethical committee and from the head of cardiovascular medicine department at Assiut University heart hospital; their approval gave for researchers to conduct the study. The researchers formally introduced themselves to the patients before the initial interview. Oral consent was acquired for volunteer participation. By coding the data, anonymity and secrecy were guaranteed. Patients have the option to withdraw from their studies at any point without providing a reason.

Implementation phase:

- Before starting data collection, the chosen patients were met by the researchers.
- Researchers introduced themselves to open a channel of communication, outlined the nature and purpose of the study and got the patients' agreement.
- Patients were randomly assigned to two equal-sized group, study and control group (100) patients for each.
- Patients in the study group were received routine hospital care and nursing discharge instructions, while control group of patients received routine hospital care.
- Demographic and medical data were collected from patients in the study and control groups using tool 1 (part 1 and 2).
- Patients' knowledge about instructions followed post primary PCI was assessed using tool I (part III) for both groups.
- Readmission risk was assessed using (tool II) for both groups.
- Study group patients received a personalized explanation of the nursing discharge instructions.
- The session carries on between 20 and 30 minutes, it is carried out at the morning shift.

- During the session, patients were assisted to recall the information; each patient received a copy of the nursing discharge instructions (brochure).
- Following input from the patients to measure their comprehension at the conclusion of the session, the researcher explained any areas that they felt were unclear.
- Data were gathered from January 2023 to October 2023.

Evaluation phase:

- Weekly for one month following the implementation of nursing discharge instructions, the researchers evaluated complications using tool (III), and readmission rate for both groups by using tool (IV).
- Reassessment of knowledge was done after one month for both groups to evaluate the effect of nursing discharge instructions using tool 1 (part III).

Statistical design:

The computer application SPSS "ver. 22" is based in Chicago, USA, and is used for data collection and analysis. Information displayed as quantity, percentage, mean, SD, and more. Independent T-test quantitative data between the two groups to determine whether a numerical variable is significant; Chi square test for qualitative data between the two groups; Fisher exact test used to compare between categorical variables (2×2).

Results:

Table (1): Frequency distribution of study and control group regarding demographic data (n=200).

	Study(n=100)		Control(n=100)		Total(n=200)		P. value
	no	%	no	%	no	%	
Age							
18-29 years	2	2.0	2	2.0	4	2.0	0.989 **NS**
30-41 years	8	8.0	8	8.0	16	8.0	
42-53 years	22	22.0	20	20.0	42	21.0	
54-65 years	68	68.0	70	70.0	138	69.0	
Sex							
Male	76	76.0	82	82.0	158	79.0	0.298 **NS**
Female	24	24.0	18	18.0	42	21.0	
Marital status							
Single	2	2.0	0	0.0	2	1.0	0.243 **NS**
Married	84	84.0	86	86.0	170	85.0	
Divorced	2	2.0	0	0.0	2	1.0	
Widow	12	12.0	14	14.0	26	13.0	
Residence							
Urban	26	26.0	42	42.0	68	34.0	0.017*
Rural	74	74.0	58	58.0	132	66.0	
Level of education							
Not educated	56	56.0	36	36.0	92	46.0	0.028*
Primary	16	16.0	26	26.0	42	21.0	
Intermediate	18	18.0	20	20.0	38	19.0	
High	10	10.0	18	18.0	28	14.0	
Occupation							
Not working	70	70.0	46	46.0	116	58.0	0.001**
Working	30	30.0	54	54.0	84	42.0	

Chi square test for qualitative data between the two groups
fisher exact test used to compare between categorical variables($2^{\times}2$)
**Significant level at P value < 0.05,*
***Significant level at P value < 0.05*
NS:- Not Significant

Table (2): Frequency distribution of clinical data of the studied sample (n=200).

	Study(n=100)		Control(n=100)		Total(n=200)		X2	P.value
	no	%	no	%	no	%		
Presence of chronic disease								
No	44	44.0	40	40.0	84	42.0	0.33	0.667 **NS**
Yes	56	56.0	60	60.0	116	58.0		
If yes								
DM	30	53.6	40	66.7	70	60.3	2.40	0.135 **NS**
HTN	46	82.1	48	80.0	94	81.0	0.09	0.816 **NS**
IHD	4	7.1	2	3.3	6	5.2	0.86	0.427 **NS**
Stroke	2	3.6	0	0.0	2	1.7	2.18	0.231 **NS**
C.A.D	2	3.6	2	3.3	4	3.4	0.01	1.000 **NS**
Hepatitis	2	3.6	0	0.0	2	1.7	2.18	0.231 **NS**
HF	2	3.6	0	0.0	2	1.7	2.18	0.231 **NS**

fisher exact test used to compare between categorical variables($2^{*}2$)
**Significant level at P value < 0.05, **Significant level at P value < 0.05 NS:- Not Significant*

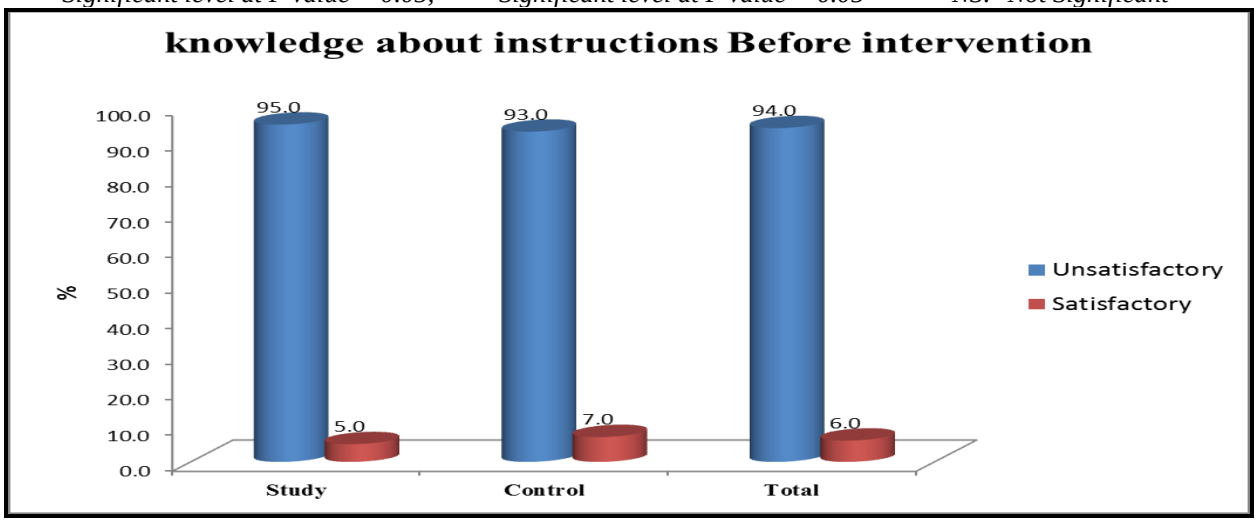

Figure (1): Comparison between study and control group related to patient's knowledge before applying nursing discharge instructions (N=200)

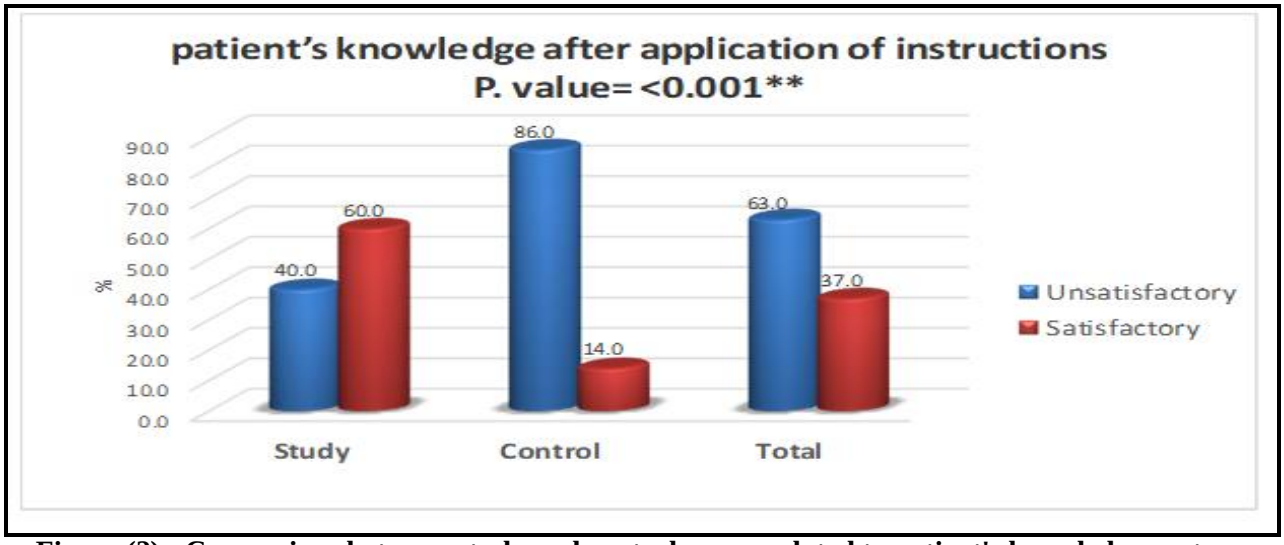

Figure (2): Comparison between study and control group related to patient's knowledge post applying nursing discharge instructions (N=200)

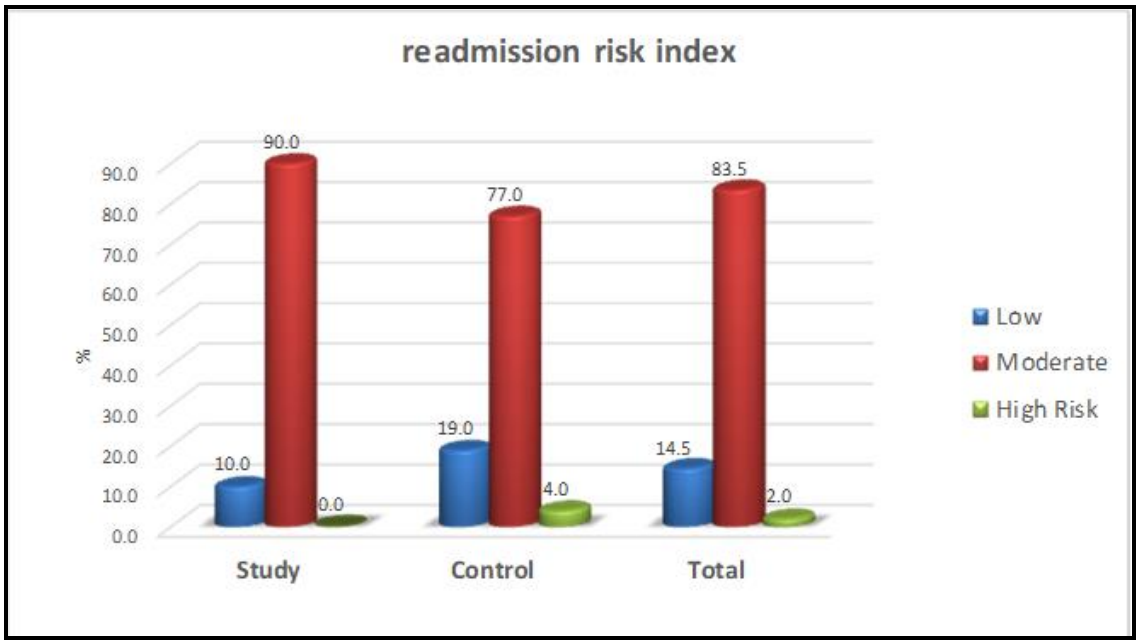

Figure (3): Readmission risk index for both study and control group (N=200)

Table (3): Complications for both study and control group post primary PCI (n=200).

Item	Study(n=100)		Control(n=100)		Total(n=200)		P. value
	no	%	no	%	no	%	
Local complications	**58**	**58.0**	**78**	**78.0**	**136**	**68.0**	**0.004****
Bleeding	4	4.0	22	22.0	26	13.0	0.000**
Hematoma	14	14.0	14	14.0	28	14.0	1.000 **NS**
Pain	44	44.0	46	46.0	90	45.0	0.887 **NS**
Numbness	8	8.0	4	4.0	12	6.0	0.373 **NS**
Swelling	0	0.0	8	8.0	8	4.0	0.007**
Edema	0	0.0	0	0.0	0	0.0	-
Infection	4	4.0	0	0.0	4	2.0	0.121 **NS**
Circulatory complication	**4**	**4.0**	**8**	**8.0**	**12**	**6.0**	**0.373 NS**
Arterial or venous infection	0	0.0	4	4.0	4	2.0	0.121 **NS**
Hypovolemic shock	2	2.0	2	2.0	4	2.0	1.000 **NS**
Stroke	2	2.0	4	4.0	6	3.0	0.683 **NS**
Myocardial infection	0	0.0	2	2.0	2	1.0	0.497 **NS**
Respiratory complications	**6**	**6.0**	**22**	**22.0**	**28**	**14.0**	**0.002****
Pneumonia	2	2.0	16	16.0	18	9.0	0.001**
- Respiratory failure	4	4.0	6	6.0	10	5.0	0.748 **NS**
Gastrointestinal complications	**38**	**38.0**	**56**	**56.0**	**94**	**47.0**	**0.016***
Nausea & vomiting	18	18.0	36	36.0	54	27.0	0.006**
Constipation	28	28.0	28	28.0	56	28.0	1.000 **NS**
Paralytic ileus	2	2.0	2	2.0	4	2.0	1.000 **NS**
Urinary complications	0	0.0	4	4.0	4	4.0	0.267 **NS**
Urinary retention	6	6.0	10	10.0	16	8.0	0.435 **NS**
Urinary tract infection	0	0.0	4	4.0	4	2.0	0.121 **NS**
Kidney failure	0	0.0	0	0.0	0	0.0	-

fisher exact test used to compare between categorical variables($2^{\times}2$)
**Significant level at P value < 0.05,*
***Significant level at P value < 0.05*
NS:- Not Significant

Table (4): Readmission rate for study and control group (n=200).

Item	Study(n=100)		Control(n=100)		P. value
	no	%	no	%	
Causes of re-admission					
Myocardial infection	6	6	12	12	
ST elevation myocardial infarction	4	4	12	12	
Un stable angina	2	2	2	2	0.614
Frequency of readmissions	1.33+0.49		1.69+0.47		0.038*
Period from discharge to readmission in days	23+2.89		17.62+1.98		0.000**

Chi square test for qualitative data between the two groups
- Independent T-test quantitative data between the two groups
**Significant level at P value < 0.05, **Significant level at P value < 0.05*

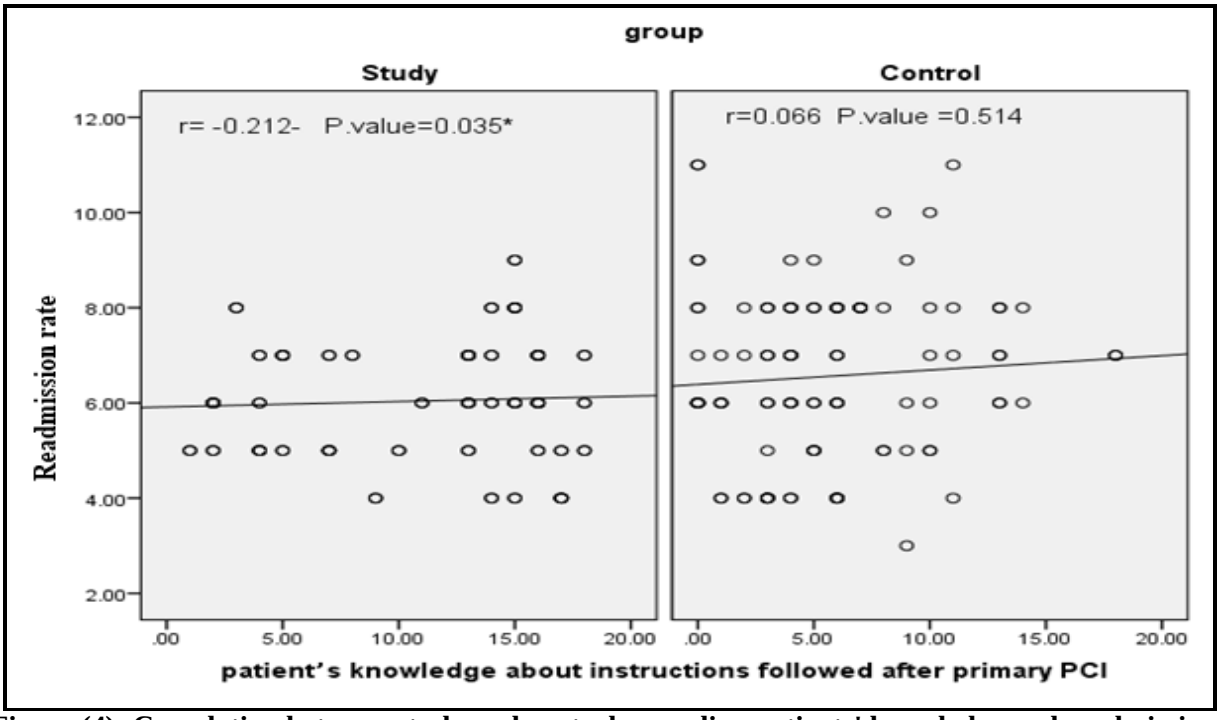

Figure (4): Correlation between study and control regarding patients' knowledge and readmission rate (n=200)

Table (5): Correlation Co-efficient between patients' knowledge, readmission risk index with medical data, complications and readmission rate for study and control group.

Correlations	Study				Control			
	patient's knowledge		readmission risk index		patient's knowledge		readmission risk index	
	R	P	R	P	R	P	R	P
length of stay	0.015	0.881	.592**	0.000	-0.149	0.139	.517**	0.000
Presence of chronic disease	-0.064	0.525	-.405-**	0.000	0.002	0.985	-.325-**	0.001
Local complications	-0.082	0.420	0.097	0.335	-0.092	0.365	0.099	0.327
Circulatory complication	0.096	0.341	0.166	0.099	-0.186	0.064	0.155	0.123
Respiratory complications	-0.026	0.798	.348**	0.000	-0.035	0.730	0.117	0.245
Gastrointestinal complications	0.119	0.239	.217*	0.030	0.001	0.994	0.143	0.157
Urinary complications	-	-	-	-	-0.285	0.324	-0.074	0.801
Causes of re-admission	-0.573	0.052	-0.559	0.059	.452*	0.020	-0.092	0.656
Frequency of readmissions	-.817-**	0.001	-.773-**	0.003	0.059	0.773	-0.188	0.357
Period from discharge to readmission in days	0.575	0.050	0.564	0.056	-.433-*	0.027	-.532-**	0.005

** Statistically Significant correlation at P. value <0.05 ** Statistically Significant correlation at P. value <0.01*

Table (6): Correlation Co-efficient between readmission rate with socio demographic data for study and control group

Correlations	Study						Control					
	Causes of re-admission		Frequency of readmissions		Period from discharge to readmission in days		Causes of re-admission		Frequency of readmissions		Period from discharge to readmission in days	
	R	P	R	P	R	P	R	P	R	P	R	P
Age	0.400	0.198	0.316	0.317	-0.323	0.306	-	-	-	-	-	-
Sex	-0.158	0.624	0.250	0.433	-.766-**	0.004	0.045	0.827	-0.030	0.883	-0.173	0.397
Marital status	-0.400	0.198	-0.316	0.317	0.323	0.306	0.045	0.827	0.365	0.067	0.296	0.142
Residence	0.400	0.198	0.316	0.317	-0.162	0.616	0.076	0.712	-0.386	0.052	-0.134	0.513
Level of education	0.539	0.070	0.107	0.742	.653*	0.021	0.332	0.097	.425*	0.031	-0.318	0.114
Occupation	0.316	0.317	0.250	0.433	0.383	0.219	0.234	0.251	0.184	0.367	0.156	0.445

Table (7): Correlation Co-efficient between readmission risk with readmission rate for study and control group

Correlations	Readmission risk index			
	Study		Control	
	R	P	R	P
Causes of re-admission	-0.559	0.059	-0.092	0.656
Frequency of readmission	-.773-**	0.003	-0.188	0.357
Period from discharge to readmission in days	0.564	0.056	-.532-**	0.005

Table (1): Indicates that the highest percentage of the patients under study had ages ranging from 54-65 years, with a mean age (51.33 ±12.31). The highest percentages of them were married, male from rural area, not educated, and not working (79 %, 85%, 667%, 46, and 58 % respectively). A significant difference was found between both study and control groups regarding residence, level of education, and occupation.

Table (2): Suggests most of the study and control groups had chronic disease; hypertension and diabetes were the highest percentage (81%, 60.3% respectively). Regarding the clinical data, no statistically significant difference has been found between the two groups.

Figure (1): Demonstrates that there was no statistically significant difference between patients` knowledge for study and control group before application of nursing discharge instructions.

Figure (2): Demonstrates that there was highly statistically significant difference between patients` knowledge for study and control group post application of nursing discharge instructions.

Figure (3): Shows that the highest percentage for both study and control group their readmission risk index was moderate.

Table (3): Illustrates that there was significant difference between two groups. As regarding local complications, respiratory complications, and gastrointestinal complications $p < 0.01$

Table (4): Presents that the main cause of re-admission in both groups was MI (50%, and 46.2 respectively). There was significant difference regarding frequency of readmissions, and from discharge to readmission in days with P value < 0.05.

Figure (4): Presents negative correlation between study and control groups regarding patients' knowledge and readmission rate.

Table (5): Shows that there was statistically significant correlation in those items (length of stay, Presence of chronic disease, respiratory complications, frequency of readmissions with P. value <0.01) in study group, while in control group (length of stay, presence of chronic disease, and Period from discharge to readmission in days with P. value <0.01).

Table (6): Demonstrates that there was negative correlation between Period from discharge to readmission in days and the patient sex, and positive correlation with their level of education among the study group, while in control group positive correlation between education level and frequency of readmissions)

Table (7): Illustrates there was negative correlation between readmission risk index and frequency of readmission among the study group, but in control

group there was negative correlation between (readmission risk index and Period from discharge to readmission in days)

Discussion:

Nursing plays a crucial role in educating patients about self-management techniques, medication adherence, lifestyle modifications, and recognizing potential signs of complications. Understanding the relationship between discharge instructions and readmission rates is essential for optimizing patient outcomes and improving the quality of care in primary PCI settings **(Kakar et al., 2022).**

Regarding demographic data of the studied patients:

According to the current research, there was no statistically significant difference between the study and control groups. This is confirmed by **Booth et al., (2021)** who documented that it is of paramount importance to prevent bias based on a variable known to affect results, such as baseline reading ability or gender, make sure the groups are equal before the experiment begins.

The current results reveals that most of the patients under study of both groups their mean age was (51.33 ±12.31), male, married, from rural area, not educated and non-working. This can be explained by the increased stress in life as well as the fact that female hormones protect women from CAD. This agrees with **(Mi et al., 2023)** they stated that alterations of the heart and blood arteries that occur with aging such as the decrease in elasticity and the ability to adapt to changes in compliance of the arterial system.

Also, this agrees with **Parwani et al., (2023)** who studied Non calcified Coronary Plaque Volumes in Healthy People with a Family History of Early Onset Coronary Artery Disease, discovered that the majority of males and the minority of women had coronary plaque. Plaque volume increased with age and was higher in men than women.

Regarding medical data, the existing study said that over 50% of patients involved in the study had chronic diseases and the majority of both groups had HTN and DM. this due to the fact of long-term medical illnesses known as chronic diseases required for constant monitoring and care. and their presence can influence patient outcomes and readmission risks.

Nelson et al., (2019) stated (DM) has been reported to increase the risk of complications of heart diseases of any etiology and subsequent survival**. Nagraj et al., (2022)** reported relatively low death rates, hypertension, or repeat revascularization. Similarly, **Jaiswal et al., (2023)** reported that major risk factors for CAD patients undergoing PCI include smoking, dyslipidemia, hypertension, diabetes mellitus (DM), and hypertension.

Regarding total knowledge:

The present study found no statistically significant difference between two groups regarding to patient's knowledge before application of instructions. This means compatibility of the groups at the baseline also that assure the important of the study aim for improving their total condition. While there was a statistically significant difference between both groups regarding to patient's knowledge after application of instructions and an improvement in the level knowledge after application of the instruction of the study group than the control group.

The researchers believe that patient education empowers patients to make informed decisions about their healthcare and become healthier and more independent. They found that the instructions not only lead to better short-term outcomes but also have positive long-term effects.

In this regard **Mohamed et al., (2019)** stated that patient education is crucial because patients have a right to be informed regarding their diagnosis, prognosis, available treatments, and any dangers involved with those treatments. In addition, **Boldt & Chung (2020)** assigned patient teaching to the professional nurse and explaining the advantages of a well-designed comprehensive teaching plan that fit patients' unique learning needs that it reduces health care costs and improve the quality of care. In the other hand, **Mogre et al., (2019)** found patient's knowledge is difficult to change easily mainly in advanced ages that effect on their compliance to medication and diet.

Keikhosrokiani et al., (2020) clarify that patients with lower medication adherence have lesser knowledge about health. Patients were also noted for difficulty in expressing the need and purposes for each discharge medications and any possible adverse drug reactions from that they may experience.

Regarding the readmission risk index:

The current research found that there was no statistically significant difference between both groups regarding patient's readmission risk index and the majority had moderate risk of admission. This means that both groups had similar levels of risk for readmission and the factors influencing the risk of readmission were similar between the two groups studied. This implies that any interventions or treatments provided to the patients in both groups were equally effective in managing their risk of readmission. Additionally, this information can be valuable for healthcare professionals and policymakers to understand the readmission risk of patients and design appropriate instructions for managing and preventing readmissions.

This compatible with **Sabatowski et al., (2021)** who reported that PCI patients had a moderate risk would

need to be further investigated, but it could be related to various patient characteristics, comorbidities, or other factors associated with the PCI procedure itself.

This does not match with **Yujeong, (2022)** who recommended a need for continued monitoring and appropriate interventions to manage the risk of readmission among PCI patients, particularly those identified as having a high risk. **Achim et al., (2022)** concluded that understanding the factors associated with readmission risk in this specific patient population, healthcare providers can develop targeted strategies to improve patient outcomes and reduce the likelihood of readmissions after PCI.

Relationship:

The present study illustrated that there was a negative correlation was observed between patients' knowledge and readmission rate for study group. These findings indicate that in the study group, where patients received specific instructions and education, an increase in the level of knowledge about those instructions played a role in reducing readmission rate.

This match with **Yılmaz, (2023)** who suggested that providing patients with clear and comprehensive instructions can contribute to better understanding and adherence to post-procedure care, potentially leading to improved outcomes and a lower likelihood of readmission. In the other hand, **Cui et al., (2019)** found a lack of a significant correlation and suggested that without the structured instruction intervention, patients' knowledge about instructions may not have a significant impact on their readmission risk. Also, **Henedy et al., (2019)** found the studied patients had an appositive correlation between their knowledge and readmission times.

The present research showed that there was no correlation in between patient's knowledge about instructions followed primary PCI and readmission risk index with different parameters except between readmission risk index with (presence of chronic disease, length of stay and respiratory complications, and frequency of readmission) among study group. This suggests that patients with chronic diseases lead to an increase in the risk of readmission following primary PCI. It implies that the presence of a chronic condition can contribute to increased healthcare utilization and the need for further medical care.

Specifically**, Jang et al., (2020)** recommended that patients with chronic diseases may have a higher risk of readmission. It implies that the presence of a chronic condition can contribute to increased healthcare utilization and the need for further medical care. **Schulindex:al., (2022)** suggests that presence of chronic disease and respiratory side effects showed a correlation with the readmission risk index. This implies by **Park et al., (2023)** who stated that the level of patient knowledge regarding post-PCI instructions did not have a direct impact on the likelihood of readmission. **Alfonso et al., (2023)** suggests that patients with longer hospital stays after primary PCI may have a higher risk of readmission. **Fayh et al., (2022)** added that prolonged hospitalization could potentially indicate more severe health conditions or complications, which may increase the likelihood of readmission.

Regarding respiratory complications and Readmission Risk Index, **Shah et al., (2021)** found that patients who experience complications related to the respiratory system following primary PCI may have an increased risk of readmission. **Huang et al., (2023)** described that respiratory complications could include issues such as infections, which may necessitate additional medical attention and contribute to increase the readmission rate.

The present study found a negative correlation between the patient knowledge level and risk of admission and frequency of readmission among the study group undergoing primary percutaneous coronary intervention after application of the discharge instructions. This means that a negative correlation means that as the level of patient knowledge increased, the risk of admission and the frequency of readmission decreased. In other words, **Iles-Smith, et al., (2017)** found patients who had a higher level of knowledge about their illness and the treatment they received were less likely to be admitted to the hospital and had a lower likelihood of being readmitted after the primary percutaneous coronary intervention.

In this regard, **Cowper et al, (2019)** suggests that patient education and knowledge play an essential role in reducing the risk of hospitalization and readmission in this particular group of patients. By providing patients with adequate information and understanding about their condition and treatment, healthcare providers can potentially improve patient outcomes and reduce the need for additional hospital admissions or readmissions.

The present study found that there was negative correlation between Period from discharge to readmission in days and the patient sex, and positive correlation with their level of education among the study group**.**

This means that there was a tendency for males and females to have different lengths of time between their discharge from the hospital and subsequent readmission and patients who have higher educational level tended to have a longer period between their discharge and readmission compared to patients with inadequate educational backgrounds. The findings highlighted the importance of managing

comorbidities and optimizing treatment strategies to reduce readmission rates.

Additionally, **Yudi et al., (2019)** found that females tend to have a shorter period between discharge and readmission compared to males, or vice versa. Other study by **Lemor et al., (2019)** found older age, comorbidities, length of hospital stay, and specific complications were correlated with increased readmission rates.

In this side, **Park et al., (2023)** confirmed that education might play a role in influencing patient behavior, self-care practices, or health literacy, which could potentially impact the timing of readmission.

Cowper et al., (2019) study examined the reasons and predictors of 30-day readmission in patients with acute myocardial infarction (AMI) and heart failure, identified factors such as comorbidities, socioeconomic status, length of hospital stays, and specific complications as predictors of readmission. **Iles-Smith et al., (2017)** study emphasized the need for comprehensive interventions targeting these risk factors to reduce readmissions.

The present study found that there was negative correlation between readmission risk index and frequency of readmission among the study group. This means that patients with lower readmission risk index scores are less likely to be readmitted due to serious complications or major health issues. Patients with lower readmission risk index scores have a lower likelihood of experiencing multiple readmissions within a given period.

This is supported by **Mark et al, (2018)** who recommended to identify patients at a higher risk of readmission and implement interventions to mitigate that risk. By improving care transitions, providing patient education, optimizing treatment plans, and addressing social determinants of health, healthcare providers can help reduce the likelihood of readmissions and associated complications.

Finally, the present study effect positively on the readmission rate among the studied patients. **Kim et al., (2023)** suggested that more effective interventions could be undertaken such as telemonitoring or phone calls from nurses to patients, to adopt healthy behavior practices more easily and to encourage behavior lifestyle modifications and promote self-management that mainly decreased the readmission of these patients.

Conclusion:

Nursing discharge instructions for patients undergoing primary percutaneous coronary intervention significantly improve patient's knowledge. Also, reduce complications and readmission rate.

Recommendations:

- Nursing discharge instructions (brochure) need to be used in hospitals as a teaching guide for patients undergoing primary percutaneous coronary intervention.
- Further studies aimed at improving knowledge of patients undergoing primary PCI, reduce complications and readmission rate should be applied.

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