

# Effectiveness of Nursing Interventions on Patient's Knowledge Undergoing Percutaneous Coronary Intervention

## فاعليه التداخل التمريضي على معارف المرضى الخاضعين للتدخل التاجي عن طريق الجلد

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### الخلاصة:

**الهدف:** لتقويم فاعلية التداخل التمريضية على معارف المرضى فيما يتعلق بإجراء التدخل التاجي عن طريق الجلد.  
**منهجه البحث:** دراسة شبه تجريبية (اختبار قبلي وبعدى) أجريت للفترة مابين 10 تشرين الثاني 2013 إلى 30 حزيران 2014 في الردهة الباطنية (الرازي) في مركز ابن البيطار التخصصي لجراحة القلب. تألفت عينة الدراسة من (100) مريض، قسمت عشوائياً إلى مجموعتين (50) مريض الكل منهما. تم تقديم التداخل التمريضي لمجموعة الدراسة من قبل الباحث. واعتبرت المجموعة التي لم تقدم لها التدخلات التمريضية لهم من قبل الباحث المجموعة الضابطة. وتكونت أداة الدراسة من ثلاثة محاور، المحور الأول الخصائص الديموغرافية، والمحور الثاني الخصائص السريرية، وتكون الحور الثالث من مجموع فقرات لقياس معارف المرضى وهي 22 فقرة، وتتألف من ثلاثة أجزاء: تتعلق بأمراض القلب التاجية، عوامل الخطورة التاجية وإجراء التدخل التاجي عن طريق الجلد. وتم قياس ثبات الاستبانة من خلال حساب معامل الفا = 0.83. استخدم الإحصاء الوصفي (التكرارات، متوسط، النسبة المئوية، الانحراف المعياري والاكتفاء النسبي) والإحصاء الاستدلالي (اختبار فيشر الدقيق الاحتمالية، اختبار مربع كاي واختبار ويلكوسون للترتيب).  
**النتائج:** أشارت نتائج الدراسة الحالية بوجود فروقات ذات دلالة معنوية عالية بين مجموعة الدراسة والمجموع الضابطة فيما يتعلق بالفقرات الرئيسية للمعارف المرضى المتعلقة بفهم مرض الشريان التاجي وعوامل الخطورة التاجية وإجراء التدخل التاجي عن طريق الجلد) والفقرات الرئيسية مجتمعة عند الاختبار البعدي بمستوى معنوية = 0.00.  
**الاستنتاجات:** توصلت الدراسة بأن برنامجاً لتثقيف الصحي ف عال في تحسين معارف المريض فيما يتعلق بإجراء التدخل التاجي عن طريق الجلد لمجموعه الدراسة.  
**التوصيات:** يجب على الممرض أن يلعب دوراً أكبر في تقديم العناية التمريضية للمرضى الخاضعين للتدخل التاجي عن طريق الجلد.

### Abstract

**Objectives:** to evaluate the effectiveness of nursing intervention on patient's knowledge regarding percutaneous coronary interventions procedure.

**Methodology:** An quasi- experimental study (pre-post test) took place between 10th October 2013 to 30 July 2014 was carried out in the medical ward (Al-razi) at Ibn Al-Bitar specialized center for cardiac surgery. Total (100) patients in the study sample, the sample was randomly divided into two groups of (50) patients each. The study group was providing nursing interventions to them by the researcher. The group that was didn't provide nursing interventions to them by the researcher was considered the control group. Three instruments were used to conduct this study. They were a demographics form, clinical characteristics and knowledge assessment tool. Knowledge assessment tool consisted of (22) question. It consists of three parts: understanding coronary heart disease (CAD), coronary risk factors, percutaneous coronary interventions procedure. Reliability of the questionnaires was determined by calculating Cronbach's Coefficient alpha = 0.83. Descriptive data analysis was done through (frequency, percentage mean, standard deviation and relative sufficiency), inferential data analysis was done by (Fisher Exact Probability Test, Chi-Square test and Wilcoxon signed rank test).

**Results:** The results of the present study shows that there are highly significant differences between the study group and control group regarding main domains of patients' knowledge (understanding coronary heart disease (CAD), coronary risk factors, percutaneous coronary interventions procedure) and overall main domains at post test at  $P = 0.00$  value.

**Conclusion:** the health educational program is effective to improve the patient's knowledge concerning PCI in the study group.

### Recommendations:

Nurses should be playing a greater role to provide the nursing interventions to the patients undergoing PCI procedure.

**Keyword:** percutaneous coronary intervention, information, nursing intervention.

## INTRODUCTION:

Until 1977, Coronary artery bypass graft surgery (CABG) was the only alternative to medicine for the treatment of coronary artery disease (CAD). This is a surgical procedure in

which a portion of a blood vessel (usually a leg vein or chest wall artery) is grafted onto a coronary artery so as to bypass an obstruction or narrowing in that coronary artery <sup>(1)</sup>.

However, the development of the first percutaneous transluminal coronary angioplasty (PTCA), performed by Gruentzig in 1977, marked major innovation in the treatment of CAD. <sup>(2)</sup>

During a PTCA, the narrowed portion of the coronary artery can be enlarged selectively without surgery. <sup>(3)</sup> A deflated balloon-tipped narrow catheter that is inserted through the skin of the groin or arm into an artery. The catheter is threaded through the artery until it arrives in the coronary artery where there is narrowing or blockage. The catheter tip is then inserted through the narrowed area. Once in the narrowed area, the balloon is inflated, mashing the plaque into the vessel walls to reduce the narrowing. <sup>(4)</sup>

According to American heart association in 2009 13,14,000 angioplasties were done in the united states. of these 13,13,000 were percutaneous coronary interventions. 8,55,000 men and 4,59,000 women had angioplasties. <sup>(5)</sup>

In Iraq; at Ibn Al-Bitter Specialized Center for Cardiac Surgery (5225) percutaneous coronary interventions (balloon and stent) were done from 2009 to end 2013. There was a (1357) Percutaneous coronary interventions (balloon and stent) were performed in the calendar year 2013. Pre-procedural orientation preparing the patient for the PCI procedure is an important part of nursing care, particularly providing information and support. In the context of acute myocardial infarction, patient care should focus on reducing door-to-balloon times to improve short and long-term survival. <sup>(6)</sup>

## **METHODOLOGY:**

A quasi- experimental study (pre-post test) has been used in the present study. This study took place between 10th October 2013 to 30 Julia 2014 was carried out in the medical ward (Al-razi) at Ibn Al-Bitar specialized center for cardiac surgery. Total (100) patients in the study sample, the sample was randomly divided into two groups of (50) patients each. The study group was providing nursing interventions to them by the researcher. The group that was didn't provide nursing interventions to them by the researcher was considered the control group. The criteria for selecting the study sample are:(1) A diagnosis of myocardial infarction (MI), acute coronary syndrome (ACS), or coronary artery disease (CAD).(2) Patients visiting the center to undergoing percutaneous coronary interventions (PCI). (3) Patients who agree to participate in the study. (4) Male and female Patients. (5) Able to communicate, read and write.(6) Patients who refuse to complete post -test. (7) Patients who have one or two vessels diseases. The nursing interventions designed was based on the results of patients' needs assessment and from information gained from previous studies, reviewing the relative scientific literature, as well as on observations stated by the researcher of deficits in PCI by the patients and through the researcher's experience. Revision was made on the contents of the nursing interventions form based on these experts' recommendations and suggestions. They have agreed that the nursing interventions were designed efficiently to improve patients' knowledge concerning percutaneous coronary interventions. Three instruments were used to conduct this study. They were a demographics form, clinical characteristics and knowledge assessment tool. A consent form was also necessary, the consent form insured informed and that the rights of human subjects were protected. Socio demographic data obtained from the patients from interview questionnaire sheet such as (age, sex, work, education level, smoking and drinking alcohol numbers of years of smoking or drinking).Clinical characteristics were comprised of (7) items, which included: do you have hypertension, do you have diabetic, Do you have a family history of coronary artery disease, Echo study (Ejection fraction%), Coronary angiography result, Number of Coronary affected, Duration of symptoms before PCI (months). Knowledge assessment tool consisted of (22) multiple choice and true false questions over the content taught in the nursing interventions. It was constructed and

reviewed by using the most recent and relevant literature. The questionnaire sheet was filled out by the patient. The patients were requested to answer the questionnaire within (10-15) minutes. It consists of three parts: understanding coronary heart disease (CAD), coronary risk factors, percutaneous coronary interventions procedure. The understanding coronary heart disease test was composed from (6) Items (multiple choice questions). The test related to patients' knowledge about their diseases. Each question comprised of (4) multiple choices (one choice true and three choices false). The coronary risk factors test was composed from (6) Items (true false questions). percutaneous coronary interventions procedure test was composed from (10) Items (multiple choice questions). This tests covered relevant points from the major content area of the education program. Validity of questionnaires determined through panels of experts and reliability of the questionnaires was determined by internal consistency through calculating Cronbach s' Coefficient  $\alpha = 0.83$ .

**Statistical analysis:** Descriptive data analysis was done through (frequency, percentage, mean, standard deviation and relative sufficiency, Fisher Exact Probability Test and Chi-Square test) and inferential data analysis was done by Wilcoxon signed rank test

## RESULTS:

**Table (1): Distribution of the Study and Control Groups by Demographic Data Characteristic.**

Variables	Groups	Study		Control		P-value	C.S.
		Freq.	%	Freq.	%		
Gender	Male	41	82	38	76	FEPT 0.368	NS
	Female	9	18	12	24		
Age Groups	32-36	1	2	2	4	P = 0.681	NS
	37-41	2	4	0	0		
	42-46	2	4	7	14		
	47-51	8	16	2	4		
	52-56	15	30	12	24		
	57-61	9	18	10	20		
	62-66	8	16	12	24		
	67-71	5	10	5	10		
	$\bar{x} \pm S.D.$	55.7 $\pm$ 8.102		56.41 $\pm$ 8.675			
Education level	write&Read	7	14	4	8	P = 0.364	NS
	Primary school	14	28	12	24		
	Intermediate school	4	8	15	30		
	Secondary school	8	16	7	14		
	Institute graduate	5	10	5	10		
	University graduate	11	22	7	14		
	Higher education	1	2	0	0		
Marital status:	Married	44	88	48	96	P = 0.868	NS
	Widowed	5	10	2	4		
	Divorced	1	2	0	0		
Occupation	Wife house	7	14	8	16	P = 0.459	NS
	Retired	17	34	19	38		
	self- employee	8	16	9	18		
	Employee	18	36	14	28		
Smoking:	Yes	21	42	26	52	FEPT 0.370	NS
	No	29	58	24	48		
Number of Cigarettes per /day	21 >	6	28.6	8	30.8	P = 0.222	NS
	21- 30	4	19	10	38.5		
	31- 40	3	14.3	7	26.9		
	41 - 50	3	14.3	0	0		
	51 - 60	4	19	1	3.8		
	<60	1	4.8	0	0		
Number of years	10 - 14	3	13.3	1	3.8	P = 0.576	NS
	15 - 19	5	23.9	3	11.5		
	20 - 24	0	0	1	3.8		
	25 - 29	4	19.1	7	26.9		
	30 - 34	3	14.3	5	19.2		
	35 - 39	2	9.5	4	15.4		
Alcohol drinking	40 $\leq$	4	19.1	5	19.2	FEPT 0.940	NS
	Yes	3	6	1	2		
	No	47	94	49	98		
Address	City	48	96	49	98	FEPT 0.960	NS
	rural	2	4	1	2		

Freq.=Frequencies, %=Percentages,C.S. : Comparison Significant,  $\bar{x} \pm S.D$  =Arithmetic Mean ( and Std. Dev. (S.D)., P=P-value, FEPT=Fisher Exact Probability Test N.S.= NonSignificant ,  $\leq$  = more Than or Equal,  $<$  = more Than, $>$  = less than.

Table 1 displays the demographic characteristics. As stated above, that the gender of patients in the study groups (82%) were males and in control group (76%) were males. Concerning to the age there were (30%) of patients in the study group are within the age group (52 - 56) and (24%) in the control group. The most common educational level was primary school graduate (28%) in study group and (24%) in control group. In relation to marital status (88%) in study group and (96%) in control group are married. Most common occupation was Employee (36%) in study group and Retired (38%) in control group. Concerning to smoking most common (58%) in study group in control group (48) was no smoking. With regard to number of cigarettes per /day and number of years in the study group most of the patients (28.6%) were smoking less than 21 cigarettes in day and (23.9%) within years group (15-19), in control group most of the patients 10(38.5%) smoking between (21- 30) cigarettes in day and (26.9%) within years group (25-29). No drinking alcohol (94%) of patients in study group and (97%) in control group. Finally, (96%) of patients in study group and (98%) in control group were live in the city. Statistically , there is no significant difference between study and control groups related to gender, age group, educational level, Marital status , occupation, smoking, number of cigarettes per /day and number of years, Alcohol drinking and finally; Address.

**Table (2): Clinical Characteristics for Patients undergoing percutaneous coronary intervention.**

Variables	Groups	Study		Control		P-value	C.S.
		Freq.	%	Freq.	%		
Hypertension	Yes	33	66	29	58	FEPT 0.054	NS
	No	17	34	21	42		
Diabetic	Yes	17	34	14	28	FEPT 0.562	NS
	No	33	66	36	72		
Do you have a family history of coronary artery disease?	Yes	20	40	14	28	FEPT 0.487	NS
	No	30	60	36	72		
Who have coronary artery disease in the family?	Father	13	65	10	71.4	0.721	NS
	Mother	4	20	3	21.4		
	Other	3	15	1	7.2		
Echo study Ejection fraction (%):	55 – 70 N	39	78	32	64	0.287	NS
	45 – 54 M	10	20	17	34		
	30 – 44 MO	1	2	1	2		
	30 > S	0	0	0	0		
Coronary angiography result	LAD	16	32	12	24	0.158	NS
	RCA	4	8	9	18		
	LCX+ LAD	12	24	8	16		
	LCX + RCA	8	16	7	14		
	LAD + RCA	10	20	14	28		
Number of Coronary affected?	One	20	40	21	42	FEPT 1.00	NS
	Two	30	60	29	58		
Duration of symptoms before PCI <sub>s</sub> (months)	1 >	0	0	0	0	0.264	NS
	1–6	17	34	18	36		
	7–12	21	38	26	52		
	12<	12	28	6	12		
	Asymptomatic	0	0	0	0		

Freq.=Frequencies, %=Percentages,C.S. : Comparison Significant FEPT=Fisher Exact Probability Test, N.S.= NonSignificant,  $<$  = more Than, $>$  = less than, Echo=Echocardiography, N = Normal ejection fraction, M = Mild dysfunction, MO = Moderate dysfunction, S = Severe dysfunction,LAD = left anterior descending , RCA =Right Coronary Artery ,LCX = left circumflex artery, PCI<sub>s</sub> = percutaneous coronary interventions.

Table 2 displays the clinical characteristics. Most of the patients in the study group 33(66%) and in the control group 29(58%) have hypertension. Related to diabetic disease 33(66%) in study group and 36(72%) in control group haven't diabetic disease. In study and control group most common haven't family history of coronary artery disease 30(60%) in

study group and 36(72%) in control group. Relation to Echo study 39 (78%) patients in study group have normal Ejection fraction and 32 patients (64%) in control group. Most common coronary angiography result 16 (32%) of patients in study group have left anterior descending artery disease, and 14(28%) of patients in control group have left anterior descending artery and right anterior descending artery disease. Relation to Number of Coronary affected majority 30(60%) in study group and 29(58%) in control group have two artery disease. Finally, Duration of symptoms before PTCA most of patients in study group 21(38%) within a period between (7–12) month and 26(52%) of control group.

Statistically, there is no significant difference between study and control groups related to hypertension disease, diabetic disease, family history of coronary artery disease, Echo study, and coronary angiography result, number of coronary affected and duration of symptoms before PTCA.

**Table (3): Comparison between The Study and Control groups at Post Test for Domains Related to Patients' Knowledge**

Overall Main Domains	Main Domains of patients' Knowledge.	No .	Post – Study			Ass .	Post – Control			Ass .	P. value	C.S .
			M.S.	S.D.	R.S. %		M.S.	S.D.	R.S. %			
knowledge of the patients concerning the PCI procedure	Understanding Heart Disease	50	0.76	0.426	76.33	S	0.28	0.451	28.33	F	0.00	HS
	Risk factors for coronary heart disease	50	0.81	0.387	81.67	S	0.45	0.499	45.33	F	0.00	HS
	Percutaneous coronary intervention procedure.	50	0.89	0.305	90.60	S	0.43	0.496	43.60	F	0.00	HS
Overall Main	Knowledge of the patients concerning the PCI procedure	50	0.83	0.368	82.86	S	0.39	0.490	39.08	F	0.00	HS

M.S. =Mean of score, SD = Standard Deviation , R.S%=Relative Sufficiency, Ass.= assessment. ,C.S. : Comparison Significant , No.= Number of Sample ,Hs : Highly Significant at  $P < 0.01$ , F : Failure ; S : Success

Table -3- shows that there are highly significant differences related to patient's knowledge at post period test between study and control groups for domains when analyzed by Wilcoxon signed rank test.

**Table (4): Pre and Post Assessment patient's Knowledge Concerning to PCI Procedure for Study and Control Groups**

Overall Main Domains	Sub Domains for patients' Knowledge.	Study		Ass.	Control		Ass.
		Pre	Post		Pre	Post	
		R.S.%	R.S.%		R.S.%	R.S.%	
knowledge of the patients concerning the PCI procedure	Understanding Heart Disease	32.67	76.33	2:4 PC	28.33	28.33	2:2 NC
	Risk factors for coronary heart disease	47.33	81.67	2:4 PC	45.67	45.33	2:2 NC
	percutaneous coronary interventions procedure	34.6	90.60	2:4 PC	36	43.60	2:2 NC
Overall Domains	knowledge of the patients concerning the PCI procedure	38.2	82.86	2:4 PC	36.55	39.08	2:2 NC

**R.S%=Relative Sufficiency, Ass.= assessment,(+) : Positive sign meaning that the study group has a better improvement than the control group. Assessment Scoring: (0 – 24): low low-1; (25 – 49): low high -2 ;(50 – 74): high low -3; and (75 – 100): high high- 4 . ;NC=no change, PC = positive change.**

Table -4- shows positive change in the study group than control group for main domains and overall main domains related to patient's knowledge with positive sign and assessment scoring.

## **DISCUSSION:**

In comparing the study and control groups demographically, both groups are similar; there were no significant differences between study and control groups (table -1). Patients involved in this study, the high percentage of whom was male, (82%) in study group and (76%) in control group, with the other (18%) in study group and (24%) in control group were female. The mean age of patients in this study was (55.7) (56, 41) years in study group and control group respectively. The Education levels in this study show most of the patients (28%)( 24%) in study group and control group respectively were primary school.Marital status in our study (88%)(96%) in study group and control group respectively of patients was married. Regarding to the occupation status the majority of sample (34%) in study group and (38%) in control group were retired. Related to smoking showed that (42%) (52%) in study and control groups respectively were smoking.

Clinical characteristics of patients undergoing percutaneous coronary intervention presented in (table -2- ); Related to hypertension disease in patients showed that (66%) in study group and (58%) in control group have hypertension. Regarding to diabetic mellitus disease in patients showed that (34%)(28%) in study group and control group respectively have diabetic disease. In study and control group most common haven't family history of

coronary artery disease (60%) in study group and (72%) in control group. Relation to Echo study 39 (78%) patients in study group have normal Ejection fraction and 32 patients (64%) in control group. Most common coronary angiography result (32%) of patients in study group have left anterior descending artery disease, and (28%) of patients in control group have left anterior descending artery and right anterior descending artery disease. Relation to Number of Coronary affected majority (60%) in study group and (58%) in control group have two artery disease. Finally, Duration of symptoms before PTCA most of patients in study group 21(38%) within a period between (7–12) month and (52%) of control group.

The results of the present study shows that there are highly significant differences related to patient's knowledge at post period test between study and control groups in main domains of patients' knowledge (understanding coronary heart disease (CAD), coronary risk factors, about percutaneous coronary interventions) and overall main (Table-3-). These results agree with study showed a significant increase in knowledge in patients who participated in an inpatient education program when compared with patients who do not attend an inpatient education program. <sup>(11)</sup> Also another study shows that knowledge and physical activity level improved for both groups from pre PTCA to follow up. <sup>(12)</sup> also study concluded that even minor nursing interventions may be of extreme importance to patients and that overall the PTCA experience. <sup>(8)</sup>

The results of the present study shows that better improvement in the study group than control group for main domains and overall main domains related to patient's knowledge with positive sign and assessment scoring (Table-4-). These results agree with the study which indicate that a structured educational approach may have beneficial effects on immediate knowledge gain. <sup>(10)</sup>

## CONCLUSION:

The present study concluded the nursing interventions are effective to improving the patient's knowledge concerning PCI in the study group.

## RECOMMENDATION:

Nursing interventions should be designed and performed on admissions of patients to increase their information about PCI procedure to improve their quality of life after discharge from hospital.

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