



Reduction of pain intensity for patients undergoing arterial sheath removal after coronary artery angioplasty: An interventional program

Reducción de la intensidad del dolor en pacientes sometidos a remoción de vaina arterial después de angioplastia de arteria coronaria: un programa de intervención

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Abstract

Background: Coronary artery disease is one of the most prominent forms of cardiovascular illness, which is a condition that affects people from all over the world. It has been proven beyond a shadow of a doubt that this disease is the primary reason for death in both industrialized nations and undeveloped nations (Yousefi, Rezaei and Hoseini, 2015).

Objectives: To assess pain severity scores and vital signs before interventional program for patients undergoing arterial sheath removal after coronary angioplasty.

To determine the effect of the interventional program on severity of pain through measuring vital signs and pain severity scores for patients undergoing arterial Sheath Removal after coronary angioplasty.

Methodology: A quasi-experimental design of the study has been used in the present study to assess reduction of pain intensity for patients undergoing Arterial Sheath Removal after coronary artery angioplasty: an interventional program in Al Hussain Teaching Hospital during the period from January 21st, 2023 to April 13th 2023. Those patients are divided into two groups 30 patients for the study group was exposed to the interventional program and 30 patients have been assigned to the control group who are not exposed to the interventional program.

Results: Descriptive analysis of studied sample pain intensity for study and control groups before and after applying the interventional program. It can be seen that mean score of pain for both study and control groups before applying interventional program have nearly the same mean score (5.50 ± 2.029 vs. 5.73 ± 2.196) respectively. In contrast after applying interventional program the mean score of pain for study group is much lesser than control group as follows respectively (0.66 ± 0.802 vs. 5.40 ± 1.830).

Conclusion: There are highly significant differences regarding pain intensity between the study and control groups of the current study after applying the interventional program. There are highly significant differences regarding following vital signs readings between the study and control groups of the current study after applying the interventional program.

Recommendations: Adopt the interventional program to be used and applied in other hospitals nationally. Train nurses to apply the program in relevant situation to achieve a benefits of the patients and to improve nursing care.

Keywords: Reduction, pain intensity, patients, Arterial Sheath Removal, Coronary artery angioplasty, Interventional program.

Resumen

Antecedentes: la enfermedad de las arterias coronarias es una de las formas más prominentes de enfermedad cardiovascular, que es una afección que afecta a personas de todo el mundo. Se ha demostrado sin lugar a dudas que esta enfermedad es la causa principal de muerte tanto en los países industrializados como en los subdesarrollados (Yousefi, Rezaei y Hoseini, 2015).

Objetivos: Evaluar las puntuaciones de intensidad del dolor y los signos vitales antes del programa de intervención en pacientes sometidos a extracción de la vaina arterial después de la angioplastia coronaria. Determinar el efecto del programa de intervención sobre la intensidad del dolor mediante la medición de los signos vitales y las puntuaciones de intensidad del dolor en

pacientes sometidos a extracción de la vaina arterial después de la angioplastia coronaria.

Metodología: En el presente estudio se utilizó un diseño cuasiexperimental del estudio para evaluar la reducción de la intensidad del dolor en pacientes sometidos a extracción de la vaina arterial después de una angioplastia de la arteria coronaria: un programa de intervención en el Hospital Docente Al Hussain durante el período comprendido entre el 21 de enero de 2023 al 13 de abril de 2023. Esos pacientes se dividen en dos grupos 30 pacientes para el grupo de estudio fueron expuestos al programa de intervención y 30 pacientes han sido asignados al grupo de control que no están expuestos al programa de intervención.

Resultados: Análisis descriptivo de la intensidad del dolor de la muestra estudiada para los grupos de estudio y control antes y después de aplicar el programa de intervención. Puede verse que la puntuación media de dolor para los grupos de estudio y control antes de aplicar el programa de intervención tienen casi la misma puntuación media ($5,50 \pm 2,029$ frente a $5,73 \pm 2,196$) respectivamente. Por el contrario, después de aplicar el programa de intervención, la puntuación media de dolor para el grupo de estudio es mucho menor que la del grupo de control, respectivamente ($0,66 \pm 0,802$ vs. $5,40 \pm 1,830$).

Conclusión: Existen diferencias altamente significativas en cuanto a la intensidad del dolor entre los grupos de estudio y control del presente estudio después de aplicar el programa intervencionista. Existen diferencias altamente significativas en cuanto al seguimiento de las constantes vitales entre los grupos de estudio y control del presente estudio después de aplicar el programa de intervención.

Recomendaciones: Adoptar el programa intervencionista para ser utilizado y aplicado en otros hospitales a nivel nacional. Capacitar a las enfermeras para aplicar el programa en situaciones relevantes para lograr un beneficio de los pacientes y mejorar la atención de enfermería.

Palabras clave: Reducción, intensidad del dolor, pacientes, Retiro de vaina arterial, Angioplastia de arteria coronaria, Programa intervencionista.

Reduction of pain intensity for patients undergoing arterial sheath removal after coronary artery angioplasty is a critical aspect of patient care. The arterial sheath is an important component in coronary artery angioplasty procedures, but its removal can be painful for patients. Nurses employ various pain reduction techniques to minimize the discomfort associated with the procedure¹.

Local anesthetics, sedatives, and other pain-relieving drugs are commonly used to help reduce pain during arterial sheath removal. Nerve blocks can also be employed to numb the affected area and minimize discomfort. Heat or cold therapy has been shown to be effective in reducing pain intensity in some cases. Relaxation techniques such as deep breathing, meditation, and guided imagery can also help patients manage their pain during the procedure².

In some cases, arterial sheath removal may be performed under conscious sedation, allowing patients to remain relaxed and comfortable. Patients can also play an active role in reducing their pain by staying hydrated, managing stress levels, and communicating their needs to their healthcare provider. A comprehensive pain management plan can help ensure a smoother and more comfortable experience for patients³.

Innovations in medical technology, such as new pain-relieving drugs and minimally invasive procedures, are also contributing to the reduction of pain intensity during arterial sheath removal. Collaboration between patients and healthcare providers is key to ensuring the most effective pain reduction strategies are implemented. Proper preparation, clear communication, and an individualized approach are essential to reducing pain intensity during the procedure⁴.

With the right care and attention, patients undergoing arterial sheath removal after coronary artery angioplasty can experience a positive outcome and rapid recovery. Through careful management of pain, patients can look forward to a successful and comfortable experience⁵.

Research Methods & Procedures

Design of the Study: A quasi-experimental design of the study has been used in the present study to assess reduction of pain intensity for patients undergoing Arterial Sheath Removal after coronary artery angioplasty: an interventional program in Al Hussain Teaching Hospital during the period from January 21st, 2023 to April 13th 2023. Those patients are divided into two groups 30 patients for the study group was exposed to the interven-

tional program and 30 patients have been assigned to the control group who are not exposed to the interventional program.

Ethical Considerations:

After receiving the necessary approvals to conduct the study from the Council of the College of the Nursing / University of Baghdad and the Research Ethics Committee (According to the Ethics Committee book No. 4 and dated 12/12/2022), the researcher submitted a detailed description of the study, including its objectives and methodology to the Ministry of Planning (Central Statistical Organization) and the Al-Muthanna Health Directorate to obtain official permission to conduct the study. Finally, approval was issued to Al-Hussain Teaching Hospital to secure the management and employees of Al-Muthanna Teaching Hospital's agreement and cooperation. This phase took about period from December 14th 2022 January 10th 2023.

Setting of the Study: The study was conducted at AL-Muthana City including AL -Hussain Teaching Hospital at the cardiac care unit intensity for patients with percutaneous transluminal coronary angioplasty (PTCA).

Population of the study: The study population includes all adult patients who have coronary artery angioplasty and are being treated with percutaneous coronary intervention, at AL-Muthana City including AL -Hussain Teaching Hospital at the catheterization unit. It also includes all adult age groups and all levels of education.

The Sample of the Study and sampling: A non- probability (purposive) sample of 60 patients who have coronary artery angioplasty and are being treated with percutaneous coronary intervention. Those patients are divided into two groups 30 patients for the study group was exposed to the interventional program and 30 patients have been assigned to the control group who are not exposed to the interventional program.

In this scientific study, a self-report method which takes approximately 5 minutes for each sample regarding pre-test assessment. Post-test assessment was taken 5 minutes after program with the same questionnaire given in pre-test assessment by Self-report method.

Validity of the Instrument: The questionnaire instrument and program were presented to a panel of twelve 12 specialists to assess their validity for the study project. In each field, the professionals had more than 5 years of experience. The experts' examination of the questionnaire and program found that the items on the questionnaire and program were clear and sufficient for the study. According to the experts' recommendations, minor changes were made to a few sections of the questionnaire and the program. The results of the review of the questionnaire by the experts revealed that all of the experts agreed that all items were clear and adequate for the measurement in the study. The recommended

modifications were done according to experts' opinions and their comments.

Pilot Study: A pilot study is a smaller version of a proposed or planned study, A pilot study was carried out on (ten selected patients), to determine the study instruments' reliability. The patients in the pilot study have the same criteria as the original study sample. The pilot study was conducted in AL-Hussain Teaching Hospital at the cardiac care unit during the period from January 10th, 2023, to January 16th 2023. The ten patients who participated in the pilot study were excluded from the original study sample. The primary goal of the study was to examine the questionnaire sections, the participants' method of response, the time it takes the researcher to conduct the actual research, identifying the potential errors and obstacles encountered by the researcher.

Statistical analysis: Statistical package for social science (SPSS) was used for the analyzing data.

Results

Table 1 Distribution of the Demographic and Clinical Characteristics of the studied Samples

Demographic Variables	Groups	Study Group (N=30)		Control group (N=30)	
		F.*	%	F.	%
Gender	Male	19	63.3	16	53.3
	Female	11	36.7	14	46.7
	Total	30	100.0	30	100.0
Age Groups	32-45	1	3.3	1	3.33
	46-58	11	36.7	7	23.33
	59-71	14	46.7	18	60.00
	≥ 72	4	13.3	4	13.33
	Total	30	100.0	30	100.0
		MS±SD = 62 ±10		MS±SD = 62±8	
Marital status	Single				
	Married	0	0.0	0	0.0
	Total	30	100.0	30	100.0
		30	100.0	30	100.0
Educational level	Illiterate	12	40.0	12	40.0
	read and write	8	26.66	9	30.0
	primary school	6	20.0	6	20.0
	Intermediate school	2	6.67	3	10.0
	preparatory school	2	6.67	0	0.0
	bachelor and above	0	0.0	0	0.0
	Total	30	100.0	30	100.0
Occupation	Free job	13	43.33	14	46.67
	Employee	6	20.00	2	6.67
	Retired	1	3.33	0	0.00
	Housewife	10	33.33	14	46.67
	Total	30	100.0	30	100.0
Number of PCI done	One time	21	70.0	22	73.30
	Two times	6	20.00	6	20.00
	Three times	3	10.0	2	6.70
	Total	30	100.0	30	100.0

F= frequency, %= percent

Table 1 presents frequencies and percentages of demographic and clinical characteristics of the studied samples. Findings shows that more than half of studied samples for the study and control groups 19 63.3%, 16 53.3% respectively were male. Regarding age group, the results of the current study illustrated that both study and control groups 14 (46.7%), 18 (60.00%) were within 59-71 age group respectively; moreover, the findings reported that the mean of age for both groups was 62 years old.

Also, findings indicated that all samples (100.0%) in both groups were married. related to educational level, the results reported that both groups have high percent 12 (40%) of respondents were illiterate. Furthermore, the results clearly demonstrated that high percent 13(43.33%), 14(46.67%) respectively of respondents for both groups were within free job category for the occupation of the studied samples. Finally, about two third of the studied samples 21(70.0%), 22 (73.3%) in both groups respectively had percutaneous coronary intervention as first time.

This table 2 presented descriptive analysis of studied sample pain intensity for study and control groups before and after applying the interventional program. It can be seen that mean score of pain for both study and control groups before applying interventional program have nearly the same mean score (5.50 ± 2.029 vs. 5.73 ± 2.196) respectively. In contrast after applying interventional program the mean score of pain for study group is much lesser than control group as follows respectively (0.66 ± 0.802 vs. 5.40 ± 1.830).

This table 3 presented descriptive analysis of studied sample vital signs for study and control groups before and after applying the interventional program. It can be seen that findings indicated that mean scores for both study and control groups before applying interventional program have nearly the same. in contrast after applying interventional program the mean scores of vital signs of study group become lower as compared with control group.

Table (2) Descriptive analysis of studied sample's pain intensity for Study and Control Groups before and after Applying the Interventional Program

Study Variable	Pre-test period						Post-test period					
	Study Group			Control Group			Study Group			Control Group		
	M.S	SD	Ass	M.S	SD	Ass	M.S	SD	Ass.	M.S	SD	Ass.*
Intensity of Pain	5.50	2.029	Moderate	5.73	2.196	Moderate	0.66	0.802	Mild	5.40	1.830	Moderate

M.S.= mean score, SD= standard deviation *Ass= assessment: (0- 0.49) = No pain; (0.5-4.4) = mild; (4.5-7.4), moderate; (7.5-10) =severe

Table 3. Descriptive analysis of studied sample vital signs for Study and Control Groups before and after Applying the Interventional Program

Study Variable (Vital signs)	Pre-test period				Post-test period			
	Study Group		Control Group		Study Group		Control Group	
Body temperature	M.S	SD	M.S	SD	M.S	SD	M.S	SD
	36.80	0.337	36.91	0.279	36.90	0.203	36.80	0.337
Peripheral pulse	103.16	12.174	102.60	12.802	89.50	12.795	102.60	12.802
Respiration	25.50	2.501	25.07	2.303	19.20	2.759	25.43	2.417
Systolic (BP)	144.06	12.875	142.90	11.577	120.90	2.820	143.23	11.811
Diastolic (BP)	83.33	16.082	83.00	16.197	80.20	2.833	85.23	7.785

M.S.= mean score, SD= standard deviation, BP= blood pressure

Table 4. Comparison of vital signs readings between Study and Control Groups at pre-test and post-test periods

Vital Signs Reading	Test period	Study Group (N=30)		Control Group (N=30)		Independent t Test statistics		
		M.	SD	M.	SD	t test value	df	P
Body temperature	Pre	36.80	.337	36.90	.279	-1.334	58	.187 NS
	Post	36.90	.203	36.80	.337	1.390	58	.170NS
Peripheral pulse	Pre	103.16	12.174	102.60	12.802	.176	58	.861NS
	Post	89.50	12.794	102.60	12.802	-3.964	58	.0000 HS
Respiration	Pre	25.50	2.501	25.06	2.303	.698	58	.488 NS
	Post	19.20	2.759	25.43	2.416	-9.308	58	.0000 HS
Systolic (BP)	Pre	144.06	12.875	142.90	11.576	.369	58	.713 NS
	Post	120.90	2.820	143.23	11.810	-10.074	58	.0000 HS

*M.= mean, SD=standard deviation, NS = Non-significant, HS= highly significant, df= degree of freedom BP= blood pressure

This table 4 presents comparison of vital signs readings between study and control groups at pre-test and post-test periods through independent t test. The results showed that there are no significant mean differences regarding following vital signs readings (body temperature, peripheral pulse, respiration, systolic BP and diastolic BP) between the study and control groups of the current study before applying the interventional program at $p > 0.05$. While there are highly significant mean differences regarding following vital signs readings (peripheral pulse, respiration, systolic BP and diastolic BP) between the study and control groups of the current study after applying the interventional program at $p \leq 0.01$.

The majority of the study were female who accounted for (64%) of the total participants while male constituted (36%). Most of the study participants (35%) were ages between 30 and 40 years old. Nearly to half of study sample (48%) were diagnosis have Varicose vein. According to body mass index most of them (64%) within normal body weight. Related smoking most of nurses (62%) were no smoker. More than one third of nurse's spent 4-6 hours daily standing and finally half of study participants spent 1-2 hours daily sitting.

this research was to determine whether or not an intervention program was effective in reducing the level of discomfort experienced by patients during the procedure.

Regarding age group, the results of the current study illustrated that both study and control groups 14 (46.7%), 18 (60.0%) were within 59-71 age group respectively; moreover, the findings reported that the mean of age for both groups was 62 years old.

This finding is in line with the study carried out by Parach et al.,^{6,12,13}. For patients undergoing coronary artery angioplasty, which aims to develop and apply evidence-based treatment guidelines for the arterial sheath removal. Also, the arterial sheath removal can serve as an effective function in minimizing the risk of bleeding, hematoma, vasovagal reactions, urine retention, and back pain. Within the scope of this specific research, the average age was determined to be 62.5 years old, with a standard deviation of 10.8 years. The researcher acknowledges the validity of these findings.

Related to marital status, all samples (100.0%) in both groups were married. Likewise, Heidaranlu et al.,^{2,14-16} reported that most of the patients in both groups were married in the study. The author mentioned that their percentages were 91% and 87% for experimental group and control group respectively. It can be interpreted that married people may have chance to get CAD because they have big responsibilities in life toward their families especially economic issues that bring out burden on them.

Concerning the educational level, more than one-third of samples in the study group and the control group are within Illiterate 12 (40%). Patients who were undergoing percutaneous coronary intervention were included in a randomized controlled experiment that undertook by Ghods et al.,^{3,17,18} to assess the effects of the Valsalva technique on pain and vasovagal reactions that occurred during the removal of the femoral artery sheath.

Regarding demographic and clinical characteristics which are presented in Table 1, concerning gender results reported that the majority of samples in the study and control groups were male and their accounts 19 (63.3%) and 16 (53.3%) respectively as compared to female counts 11(36.7%) and 14(46.7%) respectively. This finding was supported by Heidaranlu et al.,^{2,10,11} who illustrated in their study in Iran. Patients receiving arterial sheath excision following coronary artery angioplasty made up 66.6% of the women in this study, and the objective of

They stated that one-third of the studied sample had secondary education level, their percentage was 10 (33.40%). A researcher's opinion is an educational level of the studied sample had low levels because the most cases of the coronary artery angioplasty were going to other hospitals outside the province.

Related to occupation the results clearly demonstrated that high percent 13(43.3%), 14(46%) respectively of respondents for both groups were within free job category for the occupation of the studied samples. This finding disagrees with Ghods et al.,³ who reported that about two-third of the studied samples were employed 20 (66.70%). The researcher's point of view that a free job person has a burden of life as compared to others, thereby this may lead to coronary artery disease.

Finally, regarding number of PTCA, about two third of the studied samples 21(70.0%), 22 (73.3%) in both groups respectively had percutaneous transluminal coronary angioplasty as first time. In contrast Sarabi et al.,⁸ conducted a a randomized clinical trial in Iran to compare the effectiveness of position change for patients with pain and vascular complications after transfemoral coronary angiography. who stated that the higher percentages of percutaneous coronary intervention of patients that performed PTCA more than once were 24(66.0%) for experimental group and 20 (55.0%) for control group.

Discussion of Pain Intensity for Study and Control Groups for studied samples at Pre-Test period

According to the present study findings in (Table 2) about pain intensity for study and control groups before and after applying the interventional program. It can be seen that mean score of pain for both study and control groups before applying interventional program have nearly the same mean score (5.50 ± 2.029 vs. 5.73 ± 2.196) respectively. In contrast after applying interventional program the mean score of pain for study group is much lesser than control group as follows respectively (0.66 ± 0.802 vs. 5.40 ± 1.830). Also, table 4.6 presents the results showed that there are no significant mean differences regarding pain intensity between the study and control groups of the current study before applying the interventional program at p (0.671). While there are highly significant mean differences regarding pain intensity between the study and control groups of the current study after applying the interventional program indicated by computed t value (-12.970) at $p \leq 0.01$. The researchers Valikhani et al.⁷ carried out a Randomized Clinical Trial. The primary purpose of the investigation was to evaluate the efficacy of a sandbag and an ice bag in reducing the amount of discomfort experienced following percutaneous coronary intervention. They came up with a result for the level of pain that was $p < 0.001$. Also, Ghods et al.,³ carried out a

randomized controlled experiment, and they reported that the difference in the amount of pain experienced by patients before and after the intervention between the two groups (study and control) patients at $p < 0.001$.

Part III: Discussion of Vital Signs for Study and Control Groups for studied participants at Pre-Test period

Regarding vital signs between study and control groups at pre-test and post-test periods which are presented in table 3. It can be seen that findings indicated that mean scores for both study and control groups before applying interventional program have nearly the same. in contrast after applying interventional program the mean scores of vital signs of study group become lower as compared with control group.

Also, the results of the table 4 showed that there are no significant mean differences regarding following vital signs readings (body temperature, peripheral pulse, respiration, systolic BP and diastolic BP) between the study and control groups of the current study before applying the interventional program at $p > 0.05$. While there are highly significant mean differences regarding following vital signs readings (body temperature, peripheral pulse, respiration, systolic BP and diastolic BP) between the study and control groups of the current study after applying the interventional program at $p \leq 0.01$. Heravi et al.^{9,19-21} reported a randomized clinical trial. The primary objective of the research was to evaluate the impact that varying the angles at which patients were lying in bed had on the amount of pain they experienced following coronary angiography. The patients' temperature variation, blood oxygen saturation, and diastolic blood pressure were not substantially affected ($P > 0.05$), while the mean pain score, heart rate, systolic blood pressure, and respiration rate all varied significantly ($P 0.05$).

Conclusions

There are highly significant differences regarding pain intensity between the study and control groups of the current study after applying the interventional program. There are highly significant differences regarding following vital signs readings between the study and control groups of the current study after applying the interventional program.

Recommendations

Adopt the interventional program to be used and applied in other hospitals nationally. Train nurses to apply the program in relevant situation to achieve a benefits of the patients and to improve nursing care.

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