The Efficacy of Change Position and Back Massage for Patients after Arterial Sheath   Removal on Reduction of Back Pain Post cardiac catheterization

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Abstract

Background: *Back pain is a common complication of cardiac catheterization (CC) and is related to post-procedure immobility and restricted positioning. To avoid potential complications after CC, patients are advised to remain completely in bed and supine for 6–12 hours.***Objectives:** *Determine the efficacy of a change position and back massage in reducing back pain post-cardiac catheterization by comparing the back pain intensity before and after the application of an interventional program and compared with a comparison group.***Methods:** *A quasi-experimental design was conducted on patients divided into two study groups. A non-probability (homogenous purposive sample) of (90) patients is included in the present study (60 patients for two study groups, and 30 patients for the comparison group). All patients are post-cardiac catheterization and have back pain. ***Outcomes:** *The study results indicated a reduction in the back pain intensity in study groups compared with those participants in the comparison group where study group 2 was more effective in the reduction of back pain compared to study group 1.***Conclusion:** *Implementing the change position and back massage program after arterial sheath removal for patients post-cardiac catheterization who have back pain is an effective approach to reducing the back pain intensity compared with the comparison group.***Recommends:** *Utilizing the results of the current study as a standard for the treatment of patients with back pain post-cardiac catheterization.*

Keywords: *Efficacy, cardiac catheterization, change position and back massage, back pain.*

Introduction

Coronary artery disease (CAD) is a complex disease that causes a reduction or absent blood flow in one or more of the arteries that encircle and supply the heart, and the most prevalent kind of heart disease [1]. CAD is still one of the most important groups of heart disease and it is a major cause of morbidity and mortality in many countries [2].

Coronary artery disease continues to affect a million people worldwide, making them a global health problem. In addition, it affects people of all ages, not just the elderly [3].

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Cardiac catheterization is the most common method of diagnosing coronary heart disease. Balloon angioplasty, stenting, and atherectomy, which are all CAD-restorative procedures, are all performed under fluoroscopic observation through catheterization [4].

It's important for arterial access procedures to extend bed rest with the injured extremity extended during and after cardiac catheterization to prevent significant bleeding [5]. The patients' pain may result from this immobility [6,7].

After five to thirty minutes, manual compression should be used to apply hemostasis to both femoral vein puncture sites. Because of this, the patient must spend 4-6 hours in bed and keep the compression dressing continuously [8].

Reported 3 5.8% of patients have back pain discomfort after coronary angioplasty. Patient reported severe back pain and believing it was caused by their continued immobility [9]. It is believed that untreated pain interferes with one's well-being. As a result, one of nursing's primary goals is to promote patient comfort measures after CC. However, it is necessary to identify the causes of back pain after CC in order to improve patient comfort. Finding the best nursing treatments to enhance patient comfort without compromising patient safety, such as preventing vascular problems, is possible after identifying the primary contributors to back pain post CC [10].

To prevent complications, post-CC, the nurse has an important role in helping people living with the disease through various preventive and therapeutic measures [11,12]. There are several methods known as therapeutic strategies that are used to lessen back pain following CC, these methods in changing positions and back massage which have been reported to reduce pain based on vital signs and pain scores [13].

Changing positions is one of the nursing duties that can be utilized as a non-invasive, non-pharmacological pain relief method[14]. In addition, back pain is brought on by tension in the pain-sensitive tissues that press on or stimulate the nerve terminals; this tension may be directly related to continuous immobility or tension in the lower spinal ligaments. Positioning patients is an essential aspect of nursing practice and a responsibility of the nurse [15].

Back massage is one of the other complementary therapies that is used as adjuvant therapy in addition to traditional medical treatments to improve general health and relieve pain, therefore massage might decrease the perception of pain [16]. Massage therapy may have a significant positive impact on those recovering from cardiac procedures [17].

Non-pharmacological interventions are categorized as changing position and back massage to manage back pain post-cardiac catheterization. These are the most frequent interventions. In this context, there are no previous studies to determine the effectiveness of those interventions in Iraq. Therefore, the present study fills the research gap in nursing research. So, the research question was, "Do a change in position and back massage after arterial sheath removal reduce back pain for a patient after cardiac catheterization?

> **The study hypotheses:** Changing position and back massage are effective for patients after cardiac catheterization in reducing back pain after arterial sheath removal.

Materials and Methods

- **Design of the Study:** The quasi-experimental design (Nonequivalent control group) has been executed in the current study to determine the efficacy of a change position and back massage on the reduction of back pain after arterial sheath removal post-cardiac catheterization.

- **Sampling and Sample of the Study:** The researcher use nonprobability (homogenous purposive sample) of 90 patients post-cardiac catheterization who have back pain at AL-Najaf Center for Cardiac Surgery and Cardiac Catheterization.

- **Determinations of Sample Size:** the researcher uses the following parameters to determine the adequate sample size; (power 0.95, significantly 0.05, and effect size 0.32). Therefore, the appropriate sample size for this study was determined to be (54) participants based on the variables, the researcher set the power at (0.99) and the significance to (0.01) to minimize the probability of "false negative and false positive" results; as a result, the sample size becomes (90) participants [18].

- **The Study Group:** The group of current study included two study groups (study group 1 received the change position protocol and study group 2 received the change position and back massage protocol), where patients in study group 1 with back pain received change position intervention after the first hour from arterial sheath removal. And patients in Study group 2 with back pain received a change position and back massage protocol by using Swedish massage (effleurage techniques). after a one-hour evaluation (post-test I), followed up after the second (post-test II), and followed up the next after the third hour from the application of the program (post-test III). throughout three periods of measurement, the intensity of the back pain decreased significantly in the patients after the application of the program.

- **The Comparison Group:** Thirty patients were on usual nursing care and treatment. After an arterial sheath removal, back pain intensity increased in the comparison group with the treatment routine. The researcher separated the control group from the study group during the program's application period.

- **The Study Instrument:** the researcher has adopted an assessment tool to achieve each of the study objectives. This tool consists of four parts: Part I: Socio-Demographic Data; Part II: Clinical Characteristics; Part III: Assessment of Patient's Back Pain Using Numerical Analogues Scale (NAS) and Part IV: Vital Signs.

- **Ethical Considerations:** A legal, governmental agreement obtained the ethical study approval before conducting the study according to the standards for conducting research with human

beings from the National Research Ethics Committee (NREC). In addition, before beginning data collection confirm informed consent for participation rights to protect the patient and the researcher's rights, where participation right includes the following elements the researcher, introducing himself and his identity to the subject, explaining the study's goals and advantages, and confirms the patient's identity and information will be kept secret. participants' freedom to withdraw from the research at any moment and their participation in it being voluntary

- ***Method of Data Collection:*** The researcher used face-to-face interviews to collect socio-demographic and clinical data from patients. As for back pain post-cardiac catheterization, the researcher used the Numeric analogous scale (NAS) to assess the level of back pain for all participants before the application of the intervention. Also, the researcher compared the level of back pain before and after the application of the program. The data collection method started from 23rd November 2022 to 22nd December 2022

- **Flowchart (3.2).**
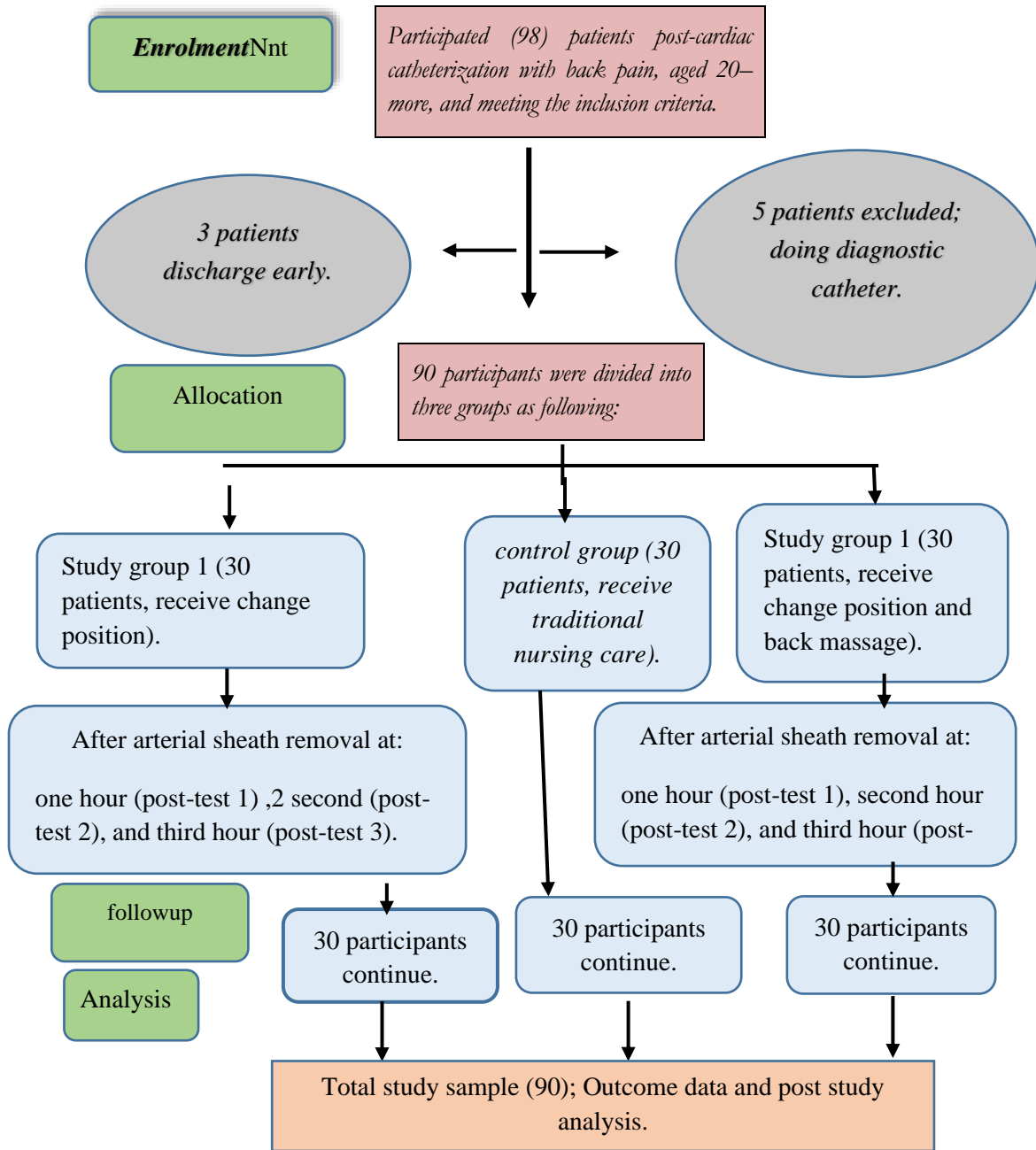
Flowchart 3.2: Participants' Flow Diagram

- **Statistical Analyses:** The data of the present study are analyzed through the application of Statistical Package of Social Sciences (SPSS) version 20, and Microsoft Excel 2019 using both descriptive and inferential data analysis approaches as follows:

- **Descriptive Data Analysis:** Presented as tables, frequencies, and percentages, Graphic presentation by using bar charts (Statistical figures)., Statistical mean, and standard deviation. And the researcher used the mean of scores 1- 3 mild level 4-6 moderate level, and 7-10 severe level.

- **Inferential Data Analysis:** Statistical tests were applied according to the distribution and type of variables, which include one-way analysis of variance (ANOVA), and chi-square test.

Study Results and Findings

Table (1): Distribution of Demographic Characteristics among Study Sample of both study and control groups.

Demographics Data	Rating and Intervals	Statistics	Groups		
			Study group 1	Study group 2	Control
Age/ years	≤ 30	Freq.	0	0	3
		%	0.0%	0.0%	10.0%
	31 – 40	Freq.	2	2	0
		%	6.7%	6.7%	0.0%
	41 – 50	Freq.	5	4	4
		%	16.7%	13.3%	13.3%
	51 – 60	Freq.	10	11	13
		%	33.3%	36.7%	43.3%
	61 and more	Freq.	13	13	10
		%	43.3%	43.3%	33.3%
	Mean (Std. Dev.)		57.10 (9.9)	58.77 (10.2)	56.5 (12.0)
Total		Freq.	30	30	30
		%	100.0%	100.0%	100.0%
Gender	Male	Freq.	14	14	13
		%	46.7%	46.7%	43.3%
	Female	Freq.	16	16	17
		%	53.3%	53.3%	56.7%
Total		Freq.	30	30	30
		%	100.0%	100.0%	100.0%
Marital Status	Single	Freq.	20	0	21

			%	66.7 %	0.0%	70.0%
	Married	**Freq.**	**0**	**19**	**0**
		%	**0.0%**	**63.3%**	**0.0%**
	Divorced	**Freq.**	2	2	0
		%	6.7%	6.7%	0.0%
	Widow	**Freq.**	8	9	9
		%	26.7%	30.0%	30.0%
Total		**Freq.**	**30**	**30**	**30**
		%	**100.0%**	**100.0%**	**100.0%**
	Obese	**Freq.**	**14**	**13**	**15**
		%	**46.7%**	**43.3%**	**50.0%**
Body Mass Index	**Overweight**	**Freq.**	12	12	13
		%	40.0%	40.0%	43.3%
	Normal	**Freq.**	4	5	2
		%	13.3%	16.7%	6.7%
	Thin/ underweight	**Freq.**	0.0	0.0	0.0
		%	0.0%	0.0%	0.0%
Total		**Freq.**	**30**	**30**	**30**
		%	**100.0%**	**100.0%**	**100.0%**

Table (1) shows the distribution of demographic characteristics among the study sample of both study and control groups. The results show that (43.3%) of the study sample are (61 and more) years old, (53.3%) are female, and (66.7%) of them are single patients in study group 1. In study group 2, the study results indicate that (43.3%) of the study sample are (61 and more) years old, (53.3%) are female and (63.3%) of them are married. Concerning the control group participants, the study results indicate that (43.3%) of the study sample (51 – 60) years old, (56.7%) are female and (70.0%) of them are married. The majority of the patients in study group 1, study group 2, and the control group present with a body mass index of 30 and more (obese).
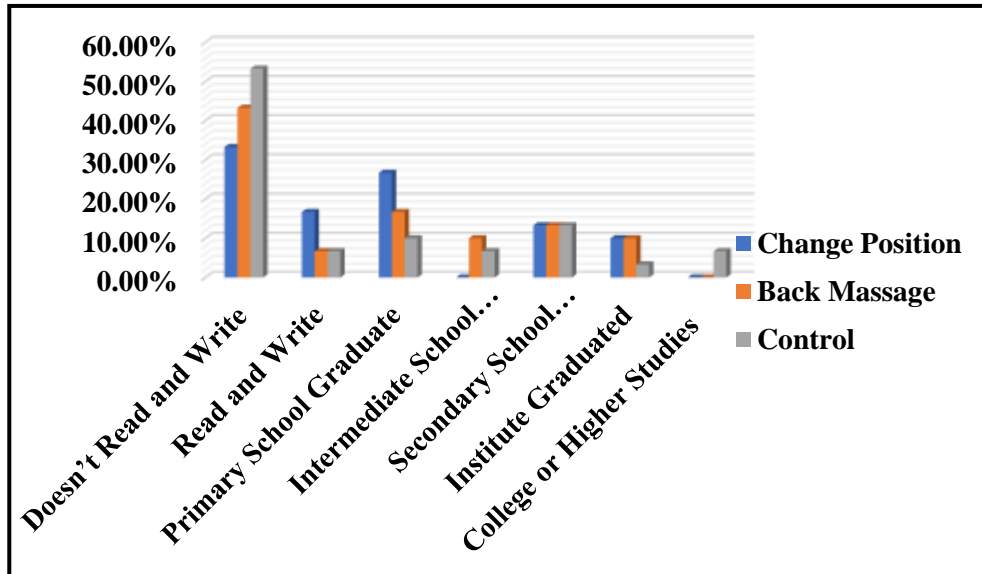
Figure (1) Education Levels of the Study Sample

Table (2) Analysis of Variance (one-way ANOVA) of the Studied Parameters Throughout Different Periods of Measurements among the Study Participants after Receiving the Change Position Program

Parameters	Statistics	Sum of Squares	d.f	Mean Square	F	p-value
Back Pain	**Between Groups**	608.4	3.0	202.8	132.2	.0001 S
	Within Groups	178.0	116.0	1.5		
	Total	786.4	119.0			
Heart Rate	**Between Groups**	4246.1	3.0	1415.4	4.6	.004 S
	Within Groups	35694.7	116.0	307.7		
	Total	39940.8	119.0			
Systolic Blood Pressure	**Between Groups**	2631.4	3.0	877.1	5.3	.002 S
	Within Groups	19377.0	116.0	167.0		
	Total	22008.3	119.0			

Diastolic Blood Pressure	Between Groups	1790.2	3.0	596.7	8.1	.0001 S
	Within Groups	8547.8	116.0	73.7		
	Total	10338.0	119.0			
Respiratory Rate	Between Groups	416.3	3.0	138.8	6.0	.001 S
	Within Groups	2673.7	116.0	23.0		
	Total	3090.0	119.0			

Table (2) shows that there is a significant difference in the Studied Parameters at the pre-test, post-test 1, post-test 2 and post-test 3 in the patients after change position program (i.e. there is a significant improvement in the Studied Parameters in a group of change position (study group 1) compared with the control group).

Table (3) Analysis of Variance (one-way ANOVA) of the Studied Parameters Throughout Different Periods of Measurements among the Study Participants after Receiving the Change position & Back Massage Program

Parameters	Statistics	Sum of Squares	d.f	Mean Square	F	p-value
Back Pain	Between Groups	844.2	3.0	281.4	142.4	.0001 S
	Within Groups	229.3	116.0	2.0		
	Total	1073.5	119.0			
Heart Rate	Between Groups	1740.0	3.0	580.0	3.5	.017 S
	Within Groups	19134.3	116.0	165.0		
	Total	20874.4	119.0			
Systolic Blood Pressure	Between Groups	4550.5	3.0	1516.8	7.8	.0001 S
	Within Groups	22528.2	116.0	194.2		
	Total	27078.7	119.0			
Diastolic Blood Pressure	Between Groups	1429.7	3.0	476.6	6.5	.0001 S

	Within Groups	8519.6	116.0	73.4		
	Total	9949.3	119.0			
Respiratory Rate	Between Groups	938.7	3.0	312.9	21.0	.0001 S
	Within Groups	1724.8	116.0	14.9		
	Total	2663.5	119.0			

Table (3) shows that there is a significant difference in the Studied Parameters at the pre-test, post-test 1, post-test2 and post-test3 in the patients after receiving a change position and back massage program (study group 2) (i.e. there is a significant improvement in the Studied Parameters in a group of change position and back massage compared with the control group).

Table (4) Analysis of Variance (one-way ANOVA) of the Studied Parameters Throughout Different Periods of Measurements among the Control Group

Parameters	Statistics	Sum of Squares	d.f	Mean Square	F	p-value
Back Pain	Between Groups	3.1	3.0	1.0	0.5	.689 NS
	Within Groups	243.2	116.0	2.1		
	Total	246.3	119.0			
Heart Rate	Between Groups	146.6	3.0	48.9	0.2	.869 NS
	Within Groups	23777.1	116.0	205.0		
	Total	23923.7	119.0			
Systolic Blood Pressure	Between Groups	80.7	3.0	26.9	0.2	.902 NS
	Within Groups	16301.7	116.0	140.5		
	Total	16382.4	119.0			
Diastolic Blood Pressure	Between Groups	436.4	3.0	145.5	1.4	.248 NS
	Within Groups	12102.5	116.0	104.3		
	Total	12538.9	119.0			

Respiratory Rate	Between Groups	20.6	3.0	6.9	0.3	.807 NS
	Within Groups	2447.8	116.0	21.1		
	Total	2468.4	119.0			

Table (4) shows that there is a non-significant difference in the Studied Parameters within the control group at the pre-test, post-test 1, post-test2 and post-test3 (i.e. there is a non-significant improvement in the Studied Parameters in the control group compared with the group of study group 1, study group 2).

Table (5) Analysis of Variance (one-way ANOVA) of back Pain Throughout Different Periods of Measurements among the Different Studied Groups.

Periods of Measurements	Statistics	Sum of Squares	d.f	Mean Square	F	p-value
Pre-test	Between Groups	5.6	2.0	2.8	1.2	.301 NS
	Within Groups	200.0	87.0	2.3		
	Total	205.6	89.0			
Post-test 1	Between Groups	26.3	2.0	13.1	5.0	.009 S
	Within Groups	230.8	87.0	2.7		
	Total	257.1	89.0			
Post-test 2	Between Groups	206.4	2.0	103.2	65.9	.0001 S
	Within Groups	136.3	87.0	1.6		
	Total	342.7	89.0			
Post-test 3	Between Groups	745.0	2.0	372.5	388.7	.0001 S
	Within Groups	83.4	87.0	1.0		
	Total	828.3	89.0			

Table (5) shows that there is a non-significant difference in back pain between the different studied groups at the pre-test. While, at post-test 1, post-test 2, and post-test 3, the study results indicate that there is a significant difference (i.e. there is a significant improvement in the back pain in the

groups of change position group, change position, and back massage group compared with the control group).

Discussion:

change in position and back massage reduces vascular complications post-cardiac catheterization [19]. Changing the position of patients after cardiac catheterization reduced the severity of pain. Patients who were positioned with the head of the bed significantly inclined and supported into a semi-seated position reported less pain in the groin, leg, and back.

The primary outcome of the present study is to examine the effectiveness of changing position and back massage in reducing back pain post-cardiac catheterization. The study results indicate that there is a decreased level of back pain after the application of the program in the two study groups throughout four periods (pre-test, post-test I, post–test II, and post-test III) and compared the study group with those participants in the comparison group.

Additionally, the present study indicates that there is a significant difference in the studied parameters throughout different periods in the patients after receiving the change position program. This result is consistent with a study conducted by [20] which reveal that lower patient back pain ratings were associated with the use of positioning only without the addition of medications.

Noted in the study conducted by[21] that there was a decrease in the study group's pain levels following the massage interventions in relation to the sessions of massage therapy following cardiac catheterization. Moreover, [22] revealed in their study that the posture of the patients might significantly lessen the discomfort following cardiac catheterization.

Similar studies conducted by [23] found low back pain and discomfort scores for experimental groups. After the intervention of changing positions by elevating the head of the bed and giving a massage, the low back pain and discomfort in the experimental group between the pre-test and post-test were statistically significantly decreased. Elevating the upper body reduces pressure on the body and avoids stiffness; it is thought to be a useful method for easing pain. Also, because it relaxes muscles and improves blood circulation, massage is useful in reducing discomfort.

The implementation of the change position and back massage program was associated with highly significant improvements in the scores of back pain. Moreover, the study sample results of the overall assessment, which improved based on the statistical means, study findings indicate that the program is an effective way to decrease back pain after arterial removal for patient's post-cardiac catheterization and who have back pain.

Conclusion:

The study concluded that the change of position and back massage after arterial sheath removal for 3 hours with continuous follow-up is an effective way to reduce the back pain intensity post-cardiac catheterization.

Recommends:

The results of the study can be used as a baseline in subsequent studies in the same setting to assess the effectiveness of change positions and back massages in reducing back pain following arterial sheath removal following cardiac catheterization.

Conflicts of interest:

The authors declare no conflict of interest.

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