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The Effect of Early Mobilization on Back Pain among Post Diagnostic Coronary Angiography Patients at Ahmed Gasim Cardiac and Renal Transplantation Hospital, Sudan

Nadia Ahmed Mohammed Hamad¹, Eman. Z. E. Yassin², Amal Mohammed Hamid³, Manal Abd Alrahman⁴, Fania. A. Abdari⁵, Khadija Abdalhakam Taifour Mohamed⁶, Ghanem Mohammed Mahjaf⁷, Mosab Nouraldein Mohammed Hamad^{8*}

¹Assistant Professor of Critical Nursing, Faculty of Medical Technical Sciences, Department of Nursing, Alzaiem Alazhari University, Khartoum North, Sudan

²Assistant Professor in Critical Care Nursing, Dean of Health Sciences College, Elsheikh Abdallah Elbadri University, Sudan

³Assistant Professor of Obstetrics and Gynecological Nursing, Al-Ghad International College, Females, Jeddah, KSA

⁴Assistant Professor of Community Health Nursing, Faculty of Medical and Health Science Nursing Department, Merowe University of Technology Abdulatif Alhamed Sudan

⁵Assistant Professor in Obstetrics and Gynecology, Elsheikh Abdallah Elbadri University, Sudan

⁶Department of Medicine, Faculty of Medicine, Alzaiem Alazhari University, Khartoum, Sudan

⁷Department of Medical Microbiology, Faculty of Medical Laboratory Sciences, Shendi University, Shendi, Sudan

⁸Assistant Professor, Microbiology Department, Faculty of Medicine, Elsheikh Abdallah Elbadri University, Sudan

*Corresponding Author: Mosab Nouraldein Mohammed Hamad

Assistant Professor, Microbiology Department, Faculty of Medicine, Elsheikh Abdallah Elbadri University, Sudan

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Abstract: Coronary catheterization is a minimally invasive procedure to access the coronary circulation and blood-filled chambers of the heart using a catheter to recognize occlusion, stenosis, and thrombosis. This procedure is commonly performed through the femoral artery, which may induce possible complications such as bleeding or hematoma. Restricting patient movement was adopted to avoid these complications. The patient has to lie in bed in a supine position for at least 6 hours after angiography. This is an experimental case-control study, conducted to evaluate the effect of early mobilization on back pain. A sample of 300 adult patients was selected by a random sample technique. They were randomly allocated to 100 patients in the experimental group and 200 patients in the control group. The study was conducted from March 2017 to March 2019 at Ahmed Gasim Cardiac Surgery and Renal Transplantation Hospital in Khartoum State, Sudan. The experimental group was mobilized early after 4 hours and the control group had routine bed rest for 6 hours post-sheath removal. Both groups received the usual care. A structured questionnaire and checklist were used to collect data. Data were analyzed by using Statistical Packages for Social Sciences (SPSS). The results revealed that the two groups feel pain varying between no pain and mild (85%) in the cases and in the controls (89.0%) from one hour up to four hours but significant back pain increased clearly at five hours and six hours for the controls group (5th hours severe (6%) very severe (0.5%)). *P. value* 0.000 significant and 6th hours severe (27.5%) very severe (6%). This study concluded that back pain reduction was statistically significant among the experimental group compared to the control group.

Keywords: Bed rest, Coronary artery, Early mobilization, Pain, Vascular complication, Renal Transplantation.

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INTRODUCTION

Coronary catheterization is a minimally invasive procedure to access the coronary circulation and blood-filled chambers of the heart using a catheter. It is performed for both diagnostic and interventional purposes. Coronary catheterization is one of the several

cardiology diagnostic tests and procedures. Specifically, coronary catheterization is a visually interpreted test performed to recognize occlusion, stenosis, and restenosis [1]. Coronary heart disease (CHD) is emerging as a main cause of CVD and heart failure, reaching nearly 30 % of the total CVD in Sudan. In 2016, the available data from the country showed that:

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585 patients underwent coronary artery bypass grafting (CABG), 1377 had percutaneous intervention (PCI) in the form of single or multiple stents and 4694 had diagnostic catheterization [8]. Also in Egypt, during 2010-2015 around 55,000 procedures were done [2]. This procedure is commonly performed through the femoral artery, which may lead to possible complications like bleeding or hematoma. The possibility of complications leads to restricting the patient to bed rest in the supine position for at least 6 hours after angiography. This practice is based on empirical reasoning and tradition and is associated with back pain, urine retention, discomfort, and negative feelings toward the procedure [3]. Self-perceived unpleasant feelings on the posterior surface of the human body from the shoulders to the hips [4]. The effect of early mobilization was studied in patients undergoing coronary angiography on vascular complications and back pain. The results showed that there was a significantly lower rate of perceived back pain in the short immobilization group, compared to the controls, at the time of mobilization, which remained significant also after 2 h of mobilization [9]. During bed rest, the patient must remain supine in the bed with the affected leg kept straight, avoiding fast movements like turning and too much reaching. Immobilization causes an increased risk of potential problems such as back pain and may delay patient discharge [10–13].

MATERIALS AND METHODS

An experimental case-control study was conducted at Ahmed Gasim Cardiac Surgery and Renal Transplantation hospital in Khartoum State, Sudan. This governmental tertiary hospital receives referral cases from all over Sudan. The inclusion criteria were adult patients, males, and females, who underwent diagnostic coronary angiography through the femoral artery and were willing to participate in the study. The exclusion criteria were the use of a Vascular Closure Device, use of radial access, patients having intervention (PCI), emergency cases, and patients refusing to participate. The sample size was measured by Slovenes' formula ($n = \frac{N}{1 + N(e)^2}$) Where: $N = 1200$ is the total number of patients who had diagnostic coronary angiography at Ahmed Gasim Cardiac and Renal Transplantation Hospital in 2017. $1200 / (1 + 1200(0.05)^2)$ gave a sample size of 300. A random sampling technique was used to select the sample of 100 patients in the experimental group and 200 patients in the control group. The data collection tool was Questionnaire developed by the researchers to record patients' demographic characteristics (age, weight, and gender).

Pilot Study

After obtaining formal administrative approval from the concerned authority, the tools were pre-tested to check for the clarity of items and feasibility. The reliability of the tools was tested on 20 patients.

Data Collection Tools

Data was collected five days a week from 8.00 am to 10.00 pm, during three months. A qualified Nurse with more than a year of experience in the post-angiography wards assisted the researcher in collecting the data after she was trained. The researcher listed all adult patients registered for coronary angiography after the procedure the first one who met the criteria was assigned to the experimental group and the second one to the control group. But unfortunately, a lot of patients refused to be part of the experimental group. Those who refused were included in the control group. Therefore, the number in the control group was larger than the experimental group. The investigator introduced herself and explained the purpose of the study. Doctors, staff Nurses, and ward in-charge Nurses who worked in the catheterization laboratory and the post-cardiac catheterization wards department were informed about the purpose of the study. The patients were randomized to mobilize early at 4 hours (experimental group) and the second group was placed on routine bed rest of 6 hours post sheath removal (control group). Otherwise, the two groups received the usual care. Back pain was checked and recorded hourly for 4 hours for cases groups and 6 hours for experimental groups. Verbal Descriptive Scale (VDS) was used to assess the back pain, and it include 5 points for No pain, Mild pain, Moderate pain, Severe pain, and Very severe pain [5].

Data Analysis

Data were analyzed by using Statistical Packages for Social Sciences (SPSS). In the analysis of the research findings; numeric values, numbers, and percentage distribution have been employed. The significance level has been determined as $p < 0.05$. Analysis using chi-square test and T. test as statistical tests.

Ethical Considerations

The study proposal was submitted to relevant Research and Ethics Committees at Alzaiem Alazhari University for ethical approval and then it was submitted to the Federal Ministry of Health. Ethical approval was obtained from the ethical committee of Ahmed Gasim Hospital. Each participant was well informed about the aim and potential benefits of the study, their written consent was taken and confidentiality was ensured. All protocols in this study were done according to the Declaration of Helsinki (1964).

RESULTS

Back pain which is a big challenge is associated with prolonged bed rest that usually follows coronary angiography. This study showed that the two groups feel pain varying between no pain and mild 85(85%) in the cases and in the controls 178(89.0%) through one hour up to four hours but significant back pain increased clearly at five hours and six hours for the controls group (5th hours severe 12(6%) very severe

1(0.5%) P. value 0.000 significant and 6th hours severe 55(27.5%) very severe 12(6%) (Table 3, 4). There is a significant association between gender and Back Pain in the control group, especially in the degree of participants (no pain) (70%) in males and (47%) in

females respectively *p-value* of chi = 0.011 (Table 4, 5). There is a significant association between participants' weight and pack pain in the degree of participants above 70kg *p-value* of chi = 0.00,0.006,0.002 & 0.026 respectively (Table 6, 7, 8 & 9).

Table 1: Patient’s personal data in cases and controls

Demographic Characteristics		Study population	
		Control groupn = 200	Cases groupn=100
Age	18 - 30 years	1 (0.5%)	2 (2. %)
	31 - 50 years	57 (28. 5%)	34 (34. %)
	51 - 70 years	132 (66%)	61 (61. %)
	Above 70 years	10(5%)	3(3%)
Weight	40-50 kg	4 (2.0%)	1 (1.0%)
	51-70 kg	92 (46.0%)	44 (44.3%)
	Above 70kg	104 (52.0%)	55 (55.0%)

Table 2: Pain in cases and controls after mobilization

Items	Cases	No pain	Mild	moderate	severe	Very severe	P .value
1 st hour	Control	178 (89%)	16 (8%)	4 (2.0%)	2(1%)	0(0%)	0.523
	Cases	85 (85%)	13 (13%)	1(1%)	1(1%)	0(0%)	
2 nd hours	Control	164 (82%)	28 (14%)	5(2.5%)	3 (1.5%)	0(0%)	0.291
	Cases	79(79%)	19(19%)	0(0%)	2(2%)	0(0%)	
3 rd hours	Control	134 (67%)	56(28%)	6(3%)	4(2%)	0(0%)	0.616
	Cases	64(64%)	33(33%)	1(1%)	2(2%)	0(0%)	
4 th hours	Control	117(58.5%)	68(34%)	8(4%)	7(3.5%)	0(0%)	0.524
	Cases	66(66%)	30(30%)	2(2%)	2(2%)	0(0%)	
5 th hours	Control	115(57.5%)	64(32%)	8(4%)	12(6%)	1(0.5%)	0.000
	Cases	-	-	-	-	-	
6 th hours	Control	43(21.5%)	42(21%)	48(24%)	55(27.5%)	12(6%)	0.000
	Cases	-	-	-	-	-	

Table 3: Pain in cases and controls after mobilization

Item	Type	No	Mean	Std. def	Std. Error Mean	P. value
Pain	Control	200	1.6108	0.55549	0.03928	0.000
	Cases	100	1.3100	0.49889	0.04989	

Table 4: Describes the relationship between gender & Pain in 3 hours for control group

Gender	No pain	Mild	Moderate	Sever	Total	P value
Male	76(76.0%)	22(22.0%)	1(1.0%)	1(1.0%)	100(100%)	0.034
Female	58(58.0%)	34(34.0%)	5(5.0%)	3(3.0%)	100(100%)	
Total	134(67.0%)	56(28.0%)	6(3.0%)	4(2.0%)	200(100%)	

Table 5: Describes the relationship between gender & back Pain in 4 hours for control group

Gender	No pain	Mild	Moderate	Sever	Total	P value
Male	70(70%)	25(25.0%)	3(3.0%)	2(2.0%)	100(100%)	0.011
Female	47(47.0%)	43(43.0%)	5(5.0%)	5(5.0%)	100(100%)	
Total	117(58.5%)	68(34.0%)	8(4.0%)	7(3.5%)	200(100%)	

Table 6: Describes the relationship between Weigh & Pain in 1 hours for control group

Weight	No pain	Mild	Moderate	Sever	Total	P value
40 – 50 kg	2(50%)	1(25.0%)	0(0%)	1(25.0%)	4(100%)	0.000
51 – 70 kg	84(91.3%)	7(7.6%)	1(1.1%)	0(0%)	92(100%)	
Above 70 kg	92(88.5%)	8(7.7%)	3(2.9%)	1(1.0%)	104(100%)	
Total	178(89.0%)	16(8.0%)	4(2.0%)	2(1.0%)	200(100%)	

Table 7: Describes the relationship between Weigh & Pain in 2 hours for control group

Weight	No pain	Mild	Moderate	Sever	Total	P value
40 – 50 kg	2(50%)	1(25.0%)	0(0%)	1(25.0%)	4(100%)	0.006
51 – 70 kg	75(81.5%)	15(16.3%)	2(2.2%)	0(0%)	92(100%)	
Above 70 kg	87(83.7%)	12(11.5%)	3(2.9%)	2(1.9%)	104(100%)	
Total	164(82.0%)	28(14.0%)	5(2.5%)	3(1.5%)	200(100%)	

Table 8: Describes the relationship between Weigh & Pain in 3 hours for control group

Weight	No pain	Mild	Moderate	Sever	Total	P value
40 – 50 kg	2(50%)	0(0%)	1(25.0%)	1(25.0%)	4(100%)	0.002
51 – 70 kg	64(69.6%)	25(27.2%)	3(3.3%)	0(0%)	92(100%)	
Above 70 kg	68(65.4%)	31(29.8%)	2(1.9%)	3(2.9%)	104(100%)	
Total	134(67.0%)	56(28.0%)	6(3.0%)	4(2.0%)	200(100%)	

Table 9: Describes the relationship between Weigh & Pain in 4 hours for control group

Weight	No pain	Mild	Moderate	Sever	Total	P value
40 – 50 kg	2(50%)	0(0%)	1(25.0%)	1(25.0%)	4(100%)	0.026
51 – 70 kg	59(64.1%)	27(29.3%)	4(4.3%)	2(2.2%)	92(100%)	
Above 70 kg	56(53.8%)	41(39.4%)	3(2.9%)	4(3.8%)	104(100%)	
Total	117(58.5%)	68(34.0%)	8(4.0%)	7(3.5%)	200(100%)	

DISCUSSION

Today with the increasing number of coronary angiography procedures and evolving technology, nurses are facing a great challenge. They are in the front line and play a significant role in the decrease or prevention of vascular complications after femoral sheath removal followed by compression of the femoral artery which is a nursing duty in many critical care settings. This experimental case-control study aimed to evaluate the effect of early mobilization after diagnostic coronary angiography on back pain. This study revealed that there is no difference in demographic data in the cases and in the control. Back pain which is a big challenge associated with prolonged bed rest usually following coronary angiography. This study showed that the two groups that feel pain vary from no pain to mild pain from one hour to up four hours. While back pain increased significantly at five hours and six hours for the control group P. value 0.000, this result is strongly supported by many studies: Chair, reported early mobilization had no significant difference in the incidence of hematoma formation (OR 0.82; 95% CI 0.59, 1.16) and back pain occurred in fewer patients [6]. Also Burn [7], found that in ten studies that looked at the safety of mobilization at below 3 hours no difference in overall vascular complications and back pain was statistically significantly reduced among the experimental group compared with the control group *p. value* (0.001). On other hand, Neishabouri *et al.*, concluded that changing position and early mobilization post angiographic on the basis of the given protocol is safe and possible because it did not cause low back pain. Meanwhile, the nursing care method can reduce back pain and decrease pain severity and extent by reducing time in bed also, because of increasing the rate of body comfort it may reduce the pessimistic idea in patients toward coronary cardio angiography [8]. Patient factors (gender & weight) can play significant

roles in the reduction of back pain after diagnostic coronary angiography. This study showed that back pain increased significantly in females in the control group at different times (from one hour to four hours) compared with males in the same group *p. value* = (0.011), while the participants had weight above 70kg notified back pain compared with whom had low weight in same group 0.00,0.006,0.002&0.026 respectively. These results are strongly supported by Burn, K.L [7].

CONCLUSION

This study concluded that back pain was statistically significantly reduced by early mobilization after diagnostic coronary angiography and patient factors such as gender & weight play a significant role in increased back pain.

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The budget for this study was from personal contributions from the authors, with no external funding.

CONFLICT OF INTEREST

The author has declared that no competing interests exist.

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