



## Original Article

## The Impact of Educational Training on Nurses to Improve Knowledge about Practices Regarding Patients Safety after Cardiac Catheterization

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## ABSTRACT

Cardiac catheterization is a severe health condition that needs standardized care strategies as well as qualified and skilled healthcare professionals to manage it effectively. **Objective:** To evaluate the impact of educational training on nurses to improve knowledge about patient safety practices after cardiac catheterization. **Methods:** This quasi-experimental study was accomplished among nurses working at cardiac units of both genders from March 2021 to September 2021. Non-probability convenience sampling technique was performed for the collection of data. The data was collected by utilizing the open-access structured tool of knowledge and practice. **Results:** Regarding the level of knowledge, pre-implementation of educational training, the majority of the participant had poor knowledge 15 (30%) and post-educational training, the knowledge level reached good knowledge (70.0%) and it was also found statistically significant  $p$ -value  $\leq 0.001$ . Similarly, a significant difference between nurses' practice after the implementation of the educational training shows (66.7%) inadequate practice before the intervention, while (83.3%) of them had an adequate level of practice after the intervention; it is also found to be a significant  $p$ -value  $\leq 0.001$ . **Conclusion:** The implementation of the educational training for nurses improved knowledge about practices regarding patients' safety after cardiac catheterization.

## INTRODUCTION

Cardiac illnesses are the most vital cause of morbidity and mortality worldwide [1]. Cardiac catheterization (including coronary angiography and angioplasty) is a standard diagnostic and therapeutic strategy for evaluating cardiovascular diseases. It needs qualified and skilled health providers to obtain a good management outcome [2]. Coronary angioplasty is a coronary intervention with mechanical stents to enhance the blood flow of coronary arteries [3]. Despite being a popular procedure, it is still fraught with complications. These complications include dye-related, anatomic, and vascular complications. In the United States alone, more than one million patients

undergo Percutaneous Coronary Intervention (PCI) each year, and major bleeding occurs at a rate of 1.7% after PCI [4]. The post-cardiac catheterized patients are at high risk of vascular complications. The most common complications are vascular access, such as painful hematoma, ecchymosis, pseudoaneurysm, arteriovenous fistulas, thrombo-emboli, and oozing. As a result, patients face additional discomfort in the form of extended hospital stays, higher hospital costs, and reduced quality outcomes [5]. A hematoma is a blood collection in the soft tissue and is recognized by local inflammation, rigidity, and pain. The management of hematoma needs pressure on the groin,

bed rest, and careful monitoring. Ecchymosis is the presence of skin discoloration, pain, and minor swelling and resolves with simple conservative treatment. Oozing can be stopped through continued manual pressure [6]. As established by research, nursing knowledge is insufficient about practice regarding patient safety after cardiac catheterization; therefore, there is a need to conduct educational sessions for nurses. Nurses, being the prime body of health care providers, must be able to assess, identify and manage the problems related to vascular site complications. Being involved the most at the patient's bedside, nurses should be able to work together to reduce vascular access complications and treat them when they arise. Therefore, a proficient nurse with comprehensive knowledge and practical capability is a key person for any healthcare institute, including cardiovascular intervention facilities. Specialized nursing care after the angiography and angioplasty is imperative to patient recovery to promote a better quality of care [7]. Complications after cardiac catheterization were 16.5%. These complications include hematomas fluctuating in size from 1 to 5 cm (15.5%), bleeding (1.5%), arteriovenous fistulas (1%), and pseudoaneurysms (0.7%). Therefore, the nurses should be expert enough to apply manual compression during the removal of the sheath and observe the vascular access complications as well as to know the techniques of sheath and TR band removal as part of the management of the patient after cardiac catheterization up to the point of discharge. Procedure protocols and staff education regarding vascular complications and post-procedure nursing care not only ensure patient safety and comfort but also reduce costs while at the same time improving the effectiveness of cardiac catheterization [8]. Good practice recommendations for percutaneous coronary intervention in the United Kingdom (UK), require that local operating policies be defined, including patient preparation, informed consent, and ward checklists. Nursing care should include care after angiography and angioplasty when the patient is shifted to either a ward or the recovery area. The main nursing care provider should instruct the patient to immobilize the limb with the puncture site and start vigilant observation of the vascular access area, hemodynamics and ECG monitoring. Furthermore, before discharge, proper advice and written instructions should be provided to the patient regarding vascular and other complications, schedule for return to work, proposed follow-up, drug therapy instructions, and planned interactions with formal cardiac rehabilitation programs [9]. The patients should be instructed to take a low-cholesterol diet and comply with lifestyle changes. A follow-up schedule should be arranged with the primary care physician and the cardiologist one week after the

procedure and then every three to six months for the first year [10]. Recent myocardial infarction is associated with a high risk of stent restenosis and increased mortality risk. Factors associated with good outcomes, including directions for the use of medication, should be discussed before discharge [11]. Investigators have pointed out that the quality of life in patients with coronary angiography, with persistent unclear chest pain before and after coronary angiography, experience more anxiety than those receiving a clear diagnosis. Patients with coronary artery disease (CAD) reported better total health status as compared with a final diagnosis of no CAD [12]. The nurses play an active role in the health behaviors of patients with myocardial infarction, in discharge planning and home health care, and in lifestyle that must be changed after MI, including medications, diets, cigarette smoking, alcoholism, and working life [13]. Moreover, further research is needed to explore the knowledge and practices of nurses related to post-cardiac catheterization care, for instance, methods of Trans-Radial and sheath removal. Finally, more research is needed to explore patient issues, develop standardized care policies, and enhance post-cardiac catheterization nursing care training to reduce vascular complications and obtain good health outcomes [14]. Hence, this study was accomplished to evaluate the impact of educational training on nurses to improve knowledge about patient safety practices after cardiac catheterization.

## METHODS

This quasi-experimental (pre and post) study was conducted over the period of seven months from March 2021 to September 2021 at a tertiary care hospital in Karachi, Pakistan. This study's target population was both genders with more than one year of clinical experience, and a valid license from Pakistan Nursing Council was enrolled. Nurses who were willing to participate and sign the informed consent form were included for the study. At the same time, the student nurses, those nurses who are working in managerial positions, were excluded from the study. The sample size was calculated by using OpenEpi software version 3.0. It was taken the interventional group before a training session, knowledge mean and standard deviation ( $43 \pm 86.0$ ), and after a training session, knowledge means and standard deviation ( $41 \pm 82.0$ ) [15]. It was calculated by taking a 95% confidence interval and 80% of the power. The calculated sample is 10 in each group. The total sample size is 20, but according to the easy availability of participants, the number of participants increased to 30. The non-probability convenience sampling technique was performed for the collection of data. Data was collected by utilizing the open-access structured knowledge about practices questionnaire to

assess the knowledge about practices regarding patient safety after cardiac catheterization and appropriate tools. This scale comprises 28 items. Amongst, ten items were related to the knowledge questionnaire, with responses classified as correct and incorrect. As for as practice-related questions, there were 18 items in the tool, and their responses were classified as always, sometimes, and never. Furthermore, data related to knowledge about the practice of patient safety after cardiac catheterization was collected from the study participants using a questionnaire before intervention (pre-test). Then the educational training intervention was given to all study participants and followed by a post-test from the same participants. The data was entered and analyzed by using the statistical package of social sciences (SPSS) version 21.0. To assess the knowledge and practices before and after the training program was measured by paired t-test.

## RESULTS

It was observed that 40% of male and 60% of female nurses participated in this study; Half (50%) of the study participants were under the age of 20-25 years, (43%) were 26-30 years of age, and only small proportion (6.67%) were 31- 35 years of age. According to the qualification distribution, most of the nurses (60%) were BS Nursing, and (40%) of them were nursing diploma-holder nurses. Experience distribution revealed that the majority (93.33%) of the nurses had less than 10 years of experience, and only (6.67%) of the study subject had an experience of more than ten years. An equal proportion of the study participant taken from each department, such as the Cardiac ward, CCU, and ICU nurses. Table 1 represents the demographic characteristics of nurses under the study.

Variables	N	%
<b>Gender</b>		
Male	12	40
Female	18	60
<b>Age</b>		
20-25	15	50
26-30	13	43
31 and above	2	6.67
<b>Professional Qualification</b>		
BS Nursing	12	40
Post RN BSc Nursing	6	20
Registered Nurse	12	40
<b>Professional Experience</b>		
1-10 Years	28	93.33
11 and above Years	2	6.67
<b>Population</b>		
Cardiac Ward Nurse	10	33.3
CCU Nurses	10	33.3
ICU Nurses	10	33.4

**Table 1:** Sociodemographic characteristics of study participants (n=30)

Nurses' knowledge and practice during pre and post-educational training, half of the participants 15 (50%) per knowledge was poor (Score  $\leq 40\%$  = Poor Knowledge). After the implementation of an intervention, the post-educational training, nearly two-thirds 21 (70%) of the study participants showed good knowledge (Highest  $\geq 40\%$  = Good Knowledge). It also supports the alternative hypothesis, and the p-value=0.001 was significant. Moreover, a significant difference was also observed between nurses' practice before and after the implementation of educational training. It is highlighted that about two-thirds 20 (66.67%) of the study participants had inadequate practice before the training according to the practice scoring system (Inadequate  $< 80\%$ ). In comparison, after the intervention of educational training, 25 (83.25%) of the study participants had an adequate level of practice (Adequate  $\geq 80\%$ ), and the p-value = 0.001 was found to be a statistical significance. Table 2. shows a significant difference between nurses' knowledge and practice during pre and post-educational training

Knowledge & Practice	Pre		Post	
	n	%	n	%
Knowledge				
Poor	15	50	9	30
Good	15	50	21	70
Mean $\pm$ SD	1 $\pm$ 0.1		1.70 $\pm$ 0.46	
Paired t-test	P-value = <0.001			
Practice				
Poor	20	66.67	5	16.75
Good	10	33.33	25	83.25
Mean $\pm$ SD	1.33 $\pm$ 0.47		1.83 $\pm$ 0.37	
Paired t-test	P-value = <0.001			

**Table 2:** Disclosed the nurses' knowledge and practice before and after the implementation of the educational training (n=30)

## DISCUSSION

Hussein *et al.*, investigated that post-cardiac catheterization nursing care is imperative for preventing vascular access complications and patients' safety. The nurse's sound knowledge and good practice enhance self-confidence and make them competent in their work [16]. The present study is an effort to assess the nurse's knowledge about practice regarding patient safety after cardiac catheterization. The current study revealed a significant difference between nurses' knowledge about practice pre and post-implementation of educational training regarding patients' safety after cardiac catheterization. After implementing post-educational training, the knowledge level reached (70%) directed to good knowledge. Similarly, Paul *et al.*, studied that there was a significant difference between pre and post-educational training regarding patients' safety after a cardiac catheterization, and the level of knowledge

improved after the implementation of educational training [17]. On the other hand, Al-Ftlawy disclosed that the nurse's knowledge was good before educational training [18]. It might be possible that almost half of their participants had already trained. That's why it was suggested to promote knowledge and performance regarding patient care after cardiac catheterization [19]. The present study identified a significant difference between pre and post-practice. In the pre-educational training, the majority 20 (66.7%) nurses had an inadequate level of practice, and in post-implementation, 25 (83.25%) of them had an adequate level of practice. Similarly, in Lahore, Pakistan, the nurse's practice was poor at 25.74%. In the same study Feroze et al., studied that nurses have adequate practice for instance, post-procedure care (78.4%), sheath removal (77.8%), applying manual pressure over catheter site (79.5%), measure stability for pain (76.0%), observe skin color & temperature (76.6%) discharge teaching (78.9%) [20]. The contradiction of the study was nurses of Sulaimani City found good practice in the post-cardiac procedure [21]. Nurses who have appropriate knowledge and practice can help in the restoration of cardiac patients. Similarly, Ali found that there is a positive and significant correlation between practice and knowledge post-implementation of educational training [15].

## CONCLUSIONS

It is concluded that implementing educational training, nurses' knowledge increased significantly, and improved patient safety practices after cardiac catheterization. The study also showed a positive and significant relation between nurses' knowledge about practice post-educational training, a high level of nurses' knowledge about practices can reduce the rate of vascular complications. Therefore, fundamental nursing care after the angiography and angioplasty is imperative to the patient's recovery to promote a better quality of care in daily practice.

## Conflict of interest

The authors declare no conflict of interest

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