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Level of Knowledge and Practice among Nurses Regarding Patients' Safety Post Percutaneous Coronary Intervention (PCI)

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ABSTRACT

Background: Percutaneous Coronary Intervention (PCI) is a common and critical procedure that uses a minimally invasive approach to unblock coronary arteries and restore blood flow to the heart. Nurses play a vital role in post-PCI care yet gaps in knowledge and practice may affect patient safety. This study was conducted to assess the level of knowledge and practice among nurses regarding patient safety post-PCI at Sultan Ahmad Shah Medical Centre @IIUM (SASMEC @IIUM), Kuantan, Pahang, Malaysia.
Methods: This was a quantitative cross-sectional study involving 98 nurses from Cardiac Care Unit (CCU) and Medical Wards of SASMEC @IIUM. Data were collected using a printed questionnaire covering sociodemographic, knowledge, and practice. The data were analysed using descriptive statistics and Chi square test.
Results: Out of 79 nurses surveyed, 59.5% (n=47) demonstrated good knowledge, and 63.3% (n=50) demonstrated adequate practice regarding patient safety post-PCI. A significant association was found between knowledge and practice levels (x^2=6.986, p=0.008), indicating that nurses with better knowledge were more likely to demonstrate adequate practice. However, no significant associations were found between knowledge or practice levels and sociodemographic factors such as age, gender, or years of experience.
Conclusion: The study demonstrated a significant positive association between nurses' knowledge and their practice related to patient safety post-PCI, underscoring the pivotal role of knowledge in enhancing clinical performance. Although sociodemographic factors such as age, gender, and years of experience showed no significant associations, the findings highlight the necessity of structured professional development initiatives to strengthen nursing competency and uphold patient safety standards following PCI.

Keywords: Percutaneous coronary intervention; Nurses' knowledge; Nurses practice; Patient safety; post-PCI care; Cardiac care; Nurses; Healthcare professionals; Medical staff

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INTRODUCTION

Percutaneous Coronary Intervention (PCI) is a common cardiac procedure used to manage blocked or narrowed coronary arteries. While generally safe, PCI poses risks such as bleeding, hematomas, arrhythmias, and vascular injuries. Nurses play a critical role in post-PCI care through patient monitoring, complication prevention, and education. Knowledge and practice of nurses in post-PCI care are essential to improve patient outcomes and reduce hospital stay durations (1). However, evidence suggests a gap between nurses' theoretical knowledge and actual practice which may compromise patient safety. Cardiac catheterisation is a critical health status which requires standardised care policies as well as it needs qualified and skilled health providers to obtain good outcomes of management (2).

This study addresses the need to assess the level of knowledge and practice among nurses at SASMEC @IIUM regarding post-PCI patient safety. This study will examine the relationship between nurses' sociodemographic such as age, gender, and years of experience with and their knowledge and practice in post-PCI care.

In conducting this literature review, we referred to several academic databases including Scopus, ClinicalKey, and Mendeley which are accessible through the IIUM Dar al-Hikmah Library. We employed Boolean search strategies using terms such as "AND" and "OR" to refine and narrow down the results to the most relevant studies. The primary keywords used were *"Percutaneous Coronary Intervention"*, *"post-PCI care"*, *"nursing knowledge"*, *"nursing practice"*, *"patient safety"*, and *"cardiac care"*. The search strategy followed the PRISMA framework to ensure a transparent selection process. Articles were included if they met the following criteria which published between 2014 and 2024, written in English, accessible in full-text, peer-reviewed, and directly relevant to nursing knowledge and practice regarding post-PCI patient care. Studies focusing on healthcare professionals other than nurses or those unrelated to post-PCI care were excluded.

Percutaneous Coronary Intervention (PCI) is a widely performed procedure for managing coronary artery disease. While it is minimally invasive, it is associated with significant risks, particularly if post-procedure care is inadequate. Nurses play a crucial role in this phase where accurate monitoring and prompt interventions are essential to prevent complications such as bleeding, hematomas, pseudoaneurysms, arrhythmias, and vascular injuries (3). Thus, the level of knowledge and practice among nurses is directly linked to patient outcomes and safety post-PCI.

Several studies highlight that there are gaps in both knowledge and practice among nurses care for post-PCI patients. For example, only 36% of nurses had good knowledge of post-PCI care (4) while in Iraq where many nurses lacked understanding of the risks and complications related to PCI (3). Similarly, previous study observed that nurses in Mosil Hospitals had gaps in their knowledge regarding the risk and complicatios associated with PCI (1). These findings point to a need for ongoing education and structured training programs to address these knowledge deficiencies.

Despite some nurses having adequate theoretical knowledge, there is a disconnect between knowledge and actual clinical practice. For instance, for instance, while 54.3% of nurses in their study showed good knowledge, only 12.9% demonstrated satisfactory practice (5). This gap may be due to factors such as the lack of clear standard operating procedures, limited hands-on training, or insufficient institutional support for continuing professional development. Effective nursing practice are strongly associated with positive patient safety outcomes as educational interventions not only improved nurses' knowledge and practice but also significantly reduced the rate of post-procedure complications (6). Similarly, trained nurses were better at educating patients about discharge care, leading to fewer readmissions and improved recovery process (7).

Therefore, this study aimed to assess the level of knowledge and practice among nurses regarding patient safety post-PCI at Sultan Ahmad Shah Medical Centre @IIUM (SASMEC @IIUM). Specifically, the objectives were to identify the levels of nurses' knowledge and practice regarding patient safetu post-PCI and to determine the association between nurses' knowledge and practice levels with demographic factors such as age, years of experience, and education

METHODS

In this quantitative study, a descriptive cross-sectional study was used to assess the level of knowledge and practice among nurses regarding patients' safety post-PCI at SASMEC @IIUM Kuantan. Participants were selected based on

predefined inclusion and exclusion criteria to ensure that only nurses directly involved in post-PCI care were considered.

The study was conducted at two clinical units which are Medical Wards and Cardiac Care Unit (CCU). A random sampling method was used. Nurses were first identified from departments directly involved in post-PCI patient care to ensure relevance to the study objectives. Subsequently, random sampling was conducted within each unit so that every eligible nurse had an equal opportunity to be selected, thereby reducing selection bias. This randomization approach enhanced the representativeness of the sample and strengthened the internal validity of the study. Using the Raosoft calculator with a 95% confidence interval (CI) and a 5% margin of error, the required sample size for this study is 98.

Inclusion criteria involved are registered nurses currently working in Medical Wards and CCU at SASMEC @IIUM and involved directly in managing post-PCI patients. Nurses who were not willing to participate were excluded from the study.

The research instrument was a structured questionnaire adapted with permission from. It contains three sections. Section A-consisted of six items on sociodemographic characteristics (gender, age, marital status, educational qualification, years of experience, unit/ward and whether the nurse had attended any training related to PCI). Section B comprised 10 items assessing nurses' knowledge regarding post-PCI care focusing on patient monitoring, complication management, and safety precautions. Each knowledge item was scored as "1" for the correct answer and "0" for an incorrect answer with multiple correct answer accepted for question number one. Based on the scoring criteria, nurses who achieved a knowledge percentage score of 40% or higher were categorised as having good knowledge while those scoring below 40% were categorised as having poor knowledge. Section C evaluated practical skills and safety measures in clinical practice which included 18 items. Each item was scored on a 3-point Likert scale ("Always" = 2, "Sometimes" = 1, "Never" = 0) and one item (P2) was reverse scored. Based on the scoring criteria, nurses who achieved a practice percentage score of 80% or higher were categorised as having adequate practice, while those scoring below 80% were categorised as having inadequate practice.

The independent variables in this study included sociodemographic factors such as age, gender, educational qualification, and years of working experience. The dependent variables were the levels of knowledge and practice related to post-PCI patient safety. Ethical approval was obtained from the Kulliyyah of Nursing Postgraduate and Research Committee (KNPGRC) (IIUM/313/G/14/3/1), the IIUM Research Ethics Committee (IREC) (IIUM/504/14/11/2/IREC 2025-KON/DOVS1), and the SASMEC Research Committee (SASRC) (IIUM/413/013/14/11/1/IIR25-08). Informed consent was obtained from all participants, and confidentiality of responses was ensured.

Data were collected using printed questionnaires distributed manually to eligible nurses. The collected data were analysed using IBM SPSS Version 30. Descriptive statistics (frequencies, means, standard deviations, and percentages) were used to summarise the data. Inferential statistics included Chi-square tests are used to explore the associations between sociodemographic variables, knowledge, and practice levels.

RESULTS

The total population of eligible nurses was 130, which 95 from medical wards and 35 from the Coronary Care Unit (CCU). Based on the Raosoft online sample size calculator with a 95% confidence interval, 5% margin of error, and 50% response distribution, the required sample size for this study was 98 nurses. Out of these, 79 nurses completed the questionnaire, resulting in a response rate of 80.6%. The response rate of 80.6% aligns with those reported in comparable nursing studies and is generally regarded as acceptable for survey-based research. Nevertheless, the potential influence of non-response bias cannot be entirely dismissed and should be considered when interpreting the study's findings.

The study found that 59.5% of nurses demonstrated good knowledge regarding post-PCI patient safety while 40.5% had poor knowledge (**Table 1**). In terms of practice, 63.3% of respondents showed adequate practice while 36.7% were categorised as having inadequate practice. Chi-square tests revealed no significant associations between knowledge level and sociodemographic variables such as age, gender, and years of experience. Similarly, practice levels were not significantly associated with any sociodemographic factors. However, a significant association was found between knowledge and

practice levels (x^2=6.986, p=0.008), indicating that nurses with good knowledge were more likely to demonstrate adequate practice in post-PCI care. These findings emphasise the importance of strengthening knowledge to improve safe nursing practice. The age groups were categorised as <30 years and ≥30 years and years of experiences as ≤6 years and >6 years to distinguish between early-career and more experienced nurses, consistent with previous nursing workforce research.

Table 1: Summary of the association between sociodemographic, nurses' knowledge and practice levels regarding patient safety post-PCI (N=79)

Variable	Knowledge level		x^2	p-value	Practice level		x^2	p-value
	Good (%)	Poor (%)			Adequate (%)	Inadequate (%)		
Age								
≤ 30 years	36 (63.2%)	21 (36.8%)	1.140	0.286	47 (82.5%)	10 (17.5%)	0.088	0.348
> 30 years	11 (50.0%)	11 (50.0%)			20 (90.9%)	2 (9.1%)		
Years of Experience								
≤ 6 years	29 (59.2%)	20 (40.8%)	0.005	0.943	41 (83.7%)	8 (16.3%)	0.129	0.719
> 6 years	18 (60.0%)	12 (40.0%)			26 (86.7%)	4 (13.3%)		
Gender	-	-	0.066	0.797	-	-	0.022	0.881
Marital Status	-	-	1.195	0.274	-	-	0.552	0.458
Educational Qualification	-	-	0.539	0.463	-	-	1.610	0.204
Ward/Unit	-	-	3.478	0.176	-	-	1.539	0.463
PCI-related Training	-	-	1.896	0.168	-	-	2.266	0.132

DISCUSSION

The absence of a significant association between nurses' knowledge and sociodemographic characteristics such as age, gender, and years of experience indicates that knowledge in post-PCI care is more strongly influenced by institutional and educational factors than by individual attributes. This finding contrasts with a study conducted in Japan, which reported that knowledge tends to increase with experience and educational attainment (8). Similarly, nurses with over five years of experience demonstrated better understanding of post-PCI safety protocols, highlighting the impact of both education and clinical experience (9). The current result suggests that access to structured training, institutional policies, and updated clinical guidelines may play a more decisive role in enhancing knowledge, aligning with evidence from Pakistan that emphasise the effectiveness of systematic educational interventions over experiential learning alone (10). Nurses in coronary care units need scientific and standardized training to enhance their knowledge and skills when managing PCI patients, reinforcing the importance of continuous professional education based on established guidelines (11).

Similarly, no significant association was observed between practice levels and sociodemographic variables, suggesting that clinical performance may be primarily shaped by organisational and environmental determinants such as staffing adequacy, supervision, and adherence to standardised protocols. Despite good knowledge, nurses demonstrated poor practice which indicating that factors beyond demographics such as institutional culture or supervision may plan a crucial role (2). This interpretation is consistent with previous findings highlighting the influence of institutional culture and ongoing professional development on nursing practice (12). The importance of educating patients to recognize early signs of complications, adherence to medications, and lifestyle modifications can reflect how well-informed nurses can contribute to improve patient self-care and safety after PCI (11).

The significant association between knowledge and practice (x^2=6.986, p=0.008) underscores the integral role of knowledge in supporting safe and competent nursing care. Nurses with higher knowledge levels were more likely to demonstrate adequate practice, reaffirming earlier findings that link knowledge with improved clinical competence and patient safety (3).

Implications for Nursing Education

These findings highlight the need for structured and inclusive training for all nurses involved in post-PCI care, as knowledge and practice levels were not significantly influenced by sociodemographic factors such as age or experience (8,10). The significant correlation between knowledge and practice reinforces the importance of evidence-based education to enhance clinical performance and patient safety (3,12). Regular workshops and ongoing learning are essential for improving decision-making and reducing post-procedural complications like bleeding and hematoma (8,13).

Comparison with International Studies

This study highlights the importance of providing structured, ongoing training for all nurses involved in post-PCI care, as knowledge and practice levels were not influenced by age, gender, or years of experience (8,10). The significant link between knowledge and practice suggests that better education leads to safer clinical care (3,12). Continuous learning through workshops and updates is essential to help nurses manage complications like bleeding and haematoma (8,13).

CONCLUSION

This study aimed to assess the level of knowledge and practice among nurses regarding patient safety post- PCI at SASMEC. Out of 79 nurses surveyed, 59.5% demonstrated good knowledge, and 63.3% demonstrated adequate practice regarding patient safety post-PCI. A significant association was found between knowledge and practice levels ($x2$=6.986, p=0.008), indicating that nurses with better knowledge were more likely to demonstrate adequate practice. However, no significant associations were found between knowledge or practice levels and sociodemographic factors such as age, gender, or years of experience.

Post-PCI nursing care is essential in ensuring patient recovery and minimising complications such as bleeding, haematomas, and vascular injuries. This study highlights that while nurses play a central role in patient safety, gaps between their knowledge and actual clinical practice still exist. These inconsistencies may compromise care quality, especially in high-risk cardiac settings. Therefore, recognising the influence of factors such as experience, role clarity, and workflow consistency is crucial. By addressing systemic and clinical practice factors, healthcare institutions can enhance nursing performance, support decision-making, and ultimately improve patient safety in post-PCI care.

CONFLICT OF INTEREST

The author(s) state(s) that there are no conflicts of interest.

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AUTHOR CONTRIBUTIONS

NMJ: Conducted the data collection, performed the data analysis, and prepared the initial manuscript draft.
RR: Developed the research idea, contributed to manuscript revision, and provided critical intellectual input. Both authors reviewed and approved the final version of the manuscript.

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