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Knowledge, Attitudes and Practices Regarding Pressure Injury (PI) Prevention among Nurses in the Intensive Care Unit (ICU) and Medical Ward at Sultan Ahmad Shah Medical Centre @IIUM (SASMEC @IIUM), Kuantan, Pahang, Malaysia

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ABSTRACT

Background: This study investigates the knowledge, attitudes, and practices (KAP) related to pressure injury (PI) prevention among nurses working in the Intensive Care Unit (ICU) and medical ward at SASMEC@IIUM.
Methods: A total of 120 staff nurses (60 from each ward) participated in this cross-sectional study. We used a validated questionnaire that was translated for accessibility. The Cronbach's alpha values for knowledge, attitude, and practice of PI prevention were 0.68, 0.78, and 0.88, respectively. The questionnaire was distributed via WhatsApp, and data were collected using an online Google Form. Statistical analysis was performed using SPSS version 27.
Results: The findings indicate that staff nurses in both the ICU and medical wards exhibited a high level of knowledge and positive attitudes toward PI prevention, with mean scores (standard deviation) of 26.53 (10.35) for knowledge and 45.21 (6.65) for attitude. Furthermore, the participants demonstrated good practices regarding PI prevention, with a mean score (standard deviation) of 25.57 (2.25). The study revealed no significant association between the KAP of PI prevention and the nursing department. However, a significant association was found between gender and the frequency of reading articles, which influenced nurses' attitudes toward PI prevention.
Conclusion: This study highlights considerable knowledge gaps among nurses regarding PI prevention, despite their positive attitudes and commendable practices. These findings emphasize the urgent need for targeted educational initiatives to enhance knowledge, especially in non-critical care settings. Integrating evidence-based guidelines with customized training programs could further improve patient care outcomes.

Keywords: Knowledge; Attitude; Practice; Pressure injury; Prevention; Nurses

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INTRODUCTION

Pressure injury (PI) occurs when the skin and underlying tissue are damaged due to prolonged pressure, often over bony prominences such as the sacrum, heels, elbows, shoulders, and hips. The National Pressure Ulcer Advisory Panel (NPUAP) and the European Pressure Ulcer Advisory Panel (EPUAP) define PI as a localized injury to the skin or underlying tissue (1). The incidence of PI in healthcare settings is concerning, affecting approximately 700,000 patients annually (2). In hospitals, around 2.5 million patients are estimated to be impacted each year, with 3.5% to 4.5% developing PI during their hospital stay (3). Critical care areas, such as intensive care units (ICUs) and critical care units (CCUs), are particularly vulnerable to the development of PI due to factors like the severity of illness, limited mobility, and complex underlying medical conditions. However, research indicates that the average stages of PI among patients in medical wards are higher compared to those in surgical wards (4). A systematic review and meta-analysis involving adult intensive care patients revealed that the incidence of pressure injuries (PIs) in ICU wards ranged from 16.9% to 23.8%, while the incidence in non-ICU patients ranged from 12% to 18% (5). This data suggests that PIs are not limited to critical care settings like the ICU; non-critical settings also require systematic risk assessments and preventive strategies. Neglecting non-critical settings could lead to an increase in preventable PI.

Patients affected by PI are susceptible to various complications, including cellulitis, osteomyelitis, joint infection, and sepsis. They are four times more likely to die than those with the same risk factors but not affected with PI (6). Other than that, patients with pressure injuries can be affected psychologically, emotionally, spiritually, socially, and financially, and these effects have a profound influence on their quality of life (7). The presence of a PI has a significant impact on patients. Therefore, PI prevention strategies are required to minimise the risk of developing pressure injuries.

The incidence and prevalence of PI during hospitalization can reflect the quality of nursing care (8). Several factors, including knowledge, attitudes, and practices, influence the effectiveness of nursing care in preventing PIs (4). A systematic review suggested that nurses must be well-educated and understand their role in PI prevention (9). Despite this, studies have shown a lack of knowledge, negative attitudes, and inconsistencies in practices among them (10). Recent research emphasizes the inadequate levels of knowledge, attitudes, and practices related to PI prevention among nurses in clinical environments, highlighting a significant issue (11,12). Furthermore, research in Malaysia concerning the knowledge, attitudes, and practices of PI prevention, particularly among nurses in non-critical care settings, is limited. This study aims to investigate the knowledge, attitudes, and practices regarding PI prevention among nurses in both critical and non-critical care settings. The findings are expected to provide valuable insights for developing interventions and training programs to improve PI prevention among nurses.

Advances in Knowledge

This study reveals important gaps in nurses' knowledge regarding PI prevention, especially in non-critical care settings like medical wards, where the emphasis on PI prevention may be less pronounced than in intensive care units (ICUs). Nurses generally exhibit positive attitudes and practices, underscoring the crucial role of institutional protocols in maintaining high care standards. The study highlights the need for targeted educational initiatives to close these knowledge gaps and ensure that theoretical understanding aligns with practical implementation. It also identifies sociodemographic factors, such as gender and the use of academic resources, as key elements to consider when developing tailored interventions.

Application to Patient Care

The study emphasizes the importance of combining evidence-based protocols with comprehensive educational initiatives to improve PI prevention practices among nurses. By addressing knowledge gaps through targeted training programs, healthcare institutions can ensure that practices are based on standardized protocols and informed by a strong theoretical understanding. The findings of this study suggest that such educational initiatives can further enhance patient care outcomes. These strategies will help ensure that both ICU and medical ward patients, who are often at a higher risk of developing pressure injuries, receive consistent, high-quality care, ultimately leading to a reduction in the prevalence and burden of pressure injuries.

METHODS

This study utilized a cross-sectional design, and participants were recruited through a convenience sampling method. The sample size for this study was calculated using the Raosoft sample size calculator. Based on a similar study conducted in Selangor (13), the required sample size was determined to be 158 nurses, accounting for a 20% dropout rate. Ultimately, a total of 120 nurses were recruited and provided informed consent to participate in the study. The inclusion criteria specified that participants had to be registered staff nurses working in the Intensive Care Unit (ICU) and medical wards at Sultan Haji Ahmad Shah Medical Centre (SASMEC @IIUM) and must be able to read, write and speak in the Malay language. Nurses on leave during the data collection period were excluded from participation.

A questionnaire consisting of four parts was distributed to all participants. The first part gathered sociodemographic data; the second part assessed participants' knowledge of PI prevention using the Pressure Ulcer Knowledge Assessment Tool (PUKAT 2.0) (14) and the third part evaluated their attitudes towards PI prevention using the Attitude towards Pressure Ulcer Prevention (APuP) (15) questionnaire. The fourth part of the questionnaire evaluated the participants' level of practice regarding PI prevention using the Practices of Student Nurses Towards Prevention and Management of Pressure Ulcers (16.) Additionally, the questionnaires were translated into Malay using a forward-backward translation method. A pilot study with 30 respondents assessed reliability using Cronbach's alpha, which yielded values of 0.68 (knowledge), 0.78 (attitude), and 0.88 (practice), indicating acceptable to very good reliability. Respondents from the pilot study were excluded from the main analysis to prevent bias.

Before collecting data, ethical approvals were obtained from the IIUM Research Ethics Committee (IIUM/504/14/11/2/IREC2024-136) and the SASMEC@IIUM Research Committee (IIUM/413/013/14/11/1/IIR24-39). Participants were briefed on the study's objectives, confidentiality protocols, and the voluntary nature of their involvement, after which written informed consent was obtained. Data collection for the study took place over two months, specifically in May and June 2024.

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 27. Descriptive statistics were used to analyse the sociodemographic data, as well as the knowledge, attitude, and practice levels related to PI prevention. Normality tests were conducted using the Kolmogorov-Smirnov and Shapiro-Wilk tests for knowledge, attitude, and practice scores. All variables demonstrated significant deviations from normality ($p<0.05$). Fisher's exact tests were applied to determine associations between sociodemographic variables and levels of knowledge, attitude, and practice (KAP) regarding PI prevention. Additionally, these tests examined the relationship between knowledge and attitude levels and the level of practice towards PI prevention. The significance level was set at $p<0.05$.

RESULTS

Sociodemographic Data

The study involved a total of 120 voluntary participants, consisting of an equal number of 60 staff nurses from the Intensive Care Unit (ICU) and 60 from the medical ward. The socio-demographic analysis indicated that the majority of participants were female (75%) and held diploma qualifications (96.7%). Regarding their engagement with literature on PI prevention, 60% of participants reported reading occasionally, while 40% indicated that they read regularly as shown in the **Table 1**.

Table 1: Sociodemographic characteristics of the study participants (N=120)

Variable		Frequency (n)	Percentage (%)
Working department	ICU	60	50.0
	Medical Ward	60	50.0
Gender	Female	90	75.0
	Male	30	25.0
Education background	Diploma	116	96.7
	Degree	4	3.3
Reading the article	Sometimes	72	60.0
	Always	48	40.0

Level of Knowledge, Attitude and Practice Towards PI Prevention Among Nurses

The findings regarding the knowledge, attitude, and practice related to PI prevention among staff nurses (N=120) are summarized in **Table 2**. The results revealed that more than half of the participants (59.2%) demonstrated poor knowledge of PI prevention, with a median knowledge score of 22.00 (IQR: 20.00). In terms of attitude, 47.5% of participants showed a poor attitude, while 52.5% had a good attitude, with a median score of 44.00 (IQR: 11.00). Practice levels were overwhelmingly positive, as 99.2% of participants demonstrated good practice, with a median score of 26.00 (IQR: 2.00).

Table 2: Level of knowledge, attitude, and practice of PI prevention among the study participants (N=120)

Variable		Median (IQR)	Frequency (n)	Percentage (%)
Level of knowledge	Total score	22.00 (20.00)		
	Poor		71	59.2
	Good		49	40.8
Level of attitude	Total score	44.00 (11.00)		
	Poor		57	47.5
	Good		63	52.5
Level of practice	Total score	26.00 (2.00)		
	Poor		1	0.8
	Good		119	99.2

Association Between Sociodemographic Factors with The Level of Knowledge, Attitude, and Practice of PI Prevention Among Nurses

The study examined the relationship between sociodemographic factors and nurses' knowledge, attitudes, and practices related to PI prevention, as detailed in **Tables 3, 4 and 5**. The analysis showed a significant association between gender and attitude level (X^2=10.705, p=0.001), as well as between the experience of reading articles on PI prevention and attitude level (X^2 =4.684, p=0.030). However, no significant associations were found between the working department and KAP levels, between gender and knowledge or practice levels, between educational background and KAP levels, or between the experience of reading articles on PI prevention and knowledge or practice levels.

Association Between the Level of Knowledge and Attitude On The Practice of PI Prevention Among Nurses

The analysis shows no significant association between nurses' knowledge levels and their practices regarding PI prevention (p=1.000). This suggests that even with limited knowledge, many nurses still demonstrate effective practices. Additionally, there was no significant association found between the level of attitude and the level of practice (p=0.475). Nurses who held negative attitudes toward PI prevention were still able to maintain good practices as stated in **Table 6**.

Table 3: Association between sociodemographic characteristics and the level of knowledge of PI prevention among the study participants (N=120)

Sociodemographic characteristics		Level of Knowledge			
		Poor Knowledge n (%)	Good Knowledge n (%)	X^2 (df)	p-value
Working department	Medical Ward	35.5 (61.7%)	24.5 (38.3%)	0.310 (1)	0.577
	ICU	35.5 (56.7%)	24.5 (43.3%)		
Gender	Male	21 (70.0)	9 (30.0)	1.943 (1)	0.163
	Female	50 (55.6)	40 (44.4)		
Educational background	Diploma	67 (57.8)	49 (42.2)	2.856 (1)[ø]	0.144
	Degree	4 (100.0)	0 (0.0)		
Reading article	Always	25 (52.1)	23 (47.9)	1.661(1)	0.197
	Sometimes	46 (63.9)	26 (36.1)		

[ø]using Fisher's exact test; **p-value<0.05*

Table 4: Association between sociodemographic characteristics and the level of attitude of PI prevention among the study participants (N=120)

Sociodemographic characteristics		Level of Attitude			
		Poor Attitude n (%)	Good Attitude n (%)	X^2 (df)	*p*-value
Working department	Medical Ward	31 (51.7)	29 (48.3)	0.835 (1)	0.361
	ICU	26 (43.3)	34 (56.7)		
Gender	Male	22 (73.3)	8 (26.7)	10.705 (1)	0.001*
	Female	35 (38.9)	55 (61.1)		
Educational background	Diploma	56 (48.3)	60 (51.7)	0.840 (1)ø	0.621
	Degree	1 (25.0)	3 (75.0)		
Reading article	Always	17 (35.4)	31 (64.6)	4.684 (1)	0.030*
	Sometimes	40 (55.6)	32 (44.4)		

ø using Fisher's exact test; **p-value<0.05*

Table 5: Association between sociodemographic characteristics and the level of practice of PI prevention among the study participants (N=120)

Sociodemographic characteristics		Level of Practice			
		Poor Practice n (%)	Good Practice n (%)	X^2 (df)	*p*-value
Working department	Medical Ward	0.5 (1.7%)	59.5 (98.3%)	1.008 (1)ø	1.00
	ICU	0.5 (0.0%)	59.5% (100.0%)		
Gender	Male	1 (3.3)	29 (96.7)	3.025 (1)ø	0.250
	Female	0 (0.0)	90 (100.0)		
Educational background	Diploma	1 (0.9)	115 (99.1)	0.035 (1)ø	1.000
	Degree	0 (0.0)	4 (100.0)		
Reading article	Always	0 (0.0)	48 (100.0)	0.672 (1)ø	1.000
	Sometimes	1 (1.4)	71 (98.6)		

ø using Fisher's exact test; **p-value<0.05*

Table 6: Association between the level of knowledge, attitude and the level of practice of PI prevention among staff nurse in ICU and medical ward at SASMEC (N=120)

Variables		Practice			
		Poor n (%)	Good n (%)	X^2 (Df)	*p*-value
Knowledge	Poor	1 (1.4)	70 (98.6)	0.696 (1)ø	1.000
	Good	0 (0.0)	49 (100.0)		
Attitude	Poor	1 (1.8)	56 (98.2)	1.115 (1)ø	0.475
	Good	0 (0.0)	63 (100.0)		

ø using Fisher's exact test

DISCUSSION

The present study systematically evaluated the knowledge levels regarding PI prevention among staff nurses in both the Intensive Care Unit (ICU) and medical wards at SASMEC. The findings indicated that a significant majority of the staff nurses, irrespective of their work units, possessed a limited understanding of PI prevention strategies. This observation is consistent with previous research, which demonstrated that most nurses employed in critical care settings within the Klang Valley exhibited an unsatisfactory level of knowledge and attitudes toward PI prevention (17). Conversely, a separate investigation conducted among nurses in Selangor revealed that 95% of participants reported an adequate level of knowledge regarding PI prevention (13). Similarly, a systematic review highlighted a significant gap in knowledge regarding pressure injury (PI) prevention among nurses, which often results in inconsistent practices in clinical settings. The review, which included 21 studies, emphasized the importance of regular educational programs and updates to enhance prevention efforts (18).

Besides, the findings of this study indicated that nearly all staff nurses in the ICU and medical wards exhibited a commendable level of practice, reflecting a high degree of proficiency in preventing PIs. In alignment with these results, a study conducted among nurses in Selangor reported that an impressive 96.8% demonstrated effective practices in PI prevention (13). Furthermore, the majority (94%) of nursing students participating in the study also exhibited strong practices for preventing pressure injuries (19).

The observed discrepancy may reflect differences in institutional training, access to educational resources, or the varying degrees of emphasis on PI prevention practices across different healthcare settings. Additionally, the study's findings suggest that adherence to institutional policies and standardized protocols is essential in guiding nursing practices, even when individual knowledge levels are subpar. This dependency on institutional frameworks highlights the necessity of evidence-based guidelines in promoting consistent and effective care delivery within nursing practice.

The results of this study revealed a significant association between two sociodemographic variables and the levels of knowledge, attitudes, and practices concerning PI prevention among staff nurses in the ICU and medical ward at SASMEC. Notably, female nurses exhibited more favourable attitudes than their male counterparts. This observation is consistent with findings from research conducted in Turkey, which identified gender as a significant factor influencing nurses' attitudes (20). The observed disparity may be attributable to gender-specific experiences, caregiving responsibilities, or differential access to training opportunities. Nonetheless, it is essential to approach these findings with caution due to the demographic distribution within the sample; 75% of the participants were female. Such a skewed representation may limit the generalizability of these results to more balanced gender populations.

The present study investigated the relationship between departmental affiliation and the level of knowledge pertaining to PI prevention. It revealed no statistically significant association between the working department and the knowledge levels regarding PI prevention. In contrast, a separate study conducted among nurses in Selangor identified a significant correlation between various departmental settings and the knowledge levels related to PI prevention, with ICU nurses exhibiting the highest percentage of adequate knowledge in this area (p<0.001) (13). To effectively address the identified knowledge gap, the implementation of targeted educational interventions is warranted. Such initiatives could enhance the quality of nursing practice and bolster nurses' confidence in their decision-making capabilities.

The findings revealed no significant association between knowledge levels and practical application, nor between attitudes and practices concerning PI prevention. This contrasts with the results of a prior study conducted by Tesfa et al., which identified a significant relationship between knowledge and practice in PI prevention among nurses in Gurage Zone Hospitals, South Eutopia (2). Furthermore, research involving nursing students supports these findings, showing a significant correlation between knowledge and practices (p<0.000) (16). These results suggest that the absence of a significant correlation in this context may imply that organizational factors, such as the implementation of consistent protocols and practices, have a more pronounced influence on maintaining practice standards than individual variations in knowledge.

CONCLUSION

The study reveals a significant disparity between nurses' insufficient knowledge and their commendable attitudes and practices regarding PI prevention within the intensive care unit (ICU) and medical wards at SASMEC. Notably, female nurses demonstrated more favorable attitudes compared to their male colleagues. Despite the observed high levels of practice, the absence of a correlation between knowledge and practice suggests a reliance on institutional protocols rather than a robust individual understanding of the subject. These findings underscore the urgent need for targeted educational initiatives designed to enhance nurses' knowledge, thereby ensuring alignment with their attitudes and practices for effective PI prevention. Additionally, the study highlights the importance of knowledge as emphasized in Islamic teachings, specifically in Surah Al-Mujadila (58:11), reinforcing the necessity for continuous learning and its application in healthcare settings.

LIMITATION

The study has some limitations that should be noted. Firstly, the findings indicating significant differences in attitudes by gender should be

interpreted with caution. Although the data suggests gender differences, these may be due to sample bias rather than reflecting true differences in the population. However, the gender imbalance in the sample could represent the real-world nursing workforce, where females typically outnumber males. Additionally, a limitation of the study is the time constraint, which limited the duration of data collection and may have affected the comprehensiveness of the responses.

To address these limitations, future research should focus on enhancing nurses' knowledge and practices regarding PI prevention. This can be accomplished by implementing strategies such as providing accessible resources, offering regular training, integrating prevention education into nursing curricula, and promoting adherence to prevention guidelines in hospitals. Furthermore, future studies should aim for larger and more balanced gender representation to validate the findings of this study.

CONFLICT OF INTEREST

The author(s) has no conflict of interest to declare with regard to this work.

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AUTHOR CONTRIBUTIONS

WNFWNA: drafted the manuscript and contributed to the concept development and design of the article through data collection, analysis, and interpretation.
MFMI: critically revised with intellectual content and the final version of the article.
SZS: critically reviewed and revised the manuscript for important intellectual content.

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