

Scientific Paper Entitled: Nurses' Knowledge, Attitude and Practices Towards Pressure Ulcer Prevention and Management in The Government Health Sector in The Kingdom of Saudi Arabia

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Abstract

Background: Nurses play a crucial role in providing quality care to patients, and their competence significantly impacts patient outcomes. Adequate knowledge and positive attitudes are essential for the early detection, prevention, and management of pressure ulcers.

Objective: This study aimed to assess the knowledge, attitudes, and practices (KAP) of nurses in the prevention and management of pressure ulcers. The study was conducted in the government of health sector in Saudi Arabia on nurses.

Methods: A quantitative, cross-sectional research design was employed to conveniently sample 50 practicing nurses. Data were collected using a self-administered questionnaire. Descriptive statistics and Fisher's exact test were used for data analysis, with statistical significance set at $p < 0.05$.

Results: A total of 50 nurses consented to participate in the study. The findings revealed that the nurses had good levels of knowledge ($n = 35$; 70%), positive attitudes ($n = 39$; 78%), and appropriate practices ($n = 47$; 94%) regarding the prevention and management of pressure ulcers. No statistically significant association was found between demographic variables and the level of knowledge, attitudes, and practices ($p > 0.05$).

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Conclusion: The study concludes that nurses in the government of health sector have adequate knowledge, positive attitudes, and appropriate practices related to the prevention and management of pressure ulcers. This suggests that these nurses are competent in managing pressure ulcers in the clinical setting.

Contribution: The findings of this study contribute to bridging the gap in the implementation of standard operating procedures for the prevention and management of pressure ulcers among nurses in the government of health sector.

Keywords: *knowledge, attitudes, practices, nurses, pressure ulcers.*

Introduction

In training hospitals within the government health sector in Saudi Arabia, nurse managers should prioritize the prevention of pressure ulcers to avoid the development of chronic wounds that are difficult to manage and can lead to complications. The competencies of undergraduate nurses are crucial for ensuring patient safety. This significance has been highlighted by previous studies conducted by Uba et al. (2015) and Kielo-Viljamaa et al. (2021). Thus, Ebi, Hirko, and Mijena (2019) emphasize the importance of providing orientation on the prevention and management of pressure ulcers to nurses from the early stages of their training program. This orientation should equip them with the necessary skills to address existing pressure ulcers when patients are admitted to healthcare facilities.

Internationally, the competencies of nurses have been a concern that has led high-income countries to develop instruments for measuring patient safety, as indicated by Mortensen et al. (2021), in order to mitigate adverse outcomes. However, Uba et al. (2015) and Lotfi et al. (2019) suggest that low- and middle-income countries have made slower progress in this area, with nurses demonstrating moderate to low competence in preventing pressure ulcers, primarily due to limited exposure in clinical practice.

Globally, pressure ulcers continue to be a significant problem, particularly in lower- and middle-income countries where healthcare systems may be inadequate, as highlighted by Mekhoa, Mooi, and Baloyi (2021). Lotfi et al. (2019) and Van Damme et al. (2019) argue that the presence or absence of pressure ulcers serves as an indicator of the quality of nursing care provided by healthcare workers.

Although Saudi Arabia's undergraduate nursing training curriculum emphasizes competencies related to patient safety, the application of this knowledge into practice by inexperienced nurses is challenging due to a lack of evidence-based outcomes. This dearth of evidence prompted the authors to conduct a study in the government health sector in Saudi Arabia, aiming to assess the knowledge, attitudes, and practices of nurses regarding the prevention and management of pressure ulcers.

Insufficient knowledge and skills, along with negative attitudes towards the prevention of pressure ulcers, can contribute to the deterioration of these wounds (Dalvand, Ebadi & Gheshlagh 2018; Fernandes, Lima & Santos 2021). It is important to note that the development of pressure ulcers in a hospital setting can lead to medico-legal issues and potential litigation due to perceived lack of care (Ortega et al. 2020; Fernandes et al. 2021). In high-income countries, there is a focus on hiring competent nurses to ensure quality patient care and maintain a competitive market (Bahrambeygi et al. 2019; Ortega et al. 2020). Conversely, in lower-income countries, there is a noted prevalence of inadequate knowledge regarding pressure ulcers, resulting in incompetence among nurses, particularly in the management of these wounds (Dalvand et al. 2018; Furtado et al. 2021).

Negative attitudes towards pressure ulcers and reluctance to provide care to patients with these wounds, as well as preferences for wound management, can contribute to the

development of pressure ulcers (Sucu & Kilic 2021). It has been suggested by the authors that positive attitudes among nurses can lead to wound improvement and enhance satisfaction in dealing with pressure ulcers. Conversely, Du et al. (2021) and Sucu and Kilic (2021) argue that negative attitudes among nurses who dislike managing pressure wounds may result in complications and prolonged healing for patients. Furthermore, the authors highlight that attitude influence the practice of risk assessment related to pressure ulcers, as they can affect the identification of prevention and treatment possibilities and barriers.

Likewise, the practical application of knowledge in the psychomotor domain is evident when nurses in the government health sector in Saudi Arabia effectively implement high-quality care to prevent the development of pressure ulcers (Moura et al. 2020; Sucu & Kilic 2021). Early detection, prevention, and treatment play a crucial role in the successful management of pressure ulcers (Boyko, Longaker & Yang 2018; Furtado et al. 2021). The effects of pressure ulcers, as highlighted by Bahrambeygi et al. (2019), can lead to delayed rehabilitation, prolonged morbidity, extended hospital stays, and increased healthcare costs due to the need for additional resources and nursing hours. Untreated ulcers may even contribute to disability and mortality.

Internationally, studies conducted by Dalvand et al. (2018) and Bahrambeygi et al. (2019) have indicated that nurses' knowledge regarding the prevention and management of pressure ulcers does not align with practical guidelines, which serve as essential tools for improving knowledge. In the context of the government health sector in Saudi Arabia, there is a lack of documentation regarding the occurrences of pressure ulcers, primarily due to inadequate awareness among healthcare workers. Consequently, data on the knowledge, attitudes, and practices of pressure ulcer prevention and management among undergraduate nurses in public health hospitals are not available.

Prevention of pressure ulcers is achievable through proper assessment, planning, and care (Dalvand et al. 2018; Moura et al. 2020). Accurate classification of pressure ulcers is essential in determining the appropriate interventions and facilitating recovery. It is necessary to develop the curriculum content for nursing education, focusing on essential information and the practical application of knowledge regarding nutrition, assessment, the use of barrier creams, patient positioning, and patient and family education as key interventions for preventing and managing pressure ulcers (Kielo et al. 2020; Furtado et al. 2021). However, the presence of high workload is identified as one of the contributing factors to nurses' inability to reposition patients as needed, thereby increasing the risk of pressure ulcer development (Berihu et al. 2020; Ebi et al. 2019; Reynolds 2008).

Problem statement

At public training hospitals in the government health sector in Saudi Arabia, the presence of limited and outdated guidelines for pressure ulcer prevention is observed. These guidelines are based on old course outlines and reference books used during the clinical practice of nurses in these hospitals. Studies have shown that the teaching of pressure ulcer management and prevention to student nurses from their first year provides them with knowledge on skincare, nutrition, mechanical loading, and the management of existing ulcers (Fernandes et al. 2021; Isa et al. 2019; Lotfi et al. 2019). Further education and training after registration in this domain have been found to enhance nurses' knowledge compared to those who did not undergo in-service training (Du et al. 2021).

The possession of knowledge regarding pressure ulcers by nurses, including students, is aligned with the guidance provided by the Saudi Arabian Nursing Act, which emphasizes the promotion of hygiene, protection of patients' skin, and facilitation of physical comfort to support healing (Saudi Arabian Nursing Council 2014).

However, in the context of the government health sector in Saudi Arabia, there is a lack of evidence-based practice regarding pressure ulcer prevention and management. Limited knowledge exists about the knowledge, attitudes, and practices of nurses in Saudi Arabia

regarding pressure ulcers. To the best of the authors' knowledge, there is no published literature specifically addressing pressure ulcers within the Saudi Arabian context. Given that who provide patient care during their clinical placements, their competence in this area may significantly impact the quality of care delivered to patients. Therefore, this study aimed to assess the knowledge, attitudes, and practices of nurses in the government health sector in Saudi Arabia regarding the prevention and management of pressure ulcers.

Aim of the study

The objective of this study conducted in the government health sector in Saudi Arabia was to examine the knowledge, attitudes, and practices (KAP) of nurses regarding the prevention and management of pressure ulcers.

The specific goals of the study were as follows:

- To determine the level of knowledge, attitudes, and practices exhibited by nurses in relation to the prevention and management of pressure ulcers.
- To describe the knowledge, attitudes, and practices of nurses regarding the prevention and management of pressure ulcers.
- To assess the correlation between demographic characteristics of nurses and their levels of knowledge, attitudes, and practices towards the prevention and management of pressure ulcers.

Study Limitations

- Spatial Limitations: The study will be conducted in Riyadh, Saudi Arabia.
- Temporal Limitations: The study will be conducted in the year 2021.
- Human Limitations: The study will be conducted on a sample of healthcare staff in the government health sector in Riyadh.
- Subjective Limitations: The study is limited to investigate nurses' knowledge, attitude and practices towards pressure ulcer prevention and management in the government health sector in the Kingdom of Saudi Arabia.

Methods

Research design

The study was a quantitative, cross-sectional and analytical study. This was a quantitative design to quantify and describe the knowledge, attitudes and practices towards pressure ulcer management and prevention and cross-sectional as the data were collected at one point in time. It was also an analytical study as it allowed the researchers to test the relationship between independent and dependent variables.

Study setting

This study was conducted in the government health sector in Saudi Arabia.

Population

The participants in this study were registered nurses (RNs) employed in hospitals located in Saudi Arabia. The study included RNs who met the following inclusion criteria: (a) aged between 18 and 60 years, (b) provided informed consent and participated voluntarily, and (c) possessed more than one year of clinical work experience. Exclusion criteria encompassed: (a) RNs receiving medication for mental illness, (b) RNs on leave due to sickness, personal reasons, studying abroad, or other factors, and (c) RNs working in medical technology departments or other functional departments. Questionnaires with incomplete answers, consistent answer options, or excessively short completion times were rejected.

Study sample

The study sample, selected from the study population, comprises a subset of individuals or elements representing the population accurately. The sample is chosen based on scientific criteria, utilizing random or non-random selection methods. The researchers selected a random sample of 50 nurses from the governmental healthcare sector in Riyadh city.

Ethical consideration

This study received ethical approval from the Medical Ethics Committee of government health sector in Riyadh city. Prior to data collection, informed consent was obtained from all participants, ensuring their understanding and agreement to participate. The confidentiality of participants' clinical data and basic information was strictly maintained. All procedures conducted in the study adhered to the principles outlined in the Declaration of Helsinki.

Research instrument

A modified self-reported questionnaire, adapted from relevant studies (Hommel & Santy-Tomlinson 2018; Mitchell 2018; NICE 2014; Tahvonen et al. 2017), was utilized to assess the knowledge, attitudes, and practices of nurses in the government health sector in Saudi Arabia regarding pressure ulcers. The questionnaire was developed and administered in English, which is the official medium of instruction in the university setting.

The questionnaire consisted of four sections. Section A gathered demographic data from the participants. Section B focused on assessing respondents' knowledge about pressure ulcers, with participants selecting one of three options (true, false, or I don't know) to indicate their knowledge level. Section C comprised 11 items rated on a four-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree) to evaluate the attitudes of nurses towards the prevention and management of pressure ulcers. Section D assessed respondents' practices related to the prevention and management of pressure ulcers using a four-point Likert scale (1 = Yes, I do it always, 2 = Yes, sometimes, 3 = No, I don't, 4 = not at all), consisting of 17 items.

To ensure the reliability of the research instrument, Cronbach's alpha coefficients were calculated. The sections of the questionnaire demonstrated acceptable levels of internal consistency: knowledge scale ($\alpha = 0.56$), attitude scale ($\alpha = 0.74$), and practices scale ($\alpha = 0.79$).

A pilot study was conducted with five experienced nurses to refine the questionnaire. The participants from the pilot study were excluded from the main study, and their data were not included in the final data analysis.

Data collection

From January 1 to February 31, 2021, data collection for this study was carried out by a team of four postgraduate students affiliated with the research group. The data collection process involved the following steps:

1. Contacting nursing managers: The investigators reached out to the nursing managers of the two selected hospitals and provided a detailed explanation of the survey's purpose. This communication aimed to obtain permission and support for conducting the study.
2. Determining the total number of RNs: During this stage, the investigators collaborated with the nursing managers to ascertain the total number of registered nurses (RNs) employed in the two selected hospitals.
3. Participant selection: Eligible participants were selected based on the study's predefined inclusion and exclusion criteria. The investigators, with the assistance of head nurses, followed the principles of informed consent and voluntary participation to identify suitable participants.

4. Recruitment of participants: A total of 587 RNs who met the eligibility criteria were selected and recruited for the study. The investigators ensured that the selected participants understood the study's purpose and obtained their informed consent.
5. Questionnaire administration: The investigators used a popular online questionnaire platform called Wen Juan Xing, commonly used in China, to send the questionnaires to the 587 recruited RNs. Clear instructions were provided to the participants, directing them to complete the questionnaires through the online platform.

Quality control

To ensure the quality and validity of the study, several measures were taken before and during data collection. These measures aimed to minimize biases and encourage participation:

Before the actual data collection, a pretest of the questionnaire was conducted on 20 individuals. Necessary modifications were made based on their feedback. These individuals were then excluded from the actual study to avoid any influence on the results.

To reduce selection bias, clear and specific inclusion and exclusion criteria were established for selecting research participants. The criteria were strictly followed during the participant selection process.

The questionnaire was designed to be straightforward and did not involve sensitive or personal questions. This approach aimed to minimize the non-response rate and encourage participants to provide accurate and honest responses.

To control information bias, participants were required to answer all questions before submitting the questionnaire. This ensured that there were no missing responses and reduced the likelihood of incomplete or biased data.

To minimize observational bias, all investigators received comprehensive training on the study's inclusion and exclusion criteria, the content of the questionnaire, and how to administer it. This training aimed to ensure consistent data collection procedures among the investigators.

To address reporting bias, steps were taken to guarantee participant anonymity and data confidentiality. Participants were assured that their responses would remain anonymous, their information would be kept confidential, and the data would only be used for research purposes. It was also emphasized that their questionnaire scores would not impact their career or promotion, as their employers would not have access to individual responses.

By implementing these measures, the study aimed to enhance the reliability and validity of the data collected and minimize potential biases that could affect the study outcomes.

Data analysis

The principal researcher reviewed the questionnaires for completeness and entered the data into Microsoft Excel version 16. Subsequently, the data were transferred to the Statistical Package for the Social Sciences (SPSS) version 27, where descriptive statistics, such as measures of frequency, were conducted by a research methodology lecturer from the School of Nursing.

Individual questionnaire items were assigned scores, and overall scores were calculated. The findings were presented using tables indicating frequencies and percentages. The following criteria were utilized:

- Knowledge levels: An overall score ranging from 20 to 33 indicated poor knowledge, a score between 34 and 46 indicated satisfactory knowledge, and a score between 47 and 60 indicated good levels of knowledge.
- Attitude levels: An overall score ranging from 11 to 27 indicated a poor attitude, while a score between 28 and 44 indicated a good attitude towards the prevention of pressure ulcers.
- Practice levels: An overall score ranging from 0 to 5 indicated poor practices, a score between 6 and 11 indicated satisfactory practices, and a score between 11 and 17 indicated good practices.

To determine the association between demographic variables and levels of knowledge, attitudes, and practices, Fisher's exact test was employed. Statistical significance was considered achieved if a two-sided p-value of less than 0.05 was obtained.

Results

A total of 50 nurses participated in the study, resulting in a sample return rate of 81%. The demographic characteristics of the nurse respondents were analyzed using frequency measures and summarized in Table 1. The association between the demographic data and the knowledge, attitudes, and practices of the nurses was examined using Fisher's exact test, with statistical significance set at $p < 0.05$.

Table 1 reveals that the majority of the nurse respondents were females ($n = 44$; 88%), while males accounted for a smaller proportion ($n = 6$; 12%). A total of ($n = 7$; 14%) of the respondents did not receive any training on pressure ulcers, whereas ($n = 22$; 44%) had received recent training within the past year. Additionally, ($n = 9$; 18%) of the respondents reported not reading books on pressure ulcers.

In Table 2, the frequencies of knowledge on pressure ulcers are presented. Around ($n = 36$; 72%) of the nurses correctly identified that pressure ulcers can be predisposed by dry or flaky skin. However, ($n = 15$; 30%) of the respondents were unaware that smoking increases the susceptibility to pressure ulcers and hinders the wound healing process. Furthermore, the majority of respondents ($n = 34$; 68%) were unfamiliar with the assessment tools used to identify the risk of developing pressure ulcers.

Table 3 illustrates that ($n = 33$; 66%) of the nurses agreed that pressure ulcers can lead to patient mortality. In terms of daily hygiene practices, only ($n = 4$; 8%) strongly agreed that activities like bathing can help prevent ulcers, while ($n = 10$; 20%) disagreed. Furthermore, ($n = 26$; 52%) of the respondents agreed that massaging bony prominences to enhance blood circulation can prevent pressure ulcers, whereas ($n = 4$; 8%) strongly disagreed with this statement. Regarding the cost of treatment, only ($n = 10$; 20%) of the respondents strongly agreed that it is expensive to treat pressure ulcers, while ($n = 12$; 24%) strongly disagreed.

Table 4 presents the practices of the nurses in relation to pressure ulcer management. Approximately ($n = 29$; 58%) of the respondents reported conducting systematic skin inspections at least once a day and documenting the results. However, only ($n = 3$; 6%) did not practice daily systematic skin inspections. Additionally, ($n = 11$; 22%) of the respondents changed their patients' positions at 15-minute intervals, while ($n = 19$; 38%) only changed positions occasionally. Thirteen nurses (26%) did not adhere to this recommended routine. Out of all the participants, ($n = 41$; 82%) stated that they provide information on pressure ulcer prevention methods to both patients and their caregivers, while only ($n = 2$; 4%) reported not providing such information.

In Table 5, descriptive summaries of the knowledge, attitude, and practice scores of the nurses are presented. The results indicate that a majority of the nurses had good knowledge ($n = 35$; 70%), a good attitude ($n = 39$; 78%), and good practices ($n = 47$; 94%) towards pressure ulcer management and prevention. However, the Fisher's exact test did not reveal

any statistically significant association between the nurses' demographic information and their overall knowledge, attitude, and practice scores ($p > 0.05$).

TABLE 1

Demographic characteristics of respondents (n = 50).

Demographic characteristic	Frequency (n)	Percentage (%)
Total	50	100.0
Age groups		
21–30	47	94.0
31–40	3	6.0
Gender		
Male	6	12.0
Female	44	88.0
Marital status		
Single	44	88.0
Married	5	10.0
Other	1	2.0
Length of time allocated in the ward		
< a week	1	2.0
1–2 weeks	17	34.0
3–4 weeks	6	12.0
≤ 2 months	2	4.0
3–12 months	24	48.0
Last time you listened to a lecture on pressure ulcer		
≤ 1 year	22	44.0
> 1 year but < 2 years	14	28.0
2–3 years ago	7	14.0
Never	7	14.0
Last time you read an article or book on pressure ulcers		
≤ 1 year	17	34.0
> 1 year but < 2 years	14	28.0
2–3 years ago	10	20.0
Never	9	18.0

Table 2

Frequencies on the knowledge of pressure ulcers (n = 50).

Knowledge characteristic	True	False	Don't know
Pressure ulcers are sterile wounds			
Frequency (n)	6	41	3
Percentage (%)	12.0	82.0	6.0
Dragging the patient up in bed increases friction			
Frequency (n)	46	2	2
Percentage (%)	92.0	4.0	4.0
Overweight patients present more handling difficulties and shearing force, and friction can be particularly problematic when moving such patients			
Frequency (n)	46	-	4
Percentage (%)	92.0	-	8.0
Obese patients have reduced tissue oxygenation and collagen production which in turn will slow healing of the existing pressure ulcer			
Frequency (n)	37	2	11
Percentage (%)	74.0	4.0	22.0
Many underlying conditions or disease can cause immobility, loss of sensation, excessive perspiration, muscle spasms and incontinence predisposing patients to develop pressure ulcers			
Frequency (n)	43	2	5
Percentage (%)	86.0	4.0	10.0
Research has also linked dry flaky or scaling skin to an increased incident of pressure ulcers			
Frequency (n)	36	3	11
Percentage (%)	72.0	6.00	22.0
Research has reported that being male increases the risk of developing a pressure ulcer by 86%			
Frequency (n)	2	19	29
Percentage (%)	4.0	38.0	58.0
Smoking can also contribute to the risk of pressure ulcers development; therefore, it can also have a negative influence on the healing of existing pressure ulcer			
Frequency (n)	27	8	15
Percentage (%)	54.0	16.0	30.0
Any pressure point is a vulnerable area when pressure is intense and prolonged			

Knowledge characteristic	True	False	Don't know
Frequency (n)	45	2	3
Percentage (%)	90.0	4.0	6.0
At risk pressure point in the sitting position is heels and toes, ischial tuberosity, sacrum, scapular and occiput			
Frequency (n)	42	5	3
Percentage (%)	84.0	10.0	6.0
Pressure ulcers are caused by unrelieved pressure shear, friction			
Frequency (n)	49	1	-
Percentage (%)	98.0	2.0	-
Although pressure ulcers can occur at any age, there is a correlation between ageing process and the incident of pressure ulcer			
Frequency (n)	42	1	7
Percentage (%)	84.0	2.0	14.0
Many conditions such as stroke, spinal cord trauma, head injury, over sedation, depression and confusion contribute to immobility. It predisposes to shearing and friction and is associated with development of larger ulcers			
Frequency (n)	43	3	4
Percentage (%)	86.0	6.0	8.0
Some drugs that cause diarrhea or urinary incontinence can add to the risk of pressure ulcer development			
Frequency (n)	17	10	23
Percentage (%)	34.0	20.0	46.0
It has been suggested that faecal incontinence may be a more important risk factor than urinary incontinence			
Frequency (n)	8	12	30
Percentage (%)	16.0	24.0	60.0
Over 2 million people develop pressure ulcers a year worldwide			
Frequency (n)	12	2	36
Percentage (%)	24.0	4.0	72.0
An essential aspect of pressure ulcer prevention is identification of those at risk			
Frequency (n)	46	1	3
Percentage (%)	92.0	2.0	6.0

Knowledge characteristic	True	False	Don't know
A pressure ulcer assessment scale attempts to identify the presence of extrinsic and intrinsic actors that cause pressure ulcers			
Frequency (n)	33	6	11
Percentage (%)	66.0	12.0	22.0
Bed or chair bound individuals or those whose ability is impaired should be considered at risk for pressure ulcer development			
Frequency (n)	39	6	5
Percentage (%)	78.0	12.0	10.0
The Norton, Waterlow and Brandon scale are all risk assessment tools			
Frequency (n)	11	5	34
Percentage (%)	22.0	10.0	68.0

Table 3

Frequencies on the attitudes to pressure ulcers (n = 50).

Attitude characteristic	Strongly disagree	Disagree	Agree	Strongly agree
Do you believe a pressure ulcer can lead to death?				
Frequency (n)	5	9	33	3
Percentage (%)	10.0	18.0	66.0	6.0
Obese patients are rarely malnourished and therefore at lower risk of developing pressure ulcers.				
Frequency (n)	16	24	10	-
Percentage (%)	32.0	48.0	20.0	-
Do you believe a daily bath or sponge bath will prevent pressure ulcers?				
Frequency (n)	3	10	33	4
Percentage (%)	6.0	20.0	66.0	8.0
Do you believe friction and shear may occur when sliding the person up in bed?				
Frequency (n)	3	7	27	13
Percentage (%)	6.0	14.0	54.0	26.0
Do you believe a blister on a patient heel is not of concern?				
Frequency (n)	20	24	5	1
Percentage (%)	40.0	48.0	10.0	2.0

Attitude characteristic	Strongly disagree	Disagree	Agree	Strongly agree
Erythema or redness on any patient that is not blanchable should be documented and reported.				
Frequency (n)	5	3	24	18
Percentage (%)	10.0	6.0	48.0	36.0
Bony prominences should not have direct contact with one another.				
Frequency (n)	3	5	25	17
Percentage (%)	6.0	10.0	50.0	34.0
Massaging a bony prominence promotes circulation and prevent pressure ulcers.				
Frequency (n)	4	6	26	14
Percentage (%)	8.0	12.0	52.0	28.0
Do you believe patients who are immobile, orthopedic, decreased mental status, unconscious are at elevated risk of developing pressure ulcers?				
Frequency (n)	3	4	21	22
Percentage (%)	6.0	8.0	42.0	44.0
Pressure ulcers are a painful condition among people who are elderly or physically impaired.				
Frequency (n)	3	9	21	17
Percentage (%)	6.0	18.0	42.0	34.0
Do you believe pressure ulcers are very costly to treat?				
Frequency (n)	12	14	14	10
Percentage (%)	24.0	28.0	28.0	20.0

Table 4

Frequencies on the practices on pressure ulcer prevention (n = 50).

Practices characteristic	Yes, I do it always	Yes sometimes	No, I don't	Not at all
All individuals at risk should have a systematic skin inspection at least once a day, paying particular attention to the bony prominences and the results of the skin inspection should be documented				
Frequency (n)	29	18	3	-
Percentage (%)	58.0	36.0	6.0	-

Individuals in bed who are completely immobile should have a care plan that includes the use of devices that totally relieve pressure on the heel, most commonly by raising the heels off the bed. Do not use doughnut-type devices

Practices characteristic	Yes, I do it always	Yes sometimes	No, don't	I Not at all
Frequency (n)	28	17	5	-
Percentage (%)	56.0	34.0	10.0	-
Do you use linen savers, under pads, briefs that can absorb moisture and which can present a quick drying surface to protect the skin against moisture				
Frequency (n)	31	16	2	1
Percentage (%)	62.0	32.0	4.0	2.0
The frequency of reassessment depends on patient status and institutional policy				
Frequency (n)	20	16	8	6
Percentage (%)	40.0	32.0	16.0	12.0
For bed bounded individuals, use devices that totally relieve pressure on the heels				
Frequency (n)	27	14	6	3
Percentage (%)	54.0	28.0	12.0	6.0
If the pressure ulcer is infected, obtain a sample of the drainage for culture and sensitivity to antiseptic agents				
Frequency (n)	25	19	5	1
Percentage (%)	50.0	38.0	10.0	2.0
For patients at risk, the nurse must avoid massage over bony prominences as current evidence suggests that this may be harmful.				
Frequency (n)	10	19	12	9
Percentage (%)	20.0	38.0	24.0	18.0
For bed bound individuals, place at risk patients on a pressure reducing mattress. Do not use doughnut-type devices				
Frequency (n)	19	14	14	3
Percentage (%)	38.0	28.0	28.0	6.0
For chair bound individuals, patients must have an individualized bathing schedule, avoid hot water, use a mild cleaning agent				
Frequency (n)	22	17	10	1
Percentage (%)	44.0	34.0	20.0	2.0
Repositioning must be done at least every 15 min				
Frequency (n)	11	19	7	13
Percentage (%)	22.0	38.0	14.0	26.0
Do you inspect pressure areas for abrasions and excoriations				

Variables	Overall KAP levels													
	Knowledge				Attitude				Practices					
	Poor		Satisfactor y		Good		Poor		Good		Poor		Good	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
21–30	0	0	14	29.8	33	70.2	10	21.3	37	78.7	3	6.4	44	93.6
31–40	0	0	1	33.3	2	66.7	1	33.3	2	66.7	0	0	3	100
P	1.000				0.534				1.000					
Gender														
Male	0	0	0	0	6	100	0	0	6	100	0	0	6	100
Female	0	0	15	34.1	29	65.9	11	25	33	75	3	6.8	41	93.2
P	0.160				0.317				1.000					
Marital status														
Single	0	0	13	29.5	31	70.5	9	20.5	35	79.5	3	6.8	41	93.2
Married	0	0	1	20	4	80	1	20	4	80	0	0	5	100
Other	0	0	1	100	0	0	1	100	0	0	0	0	1	100
P	0.276				0.164				0.804					
Length allocated in the ward														
1–2 weeks	0	0	7	38.9	11	61.1	4	22.2	14	77.8	2	11.1	16	88.9
3–4 weeks	0	0	3	50	3	50	0	0	6	100	1	16.7	5	83.3
≤ 2 months	0	0	0	0	2	100	0	0	2	100	0	0	2	100
3–12 months	0	0	5	20.8	19	79.2	7	29.2	17	70.8	0	0	24	100
P	0.303				0.395				0.295					
Last time you listened to a lecture on pressure ulcer														
≤ 1 year	0	0	3	13.65	19	86.4	3	16.6	19	86.4	2	9.1	20	90.9
> 1 year but < 2 years	0	0	6	42.9	8	57.1	6	42.9	8	57.1	1	7.1	13	92.9
2–3 years ago	0	0	3	42.9	4	57.1	1	14.3	6	85.7	0	0	7	100
Never	0	0	3	42.9	4	57.1	1	14.3	6	65.7	0	0	7	100
P	0.171				0.177				0.729					
Last time you read an article on pressure ulcers														
≤ 1 year	0	0	4	23.5	13	76.5	4	23.5	13	76.5	1	5.9	16	94.1
> 1 year but < 2 years	0	0	2	14.3	12	85.7	4	28.6	10	71.4	0	0	14	100
2–3 years ago	0	0	5	50	5	50	2	20	8	80	2	20	8	80
Never	0	0	4	44.4	5	55.6	1	11.1	8	88.9	0	0	9	100
P	0.188				0.796				0.176					

Discussion

The study conducted in the government health sector in Saudi Arabia aimed to assess the knowledge, attitudes, and practices of nurses regarding the prevention and management of pressure ulcers. The results of the study showed that the majority of the nurse respondents were female, which is consistent with the gender distribution observed in the nursing

profession (Stanley et al., 2016). Additionally, the majority of the respondents were young, indicating that they were relatively new to the nursing profession.

In terms of knowledge, the findings revealed that a significant proportion of the nurses had good knowledge about the causes and prevention of pressure ulcers. This contrasts with previous studies that reported low levels of knowledge among nurses (Murugiah et al., 2020; Isa, Azman, & Mat, 2019). However, there was still a portion of respondents who demonstrated only satisfactory knowledge, which is a concern as it may put patients at risk. Lack of knowledge has been associated with increased ulcer development and incompetence in managing pressure ulcers among nurses (Dalvand et al., 2018; Furtado et al., 2020).

Interestingly, respondents in the age category of 31-40 years, who may have had prior nursing experience, demonstrated a higher level of knowledge about pressure ulcers. This suggests that higher educational levels or previous training on pressure ulcers may contribute to increased knowledge (De Meyer et al., 2019).

Regarding attitudes, the findings indicated that the majority of the nurse respondents had a positive attitude towards the prevention and management of pressure ulcers. This aligns with previous studies that reported high positive attitudes among nurses (Uba et al., 2015; Isa et al., 2019). The positive attitudes may be attributed to the training provided during simulation training and the nurturing of appropriate attitudes throughout their studies (Simonetti et al., 2015; Mukumbang & Adejumo, 2014).

Although there were no statistically significant associations between positive attitudes and the timing of lectures or reading materials on pressure ulcers, it is essential to note that good knowledge and positive attitudes are crucial for the implementation of effective practices in the prevention and management of pressure ulcers.

Regarding practices, the findings revealed that the majority of nurses (94%) demonstrated good practice in preventing pressure ulcers. Good practice is influenced by having a solid foundation of knowledge and positive attitudes towards pressure ulcer prevention and management, as discussed in previous sections.

These findings are in line with a study by Sham et al. (2020), which also reported a high percentage (96.8%) of nurses demonstrating good practice in pressure ulcer prevention and management. However, the findings differ from a study conducted in Guntur, which reported that only slightly over half (51.1%) of the respondents had satisfactory practices, with the remaining having unsatisfactory practices.

Despite the overall positive practice outcomes, there is a cause for concern. The study found that only a small percentage (22%) of respondents practiced changing their patients' positions at 15-minute intervals, as recommended. A significant portion (38%) only changed positions occasionally, while another portion (26%) did not follow this routine recommendation at all. This indicates that even though nurses have good knowledge, there is still a risk of patients developing pressure ulcers if proper position-changing practices are not implemented.

The study also examined the relationship between demographic factors and respondents' practices. However, no statistical significance was found between the timing of lectures on pressure ulcers or reading relevant materials and the level of practice among the nurses.

Conclusion

In conclusion, the findings of the study conducted on nurses in the government health sector in Saudi Arabia indicate that overall, nurses have good knowledge, positive attitudes, and practices related to the prevention and management of pressure ulcers. However, there are specific areas of concern that need to be addressed.

One concerning finding is that a significant proportion (30%) of the respondents lacked knowledge about the association between smoking and the development of pressure ulcers, as well as its impact on wound healing. This knowledge gap is important to address, as it can have implications for patient care and outcomes.

Additionally, the study revealed that the majority (78%) of the respondents lacked knowledge about the various tools used to assess and identify patients at risk of developing pressure ulcers. This lack of knowledge can hinder the early identification and prevention of pressure ulcers, which is crucial for patient safety and well-being.

Based on these implications, the study concludes that while nurses demonstrate good overall knowledge, there are specific areas that require reinforcement in their curricula. The authors recommend incorporating focused education on risk factors and assessment tools for pressure ulcer development and management, particularly during the final year of nursing studies. By addressing these knowledge gaps, nurses will be better equipped to competently manage pressure ulcers in the clinical setting.

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