



Assessment of nurses' knowledge and practice in skin traction care for orthopedic trauma patients with fractures and associated factors in a developing country

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ABSTRACT

Objective: Nurses play a crucial role in maintaining and improving patient health. Their knowledge and practice in managing complex interventions such as skin traction, especially in trauma and elderly patients, are essential to prevent complications and accelerate patient recovery. This study aimed to determine the knowledge and practice of nurses in skin traction care for orthopedic trauma patients with fractures and associated factors.

Methods: This descriptive-correlational study was conducted using a convenience sampling method among 220 nurses working in the emergency and surgical departments of hospitals affiliated with XX University of Medical Sciences in 2023. A three-part valid and reliable tool was used to collect data on demographic characteristics, knowledge, and practice of nurses in caring for patients with skin traction. The collected data were analyzed using SPSS version 23 and descriptive and inferential statistical tests.

Results: Data analysis showed that most of the participating nurses were female, married, and held a bachelor's degree. Most nurses (65.5 %) had a moderate or higher level of knowledge about skin traction care. Regarding nurses' practice in skin traction care, the results showed that the majority of nurses (86.4 %) had a satisfactory practice level. There was a significant correlation between nurses' knowledge and practice in skin traction care ($r = 0.244$, $p = .011$). Moreover, nurses' knowledge was significantly correlated with their educational level ($P = .014$), and nurses' practice in skin traction care were significantly correlated with their work experience ($P = .017$) and gender ($P = .040$).

Conclusion: The results of the study showed that although the level of knowledge and practice of most nurses in caring for patients with skin traction was moderate or above, there is a need to strengthen specialized training in some dimensions of knowledge and practice, especially regarding awareness of the complications of using skin traction.

1. Introduction

Among health-care providers, nurses spend the most time with patients¹ and are responsible for maintaining and improving their health.² With their specialized knowledge, high clinical skills, and decision-making abilities,³ they are able to provide comprehensive and targeted care to patients, which can reduce complications and consequently promote health.⁴ One of the important areas of nursing care is caring for patients who are undergoing traction treatment due to fractures.⁵

Unlike developed countries, traumatic injuries are the second leading cause of mortality in developing countries such as Iran⁶ and the most

common cause of limb fractures, creating significant challenges for survivors and their families.⁷ According to studies conducted in Iran, accidents are the most common cause of limb fractures (39.6 %), especially among young people, while in individuals over 65 years old, falls (30.2 %) are the most common cause of limb fractures.^{8, 9} Therefore, fractures are more common among the elderly and those involved in accidents,¹⁰ and it is predicted that by 2050, the annual number of hip fractures among the elderly worldwide will nearly double.¹¹

Patients with limb fractures often experience severe pain and swelling at the injury site due to the disruption of bone integrity, which may lead to further complications and risks if not promptly and effectively managed.⁵ Although surgery is the standard treatment for limb

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fractures,¹² in some cases, such as the unavailability of an operating room, the patient's condition, or the need to stabilize the patient, surgery may be delayed.¹³ In such cases, traction is used as a temporary measure before surgery.¹⁴ Although the use of traction, especially in developed countries like the United States, has declined,¹⁵ its use remains more prevalent in developing countries.^{13, 16} While precise statistics on the use of skin traction in Iran are not available,¹⁶ given the high prevalence of traumatic injuries and related fractures, it appears that this method remains common for limb fractures in Iran.^{6, 7, 16}

Traction, as a non-surgical treatment method,¹⁷ uses pulling force to immobilize fractures, relieve muscle spasms, and alleviate pain,¹⁵ and can be vital for patients.¹⁸ Among these, skin traction, which is used for a shorter period before orthopedic surgery, reduces muscle spasms and has fewer complications.¹⁹ Given the importance of this intervention in improving patient outcomes, specialized care for these patients is essential, and the success of their treatment depends on the nurses' skills in managing skin traction and its potential complications.²⁰

Nurses play a crucial role in preventing injury, reducing complications of immobility caused by orthopedic devices such as skin traction, and promoting patient rehabilitation.²¹ In other words, they must possess a high level of competence to provide standard care to patients with skin traction.²² However, research has shown that nurses' knowledge and practice in caring for patients with traction fall short of desired standards. For example, according to a study by Mohammad et al., nurses' knowledge about traction, related care, and its complications was insufficient, and the majority of nurses demonstrated poor performance in post-traction care.²² Similarly, Wahba et al. found that more than half of the nurses lacked adequate skills in caring for patients with traction.²³

Providing high-quality patient care, based on Benner's theory (from Novice to Expert) requires the acquisition of competency and skill in nurses.²⁴ According to this theory, which can serve as a framework for evaluating skills, nurses progress over time and with experience from the novice stage (requiring precise instructions) to the expert stage (capable of complex decision-making and evidence-based care).²⁵ They will be able to apply acquired knowledge in real- clinical situations.²⁶

Therefore, maintaining and enhancing nursing performance, which includes both direct and indirect nursing care, particularly for patients with specific conditions, directly impacts their recovery.²⁷ Studies have shown that nurses performance and awareness can be influenced by various factors,²⁸ including work environment²⁷ or individual characteristics.²⁹ For example, nursing performance improves with age and experience, and nurses with more experience tend to make better care decisions for patients.³⁰

As mentioned, despite the importance of proper nursing interventions for these patients, inadequate care of skin traction can lead to complications such as pressure ulcers.³¹ According to a study by Birch et al., the average rate of complications in patients with skin traction is 11 %.³² All these complications can be reduced by increasing nurses' knowledge and practice in caring for patients with skin traction.³³ In other words, if nurses have sufficient competence and their knowledge and practice are evidence-based and aligned with care standards, patient recovery can be achieved.³⁴

Given the importance of effective care for patients with skin traction and the critical role of nurses in emergency and surgical departments in managing these patients, as well as the lack of comprehensive studies in this area, there is a need for further research to comprehensively examine the knowledge and practice of nurses working in these departments regarding the care of patients with skin traction. Additionally, despite the association between individual characteristics and nurses' awareness and performance, no study has been conducted on the relationship between demographic variables and the knowledge and practice of nurses in these departments regarding the care of patients with skin traction. Therefore, based on Patricia Benner's theory, this study aimed to determine the knowledge and practice of nurses in skin traction care for orthopedic trauma patients with fractures and associated

factors.

2. Methods

This descriptive correlational study was conducted in northwestern of XX, in the hospitals of XX University of Medical Sciences in 2023. The study population comprised all nurses working in the surgical and emergency departments of these hospitals. After obtaining a research permit from the Vice Chancellor for Research and ethical approval from the research ethics committee, the researcher proceeded to the research setting. Given the inaccessibility of the entire study population due to factors such as leave or unwillingness to participate, a convenience sampling method was employed.

To determine the sample size, Cochran's sample size formula was used, resulting in the determination of 220 nurses. The inclusion criteria were informed consent to participate in the study, having at least a bachelor's degree, and having at least six months of work experience in the relevant departments. After determining the sample size, the researcher visited the targeted hospital departments of XX University of Medical Sciences during different days of the week and various shifts (morning, afternoon, and night). Upon visiting the research environment in various work shifts, the purpose of the study, the method of work, and how to fill out the questionnaire were explained to the nurses of the respective shift. Those who consented and met the inclusion criteria were included in the study after providing informed consent. The questionnaires were completed individually at the workplace. For assessing knowledge, nurses completed the questionnaires, and for assessing practice, the researcher completed the questionnaires through indirect observation, using unique codes for each participant. Completion of each knowledge and practice questionnaire took approximately 15–30 min during the various shifts. In some research samples, due to time constraints, the nurse's knowledge questionnaire was completed online. In this case, an online access link to the electronic questionnaire was sent to the nurse's mobile phone via one of the messaging applications and then completed by the nurse during the same work shift. Sampling from nurses in the surgical and emergency departments continued across various work shifts until reaching the desired sample size over five months.

This study was designed based on the SQUIRE guidelines for quality improvement studies in healthcare.

The data collection tool in this research was a three-part questionnaire: The first part included demographic questions such as age, gender, marital status, education level, workplace department, work experience, and participation in related training courses and workshops. The second part was a tool for assessing nurses' knowledge about caring for patients with skin traction, which included 17 questions in 4 sections: general knowledge about traction (3 questions), knowledge about skin traction (3 questions), knowledge about caring for patients with skin traction (8 questions), and knowledge about complications of skin traction (3 questions).³⁵

The scoring method was based on the proportion of correct answers, and a higher score indicated greater knowledge about caring for patients with skin traction. Thus, the overall knowledge of nurses and each section regarding traction was evaluated. Overall, a score of 75 % or higher indicated good knowledge, 50 % to 74 % indicated average knowledge, and less than 50 % indicated poor knowledge about skin traction.³⁶ The psychometric properties of this tool had previously been confirmed, with a Cronbach's alpha coefficient of 0.87.³⁵

The third part, an observational checklist assessing nurses' practice in caring for patients with skin traction, comprised 65 questions divided into four sections: nursing interventions before skin traction application (11 questions), nursing interventions during skin traction application (27 questions), nursing interventions after skin traction application (19 questions), and follow-up of patients under skin traction (8 questions).^{22, 37} All questions in this tool had three options and were scored using the Likert scale. The total score was then calculated, ranging from

0 to 130. In this tool, the ratio of correct answers was also estimated. A higher score indicates a higher level of practice. Generally, nurses' practice in caring for patients with skin traction were categorized into three levels: good, average, and poor. If the practice score was above 75 % (98–130), it indicated good practice; a practice score between 50–74 % (65–97) indicated average practice; and a practice score below 50 % (0–64) indicated poor practice.³⁸ The Cronbach's alpha coefficient for this tool had previously been assessed and confirmed at 0.74.³⁵

To assess the validity and reliability of these tools, considering they had not been psychometrically evaluated in XX, the tools were initially translated. To ensure proper translation, they were retranslated into Persian by a specialist. After the translator confirmed the translation, it was accepted. Subsequently, the tools were provided to 10 expert faculty members in this field for thorough review to ensure there were no semantic discrepancies. Then, the content and face validity indices, as well as internal consistency reliability, were examined. For determining face validity, the tools were given to specialists to provide their opinions and suggestions regarding the appearance of the questions. For ensuring content validity in both tools, the content validity index was used to assess the relevance of the questions separately. The obtained validity index for the relevance of the questions was 0.73 for the nurses' knowledge tool and 0.78 for the nurses' practice tool. Additionally, the internal consistency reliability of the nurses' knowledge and practice tools was assessed using the Cronbach's alpha coefficient, which was 0.72 for the nurses' knowledge tool and 0.75 for the nurses' practice tool, both of which were confirmed.

Obtaining ethical approval from the Research Ethics Committee of XX University of Medical Sciences, obtaining an introduction letter from the Deputy of Research and Technology of XX University of Medical Sciences, visiting the research environment, explaining the study's purpose, obtaining informed consent from participating nurses, participation upon willingness, and assuring participants that collected data would remain confidential were among the ethical considerations addressed in this research.

In this study, data were analyzed using SPSS software version 23. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to describe the data. Given that the data distribution was normal based on the Kolmogorov-Smirnov statistical test, Pearson correlation, independent *t*-test, and one-way ANOVA were used to evaluate the relationships between variables. In all the statistical tests used, $p < .05$ was significant.

3. Result

A total of 220 nurses from emergency and surgical departments participated in this study. The mean age of participants was 35.45 ± 8.62 years, ranging from 21 to 55 years. Approximately half of the nurses were female (50.9 %) and married (65.5 %). In terms of education, 72.7 % of participants reported having a bachelor's degree. Most participating nurses were from the emergency department, and 32.8 % were from the surgical departments. The employment status of the participating nurses varied, with most (60.9 %) being university employees. Over half of the participants (55 %) had less than 10 years of work experience. Overall, the majority of participants had not attended training courses related to the care of patients with skin traction (81.8 %) (Table 1).

Regarding nurses' knowledge about caring for patients with skin traction, Table 2 shows that most nurses (91.8 %) scored poorly in the general information section about traction, providing incorrect answers regarding the reasons for using traction, the duration of traction use, and the weights used in traction. In the section on knowledge of caring for patients with skin traction, most nurses (85.4 %) obtained moderate to good scores. For example, most nurses correctly answered questions about the frequency of assessing the neurovascular status (79.1 %) and the reason for doing so (69.1 %), the patient's position in bed (87.3 %), how to change patient position in bed (85.5 %), the timing of removing

Table 1

Demographic Characteristics of nurses working in surgical and emergency departments.

Variable		Frequency (Percentage)
Gender	Female	112 (50.9 %)
	Male	108 (49.1 %)
Marital Status	Married	144 (65.5 %)
	Single	76 (34.5 %)
Education	Bachelor's	160 (72.7 %)
	Master's and above	60 (27.3 %)
Working Department	Emergency	148 (67.2 %)
	Surgery	72 (32.8 %)
Employment Status	Contract	24 (10.9 %)
	Project-based	46 (20.9 %)
	Fixed-term	16 (7.3 %)
	Permanent	134 (60.9 %)
Work Experience (years)	< 5	53 (24 %)
	5–10	68 (31 %)
	10–15	40 (18 %)
	15–20	33 (15 %)
	20–25	11 (5 %)
	25–30	15 (7 %)
Participation in Related Training Workshops	Yes	40 (18.2 %)
	No	180 (81.8 %)

skin traction weights (79.1 %), and the timing of getting out of bed (55.5 %). However, some knowledge gaps were identified. Although a small percentage of nurses (9.1 %) scored poorly in the section on complications of skin traction, most nurses (92.7 %) were unaware of the long-term complications of using skin traction.

Overall, the results showed that out of the 220 participating nurses, 144 (65.5 %) had a moderate to good score (50 % and above) in the nursing care knowledge section, while 76 nurses (34.5 %) had a low and poor score (less than 50 %) in skin traction care knowledge.

Regarding nurses' practice in caring for patients with skin traction, the results showed that out of the sample, 190 nurses (86.4 %) had a high practice score, 24 nurses (10.9 %) had a moderate practice score, and 6 nurses (2.7 %) had a poor practice score (Table 3).

One of the most significant findings regarding nurses' performance before applying skin traction was that over 90 % of participating nurses performed actions such as taking a history, assessing skin, neurological and vascular status, pain intensity, and explaining the procedure to the patient. For example, 91.8 % of nurses took a history from patients before applying skin traction, checked skin integrity, and explained the purpose of skin traction to patients. 93.6 % of nurses assessed the neurological and vascular status of the affected area before performing the procedure, and 92.7 % of them assessed pain and its severity in patients before performing the procedure. Another notable strength in the research results, regarding nurses' performance during the application of skin traction, was patient identification, which was performed by almost all nurses (96.4 %), ensuring that the intervention and procedure were performed correctly for the patient.

However, there were some instances where procedures were not performed by approximately half of the nurses after applying skin traction. For example, 34 % of nurses did not assess the position of patients with skin traction every 4 h, which is necessary to prevent complications.

Furthermore, based on the results of the Pearson correlation test, there was a significant positive correlation ($r = 0.244, p = .011$) between nurses' knowledge and practice in caring for patients with skin traction, indicating that higher knowledge was associated with better performance in caring for patients with skin traction.

Based on the results of the independent *t*-test shown in Table 4, among the demographic variables, the score of nursing care knowledge differed significantly only in the variable of nurses' education level ($P = .014$), meaning that the mean knowledge score was higher in nurses

Table 2

Frequency distribution, mean, and standard deviation of nurses' knowledge regarding skin traction care.

Variable	Frequency of individuals with a good knowledge score (%)	Frequency of individuals with a moderate knowledge score (%)	Frequency of individuals with a poor knowledge score (%)	Highest score, frequency (%)	Lowest score, frequency (%)	Mean \pm Standard Deviation
Overall knowledge about skin traction care	2 (0.1 %)	142 (64.5 %)	76 (34.5 %)	13 1 (0.1 %)	3 1 (0.1 %)	9.02 \pm 1.80
General knowledge about traction	2 (0.9 %)	16 (7.3 %)	202 (91.8 %)	3 1 (0.9 %)	0 62 (56.4 %)	0.53 \pm 0.67
Knowledge about skin traction	0 (0 %)	114 (51.8 %)	106 (48.2 %)	2 57 (51.8 %)	0 14 (12.7 %)	1.39 \pm 0.70
Knowledge about caring for patients with skin traction	94 (42.7 %)	94 (42.7 %)	32 (14.5 %)	8 2 (1.8 %)	2 4 (3.6 %)	5.15 \pm 1.39
Knowledge about complications of skin traction	10 (4.5 %)	190 (86.4 %)	20 (9.1 %)	3 5 (4.5 %)	1 10 (9.1 %)	1.95 \pm 0.36

Table 3

Frequency distribution, mean, and standard deviation of nurses' practice regarding skin traction care.

Variable	Frequency of individuals with a good practice score (%)	Frequency of individuals with a moderate practice score (%)	Frequency of individuals with a poor practice score (%)	Highest score, frequency (%)	Lowest score, frequency (%)	Mean \pm Standard Deviation
Overall practice in skin traction care	190 (86.4 %)	24 (10.9 %)	6 (2.7 %)	130 15 (13.6 %)	57 1 (0.9 %)	117.28 \pm 16.18
Nursing interventions before skin traction application	172 (78.2 %)	42 (19.1 %)	6 (2.7 %)	22 41 (37.3 %)	6 1 (0.1 %)	19.12 \pm 3.39
Nursing interventions during skin traction application	200 (90.9 %)	16 (7.3 %)	4 (1.8 %)	54 33 (30 %)	22 2 (1.8 %)	49.87 \pm 6.24
Nursing interventions after skin traction application	188 (85.5 %)	18 (8.2 %)	14 (6.4 %)	38 43 (39.1 %)	8 1 (0.9 %)	33.45 \pm 6.69
Follow-up of patients with skin traction	192 (87.3 %)	6 (2.7 %)	22 (10.0 %)	16 64 (58.2 %)	0 1 (0.9 %)	14.25 \pm 3/05

Table 4Mean, Standard deviation, and independent *t*-test results comparing demographic variables with nurses' knowledge scores regarding skin traction care.

Variable		Knowledge Score (Mean \pm SD)	Independent <i>t</i> -test (P-value)
Gender	Male	9.09 \pm 1.94	0.674
	Female	8.95 \pm 1.67	
Marital Status	Single	8.87 \pm 2.05	0.530
	Married	9.10 \pm 1.67	
Education	Bachelor's	8.76 \pm 1.78	0.014
	Master's and above	9.72 \pm 1.75	
Working Department	Emergency	9.31 \pm 1.80	0.220
	Surgery	9.90 \pm 1.65	
Participation in Related Training Workshops	Yes	9.20 \pm 2.01	0.621
	No	8.98 \pm 1.76	

with master's degrees and above. However, based on the results of the one-way analysis of variance, there was no significant difference in the nursing care knowledge score in any of the variables of age, work experience, and employment type of nurses.

On the other hand, the results of the one-way analysis of variance showed that the practice score of caring for patients with skin traction differed significantly in the variable of nurses' work experience ($P = .017$), meaning that the mean practice score of caring for patients with skin traction was higher and better in nurses with 10 to 15 years of work experience.

Finally, the results of the independent *t*-test in Table 5 showed that the practice score of caring for patients with skin traction differed significantly only in the gender variable of nurses ($P = .040$), meaning that the mean practice score of caring for patients with skin traction was

Table 5Mean, standard deviation, and independent *t*-test results comparing demographic variables with nurses' practice scores regarding skin traction care.

Variable		Practice Score (Mean \pm SD)	Independent <i>t</i> -test (P-value)
Gender	Male	114.02 \pm 19.52	0.040
	Female	120.36 \pm 11.58	
Marital Status	Single	115.35 \pm 18.04	0.376
	Married	118.26 \pm 15.17	
Education	Bachelor's	117.97 \pm 15.13	0.465
	Master's and above	115.38 \pm 19.14	
Working Department	Emergency	119.17 \pm 15.02	0.590
	Surgery	116.85 \pm 17.00	
Participation in Related Training Workshops	Yes	117.00 \pm 17.89	0.935
	No	117.33 \pm 15.90	

higher and better in female nurses

4. Discussion

The high prevalence of traumatic fractures has led to an increase in certain interventions, such as the use of skin traction, which largely depends on the nurse's knowledge and practice in caring for it to prevent subsequent complications and accelerate recovery.²² Therefore, this

study aimed to determine the knowledge and practice of nurses regarding nursing care for patients with skin traction and the associated factors in XX. In this study, almost all participants were female nurses, which is consistent with similar studies showing that most nurses were female.²² This result may stem from the belief that nursing is a private profession for women, hence the higher number of female nurses.³⁹

Most of the participating nurses in this study were married. Similarly, in the study by Gouda et al., the majority of the participating nurses were married.²⁰ Marriage and having a spouse may be associated with nurses' competence.⁴⁰ In this research, most nurses had an academic degree of a bachelor's level, which is consistent with similar studies.²² Furthermore, more than half of the nurses in this study had less than 10 years of work experience. However, in a similar study, contrary to the results of this study, most participating nurses had more than 10 years of work experience.²⁰ Generally, more work experience in nurses leads to higher expertise in patient care.¹² Overall, most participants in the research had not undergone relevant training courses, which is similar to the results of the study by Gouda et al., where a small percentage of nurses had attended training courses for patient care with traction.²⁰ According to the findings of the study by Cline et al., creating educational programs for nurses and their participation in these training courses increases their awareness and job skills, which in turn improves the quality of patient care.⁴¹

The present study showed that most nurses achieved average and good scores in overall knowledge of skin traction care, but had poor awareness in certain dimensions of skin traction care, such as general information about skin traction and its late complications. Consistent with a study that aligns with the present study, most nurses had sufficient knowledge regarding patient care with traction.⁴² However, unlike the present study, another study showed that although nursing students had good general information about skeletal traction and its complications, their knowledge of skeletal traction care was low.⁴³ Another similar study showed that while students' knowledge about the complications of traction was acceptable, their knowledge of traction care was low.⁴⁴ Given that low knowledge of nurses about skin traction care can lead to various complications, nursing schools need to review their curricula concerning traction-related complications, prevention methods, and treatments. Healthcare centers should also have precise guidelines for preventing and managing complications arising from skin traction and related care.⁴²

In this study, nurses' knowledge about skin traction care had a statistically significant positive correlation with their level of education. In contrast, another study showed that the education level of orthopedic nurses had no significant correlation with their care knowledge.⁴² It is expected that nurses with higher education levels better understand the care practice and appreciate the importance of caring for patients with traction.²³

Furthermore, most nurses in this study scored high in care skills for patients with skin traction, and their care performance before, during, and after the placement of skin traction was good, although they scored average in a few practice. However, contrary to this result, other studies showed that most nurses had unsatisfactory practice in traction care.^{22, 23} According to the researcher, the low performance of nurses in patient care may stem from their attitude and sensitivity towards patients or be due to a lack of supervision, training, and continuous evaluation of nurses' performance.²³

The present study found a statistically significant positive correlation between nurses' knowledge and practice in caring for patients with skin traction. Consistent with the present study, other research showed that nurses' knowledge directly correlates with their performance in traction care. In other words, nurses with higher knowledge have better practice in traction care, preventing subsequent complications and problems in patients.^{22, 23}

Additionally, the present study showed that the practice score in caring for patients with skin traction was higher among female nurses. The study by Wahba et al. also showed that female nurses had better

performance in caring for patients with traction, which could be related to their intrinsic precision in performing interventions, consistent with the present study.²³

Finally, the study results showed that the average practice score for skin traction care was higher among nurses with 10 to 15 years of work experience. In a similar study, nurses with nearly 10 years of work experience had better skills in caring for patients with traction.²² It can be said that with increased work experience, nurses' care performance improves, possibly due to their adaptation to work conditions and their higher precision and sensitivity in providing patient care in mid-career.⁴⁵

One of the limitations of this study was the potential for bias and social desirability in the performance of some participants. In other words, the participants' possible awareness of the researcher's presence and performance evaluation may have led to an idealized and unrealistic performance in caring for patients with skin traction. This could affect the accuracy and validity of the findings and limit their generalizability.

Future studies can compare the knowledge, attitudes, and practice of nurses regarding the care of patients with skin traction and skeletal traction to gain a broader understanding of preventive behaviors and risk factors associated with complications. They can also benefit from conducting a longitudinal study to evaluate the lasting impact of nurses' knowledge and care practices on improving conditions and preventing complications in patients with skin traction. Additionally, future research should explore the role of various environmental, psychosocial, and cultural factors in shaping nurses' knowledge and practice in caring for patients with skin traction. Understanding how environmental factors, organizational culture, and social norms influence nurses' knowledge and practice can lead to more tailored educational programs addressing specific socio-cultural contexts. Finally, future studies should assess not only nurses' knowledge and practice in caring for patients with skin traction but also their overall awareness of the risks of using or not using skin traction and additional preventive strategies. By conducting such studies, more effective educational programs for nurses can be developed, leading to a reduction in complications and a significant improvement in the quality of care for patients with skin traction.

5. Conclusion

This study revealed that nurses' knowledge of caring for patients with skin traction was generally moderate to good, although there were knowledge gaps, particularly regarding long-term complications of skin traction. Moreover, the majority of nurses demonstrated a satisfactory level of practice in caring for these patients, but their practice was assessed as moderate in some specific areas. Based on these findings, there is still a need to enhance nurses' knowledge and practice in caring for these patients. Therefore, it is recommended that nursing education programs be updated to focus on the care of patients with skin traction, with particular emphasis on the long-term complications of skin traction and prevention strategies. Additionally, the results showed that factors such as higher education, longer work experience, and female gender were associated with increased knowledge and practice in caring for patients with skin traction. These findings underscore the importance of specialized training and practical experience in improving nurses' knowledge and practice.

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Ethical considerations

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CRediT authorship contribution statement

Mina Soleimani: Methodology, Conceptualization. **Mohammad Hossein Hakimi:** Writing – review & editing, Supervision, Investigation, Formal analysis.

Declaration of competing interest

The authors have no conflict of interest to disclose.

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