

Original Investigation

Student Nurse Knowledge of and Attitudes Toward Pressure Injury Prevention: How Sufficient Is Undergraduate Education?

Hava Kara, RN; Fatma Arikan, PhD, RN; and Ali Kahyaoglu, BHSc

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ABSTRACT

OBJECTIVES: To assess the knowledge and attitudes of student nurses regarding evidence-based guidelines for preventing pressure injuries.

METHODS: This study used a descriptive research design. The participants included second-, third-, and fourth-year nursing students completing their bachelor's degrees at a faculty of nursing in Turkey. Data collection forms consisted of a student nurse information form, the Pressure Ulcer Prevention Knowledge Assessment Instrument, and the Attitude Towards Pressure Ulcer Prevention Instrument.

RESULTS: The overall mean score for knowledge was 49.9% (11.7/26). The highest scores for the instrument's subthemes were for nutrition (72%), and the lowest were for etiology and development (40.1%). The overall mean attitude score was 42.20 ± 2.40, although a statistically significant difference among grades was found ($P < .001$). The highest mean scores showed agreement among students that pressure injury prevention should be a priority (10.50 ± 1.43). A significant difference was found in the competence subscale according to the number of dressing changes observed and sense of competence in pressure injury care ($P = .003$). A weak but statistically significant positive relationship was found between knowledge and attitude scores ($r = 0.158$; 95% confidence interval, .040–.269; $P < .001$).

CONCLUSIONS: This study revealed that certain revisions are needed in the nursing curriculum to improve the knowledge and attitudes of nursing students toward the prevention and care of pressure injuries. More details should be covered in the classroom and laboratories through simulation or clinical practice for improved management of pressure injuries.

KEYWORDS: attitude, nursing students, knowledge, pressure injury, prevention, wound care

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INTRODUCTION

Pressure injury (PI), an often preventable skin condition, is a common problem in healthcare institutions.[1,2] A PI is localized skin and/or subcutaneous tissue damage caused by pressure or shear from medical/other devices, often on bony prominences.[3] Pressure injuries affect 2.5 million people per year, and 3.5% to 4.5% occur in hospitalized patients.[4] The prevalence of PIs in Turkey is 4.7% to 15% in ICUs and 7.2% to 17.6% in acute care clinics.[5,6] These injuries increase morbidity and mortality as well as healthcare costs.[7–9]

Pressure injuries cause complications, decrease patients' quality of life, and prolong the length of hospital stay.[2,10] Treatment for PI costs 2.5 times more than prevention and negatively affects patient outcomes and cost.[9] The incidence of PIs is an accepted indicator that measures the standard of care.[8,11,12] Legal action against nurses as a result of neglect in preventing PIs has increased, and prevention of PIs is among the most important goals of healthcare services.[10,13–15]

Preventing PIs requires an interprofessional approach, and nurses responsible for providing continued care to the patient have an important role on the care team.[11,16] In addition to knowledge and clinical skills, a nurse's attitude toward PIs is also important in the prevention and care of this condition.[11] Lack of knowledge about and a negative attitude toward PIs often affect the implementation of prevention strategies.[12,15] Although international guidelines have been developed to reinforce the importance and care of PIs, direct care nurses have a range of knowledge about PIs, and nursing students often do not have sufficient knowledge about current PI guidelines, preventing them from using them once they begin clinical work.[15,17,18] When students have inadequate knowledge about PI prevention and treatment, they fail to adopt appropriate care practices.[19]

Although the transition from education to practice is always difficult, more focus should be placed on increasing

At Akdeniz University in Antalya, Turkey, Hava Kara, RN, is Research Nurse, Nursing Practice and Research Center; Fatma Arikan, PhD, RN, is Director, Nursing Practice and Research Center; and Ali Kahyaoglu, BHSc is Student Nurse, Faculty of Nursing. **Acknowledgments:** The authors thank the nursing students who participated in this study. The authors have disclosed no financial relationships related to this article. Submitted August 30, 2020; accepted in revised form October 30, 2020.

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students' use of evidence-based knowledge.[8] Nursing students must have sufficient knowledge and skills at the end of basic nursing training to prevent PIs and, if necessary, to recognize, assess, and treat them properly.[15]

A barrier to the full implementation of evidence-based practice in PI prevention is often formed by the limited knowledge and attitudes of nursing students. Pressure injuries are significant indicators of the quality of health institutions in Turkey; thus, hospitals make serious efforts to reduce their incidence. To that end, some hospitals have established nursing units specifically for wound care, although their numbers are still few.[5,20–23] A comprehensive literature review reveals that limited research into the knowledge and attitudes of nursing students about PI exists.[2,23,24] Considering all these issues, the importance of assessing the knowledge and attitude of students on preventing PIs is evident. Accordingly, this study sought to assess the knowledge and attitudes of student nurses about evidence-based guidelines for preventing PIs to contribute to the improvement of nursing curricula in Turkey and other countries.

METHODS

Study Design, Setting, and Participants

This single-center, descriptive study was conducted with a physical questionnaire given to second-, third-, and fourth-year nursing students completing a bachelor's degree at the Akdeniz University Faculty of Nursing. The program is a 4-year undergraduate degree designed to gradually build necessary knowledge and skills in nursing students. The study excluded first-grade nursing students because their syllabus contained limited training on PIs.

Data Collection

Nursing students were verbally informed about the aim and scope of the study by the researchers, and those volunteering to participate were given a questionnaire. The questionnaires were distributed to the students before a lesson in the first semester of 2020 (February through March), and students were instructed to fill out the questionnaire in a single sitting. Students completed the surveys in about 20 minutes. Strict attention was paid to the confidentiality of student identity, and no descriptive information or participant names were recorded.

Instruments

The survey consisted of three sections: a Student Nurse Information Form and two questionnaires, the Pressure Ulcer Prevention Knowledge Assessment Instrument (PUPKAI)[25] and Attitude Towards Pressure Ulcer Prevention Instrument (ATPUPI).[26]

Student Nurse Information Form. The form was created by investigators considering the data derived from the current literature. It contained questions about the participants' sociodemographic data and their opinions and training about PIs in clinical practice.

Pressure Ulcer Prevention Knowledge Assessment Instrument. The PUPKAI was developed by Beeckman et al[25] in 2010 and measures the nurse's knowledge of evidence-based PI prevention. The Cronbach α for the total scale is .77. The validity and reliability of the Turkish version of the PUPKAI were examined by Tülek et al[2] in 2016; the Cronbach α for the total translated scale was .94.

The PUPKAI consists of 26 multiple-choice questions and 6 subthemes related to preventing PIs. The subthemes include questions about etiology and development (6), classification and monitoring (5), risk assessment (2), nutrition (1), preventive interventions to reduce the amount of pressure/shear (7), and preventive measures to reduce the duration of pressure/shear (5). The maximum score is 26 points.[2,25,27]

Attitude Towards Pressure Ulcer Prevention Instrument. The ATPUPI was developed by Beeckman et al[26] in 2010 and Cronbach α for the total scale was .79. The validity and reliability testing of the Turkish version was performed by Üstün[28] in 2013; the Cronbach α for the total translated scale was .71. The scale consists of 13 items using a 4-point Likert-type scale (1 = strongly disagree to 4 = strongly agree). The tool measures five attitudes: toward competency to prevent PIs (competence dimension, three items); priority of preventing PIs (priority dimension, three items); the effect of PIs (effect dimension, three items); personal responsibility in preventing PIs (responsibility dimension, two items); and the effectiveness of preventing PIs (effectiveness dimension, two items). The minimum score is 13, and the maximum is 52. High scores correlate with a positive attitude.[26,28] In this study, the internal consistency coefficient was 0.74.

Data Analysis

Previous studies of nursing students[8,15] found an average knowledge score of 51%, and accordingly, investigators used an estimated average of 49%. The desired sample size was 332, according to the calculation based on a 95% confidence interval (CI), 95% power, and type 1 error α = .05. Data analysis was performed with SPSS 23 (IBM, Armonk, New York). Descriptive statistical methods, variance analysis, and Spearman correlation analysis were used.

Answer percentages of the PUPKAI knowledge questions were calculated. The total PI knowledge score was obtained by adding the knowledge scores in the subscales. Descriptive statistics were used for the scores from the questions on attitudes toward PI prevention. The ATPUPI negatively expressed questions were scored inversely. The total PI attitude score was obtained by adding the attitude subscale scores.

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Table 1. PARTICIPANT DEMOGRAPHICS AND BASIC EDUCATION QUESTIONS (N = 359)

Variable	Frequency
Age, mean ± SD, y	20.9 ± 1.3
Year of education, n (%)	
Second	125 (34.8)
Third	147 (40.9)
Fourth	87 (24.2)
Encountered a patient with pressure injuries, n (%)	
No	31 (8.6)
Sometimes	236 (65.7)
Often	92 (25.4)
Participated in a pressure injury dressing change, n (%)	
Never	110 (30.6)
1 to 4 times	218 (60.7)
5 to 10 times	28 (7.8)
10 and above	3 (0.8)
Could transfer the theoretical education to the practical care of pressure injuries,[a] n (%)	
Yes	92 (25.6)
Partially	94 (24.2)
No	100 (27.9)
About acquiring information on pressure injuries from different sources other than their lecture notes, n (%)	
Yes	33 (9.2)
No	326 (90.8)
Competence in caring for pressure injuries	
Sufficient	70 (19.5)
Partly sufficient	241 (67.1)
Insufficient	48 (13.4)

[a]There were 73 missing responses.

Because the knowledge and attitude scores were normally distributed, one-way analysis of variance was used to test the differences among groups. Post hoc tests and Bonferroni corrections were used for double comparisons. Spearman correlation analysis was performed to measure the strength of the relationship between PI knowledge and attitude scores.

Ethics

A written approval from the medical research ethics committee (approval no. 70904504/123) and written permission from the Faculty of Nursing were obtained. All participants in the study were volunteers.

RESULTS

A total of 400 questionnaires were distributed to nursing students; 366 of them were completed. Seven of the questionnaires were incomplete and not included in the analysis. The rate of participation in the study was 89.75%.

Descriptive Statistics

The mean age of the participants (n = 359) was 20.9 ± 1.3 (Table 1). The study sample consisted of second-year (34.8%), third-year (40.9%), and fourth-year (24.2%) student nurses. About 8.6% of the students never encountered a patient with a PI, whereas 30.6% never participated in a PI dressing change, and 60.7% reported attending a dressing change one to four times. Nearly all (90.8%) of the students answered "No" to the question about acquiring information on PIs from sources other than their lecture notes. Only 19.5% answered "Yes" to the question on whether students consider themselves competent in PI care. In addition, 25.6% of the students answered "Yes" when asked if they could translate their theoretical education to the practical care of PIs.

Knowledge

Students' percentages of correct answers to questions regarding PI prevention are shown in Table 2. The overall mean PUPKAI score was 49.9% (11.7/26), with the scores ranging from 4 to 21, and no student provided correct answers to all of the questions. The highest scores for subthemes were about nutrition (72%), and the lowest were etiology and development (40.1%). The analysis of the etiology and development subscale showed that the first, third, and fourth questions were mostly answered incorrectly. Many student nurses were not aware of the factors causing PIs (11.7%), what happens when patients slip while seated in a semireclined position (60°; 20.6%), and the etiology of PIs (26.5%).

The analysis on reducing the pressure/shear amount (44.2% subscale score) revealed that students mostly gave incorrect answers to the first, second, and fifth questions. Students had limited knowledge on the ideal sitting position to reduce pressure between the body and seat (41.5%), positions reducing the patient's risk of PIs (24.0%), or the position change interval with the use of

Table 2. MULTIPLE CHOICE RESPONSES REGARDING PRESSURE INJURY PREVENTION (N = 359)

Question	Correct Answer (%)
Information subgroups	49.9
Etiology and development	40.1
Classification and observation	46.4
Risk assessment	51
Nutrition	72
Preventive measures to reduce the amount of pressure/shear	44.2
Preventive measures to reduce the duration of pressure/shear	46.2

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a viscoelastic foam mattress in patients at risk of developing PIs (22.3%).

Most students (72%) knew that a balanced diet could reduce the risk of PIs (72%) and that recurrence was a risk in patients with PIs (51%; Table 2). Whereas the classification subscale received the fewest correct answers, the subscale with the most correct answers was nutrition. The overall mean knowledge score for preventing PIs was 11.70 ± 0.14 (Table 3).

Attitude

The overall mean ATPUPI score was 42.20 ± 2.40. The mean scores for the subscales were 7.44 ± 1.30 for competence, 10.50 ± 1.43 for priority, 10.88 ± 1.58 for effect size, 6.45 ± 1.12 for responsibility, and 6.95 ± 0.87 for efficacy of prevention. The highest mean scores were reached in the effect size subscale, which showed agreement among students that PI prevention should be a priority (3.7 ± 0.5), and in the priority subscale, the opinion that PI prevention is very important (3.7 ± 0.5). In the efficacy of prevention subscale, students reported knowing that PI could be prevented (3.6 ± 0.6), and the responsibility subscale demonstrated that they would personally feel responsible if patients developed PIs (3.4 ± 0.7).

The lowest mean scores were recorded in the competence subscale, which revealed the opinions among students that "pressure ulcers are very difficult to prevent, and others are better than me" (2.3 ± 0.6), "I am well-trained to prevent pressure ulcers" (2.3 ± 0.6), and "I trust my skills to prevent pressure ulcers" (2.6 ± 0.6).

Table 3. PRESSURE INJURY PREVENTION KNOWLEDGE AND ATTITUDE SCORES (N = 359)

Parameter	Mean	SD	Minimum	Maximum
Knowledge				
Total	11.70	0.14	4	21
Etiology and development	2.42	0.06	0	6
Classification and observation	2.32	0.05	0	5
Risk assessment	1.02	0.03	0	2
Nutrition	0.72	0.02	0	1
Preventive measures to reduce the amount of pressure/shear	3.10	0.06	0	7
Preventive measures to reduce the duration of pressure/shear	2.13	0.05	0	5
Attitude				
Total	42.20	2.40	23	51
Competency	7.44	1.30	3	11
Priority	10.50	1.43	4	12
Effect size	10.88	1.58	3	12
Responsibility	6.45	1.12	2	8
Efficacy of prevention	6.95	0.87	3	8

Factors Affecting Knowledge and Attitude

There was no significant difference between the overall PUPKAI scores and grades of the students, sense of competence in the care of PIs, and the number of dressing changes performed. In the subgroups, the assessment of risk varied significantly among grades ($P = .015$, $P < .05$). Although the second-year students failed to perform the risk assessment very well, the third graders assessed PI risk better. In addition, students reporting better competence scored significantly higher in the etiology and development subscale ($P = .029$, $P < .05$; Table 4).

The mean ATPUPI score of the student nurses showed a statistically significant difference among grades ($P < .001$). Similarly, a significant difference was found in the subscales of priority, competence, and responsibility ($P = .002$, $P < .001$, and $P < .001$, respectively). Students in their third and fourth years had a more favorable attitude toward preventing PIs than students in their second year.

A significant difference was found in the competence subscale of the ATPUPI according to the number of dressing changes observed and sense of competence in PI care ($P = .003$). As the number of dressing changes performed increased, the level of self-competence increased. In addition, those rating themselves "self-competent" in PI care had higher competence ($P < .001$) and responsibility ($P = .023$) scores (Table 5).

A Spearman correlation coefficient was calculated to determine the relationship between students' attitude and knowledge scores. A weak but statistically significant positive relationship was found between the two scale scores ($r = 0.158$; 95% CI, 0.040–0.269; $P < .001$).

DISCUSSION

The healthcare sector needs professionals with enough knowledge and appropriate attitudes toward preventing PIs.[11,18] Therefore, the competencies that nursing education offers in the management of PIs should be constantly reviewed and optimized. In this study, the overall mean PUPKAI score was only 49.9% (11.7/26), and no student could answer all questions correctly; in addition, the overall mean ATPUPI score was 42.20 ± 2.40. A study conducted by Mather et al[29] with 472 student nurses showed that students lacked knowledge despite their positive attitudes toward PIs (mean score, 55.4%). Another study involving student nurses from seven universities in Australia reported a mean knowledge score of 51.1% and an attitude score of 40.8 ± 3.9.[15] In a study carried out with 742 student nurses in Italy, the mean knowledge score was 51.1%, and attitude score was 39.9 (76.7%).[8] Dalvand et al,[9] in their meta-analysis (eight studies in total), found the mean knowledge of students about PI prevention to be 55.4% (95% CI, 42.3–68.4). Compared with the previous studies examining the attitudes and knowledge of student nurses, the

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Table 4. ATTITUDE BY SELECTED INDEPENDENT VARIABLES (N = 359)

Variables	Total Scores	Competency	Priority	Effect Size	Responsibility	Efficacy of Prevention
Year of education, mean ± SD						
Second[a]	40.90 ± 4.59	7.06 ± 1.21	10.21 ± 1.45	10.68 ± 1.71	6.14 ± 1.22	6.88 ± 1.11
Third[b]	42.76 ± 3.61	7.05 ± 1.30	10.80 ± 1.17	10.90 ± 1.50	6.48 ± 0.98	7.04 ± 0.80
Fourth[c]	43.18 ± 4.45	7.89 ± 1.29	10.40 ± 1.70	11.11 ± 1.49	6.86 ± 1.08	6.90 ± 1.03
F	9.49	11.12	6.17	1.90	11.11	0.96
P	.000	.000	.002	.150	.000	.382
	a < b, c	a < b, c	a < b		a < b < c	
Encountered a patient with pressure injury, mean ± SD						
Never[a]	42.05 ± 3.70	7.22 ± 1.26	10.55 ± 1.37	11.04 ± 1.30	6.31 ± 1.14	6.94 ± 1.00
1 to 4 times[b]	42.08 ± 4.60	7.46 ± 1.31	10.45 ± 1.47	10.76 ± 1.72	6.48 ± 1.11	6.94 ± 0.98
5 to 10 times[c]	43.50 ± 3.59	7.96 ± 1.07	10.67 ± 1.36	11.14 ± 1.43	6.64 ± 1.06	7.07 ± 0.85
10 or more times[d]	46.00 ± 4.58	9.33 ± 1.52	10.66 ± 2.30	11.00 ± 1.73	8.00 ± 0.00	7.00 ± 0.00
F	1.73	4.71	0.29	1.046	2.77	0.14
P	.159	.003	.833	.372	.042	.933
		a < c, d				
Themselves competent in the care of pressure injuries, mean ± SD						
Sufficient[a]	42.72 ± 4.85	8.00 ± 1.38	10.35 ± 1.57	10.79 ± 1.77	6.52 ± 1.20	7.04 ± 1.00
Partly sufficient[b]	42.33 ± 3.98	7.41 ± 1.20	10.50 ± 1.42	10.94 ± 1.49	6.51 ± 1.01	6.95 ± 0.97
Insufficient[c]	40.93 ± 4.72	6.76 ± 1.35	10.72 ± 1.28	10.66 ± 1.74	6.04 ± 1.44	6.85 ± 0.96
F	2.68	13.61	0.95	0.75	3.83	0.53
P	.069	.000	.386	.469	.023	.534
		c < b < a			c < b	

student nurses in this study had higher attitude scores, but lower knowledge scores.

The results of this study reveal that the students lacked sufficient education and theoretical knowledge on the prevention and care of PIs, which is not optimal for nurses soon to be responsible for preventing PIs. Guidelines do not always translate to behavioral change in clinical practice, and it is clear that the lack of knowledge, negative attitudes, and insufficient skills among students are barriers to good nursing practice.[8]

Knowledge

The overall mean knowledge score in this study was 49.9% (11.7 ± 0.1). This is much lower than the scores reported by researchers using the same tool in Australia and other countries, such as Gunningberg et al[24] (58.9%), Simonetti et al[8] (51.1%), Mather et al[29] (55.4%), and Usher et al[15] (51.1%). It is higher than the mean knowledge score found by Kısacık and Sönmez[23] (38.2%) but lower than the 58% reported by Tülek et al[2] in Turkey. These results also suggest that educators need to contribute more to increase the knowledge of student nurses. This school did not have a specific lesson or course for PIs, but the students were given limited information such as skin assessment and care of the bedridden patient's skin. Pressure injury prevention should be included in the curriculum as an essential lesson and incorporated into nursing textbooks, supported by laboratory and simulation training. These low scores indicate that preventive care strategies in clinical practice may be negatively affected by a lack of knowledge. Better knowledge on the etiology, classification, nutrition, risk assessment, and shear and tear forces in PIs is a key factor in prevention.[30–33]

In this study, the highest score was obtained in the nutrition subscale (72%) and the lowest scores in etiology and development (40.1%) and preventive measures. Previous studies have commonly reported that the lowest scores are seen in reducing the pressure/shear amount (under preventive measures), whereas the highest scores are obtained for nutrition.[2,9] Usher et al[15] found the highest score (87.9%) in nutrition and the lowest score (44.1%) in preventive measures to reduce the pressure/shear amount.[14] Similar results were found by Simonetti et al[8] and Gunningberg et al,[24] but Kısacık and Sönmez[23] noted the highest score (51.0%) in nutrition and the lowest score (30.3%) in risk assessment.

In the school where this research was conducted, nutrition courses are included in the curriculum as a compulsory course in the third semester. At the same time, information about nutrition is given in the contents of

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Table 5. KNOWLEDGE BY SELECTED INDEPENDENT VARIABLES (N = 359)

Variables	Total Scores	Etiology and Development	Classification	Risk Assessment	Nutrition	Shearing	Laceration
Year of education, mean ± SD							
Second[a]	11.61 ± 2.47	2.41 ± 1.12	2.35 ± 1.08	0.93 ± 0.63	0.66 ± 0.47	6.88 ± 1.11	2.07 ± 0.94
Third[b]	11.85 ± 2.78	2.43 ± 1.22	2.23 ± 1.11	1.15 ± 0.69	0.75 ± 0.43	7.04 ± 0.80	2.09 ± 1.03
Fourth[c]	11.84 ± 2.55	2.40 ± 1.23	2.42 ± 0.95	0.94 ± 0.70	0.75 ± 0.43	6.90 ± 1.03	2.28 ± 1.15
F	0.29	0.02	0.89	4.23	1.74	0.96	1.19
P	.743	.971	.409	.015	.176	.382	.305
				a < b			
Encountered a patient with pressure injury, mean ± SD							
Never[a]	11.75 ± 2.36	2.34 ± 1.21	2.42 ± 1.01	0.98 ± 0.69	0.72 ± 0.44	3.06 ± 1.17	2.13 ± 1.08
1 to 4 times[b]	11.79 ± 2.72	2.41 ± 1.19	2.29 ± 1.09	1.06 ± 0.65	0.72 ± 0.44	3.10 ± 1.19	2.12 ± 1.01
5 to 10 times[c]	11.80 ± 2.87	2.70 ± 1.13	2.12 ± 0.97	0.92 ± 0.81	0.71 ± 0.46	3.32 ± 1.12	2.17 ± 1.02
10 or more times[d]	10.66 ± 1.15	2.66 ± 0.57	2.33 ± 1.15	0.33 ± 0.57	0.66 ± 0.57	2.33 ± 1.15	2.33 ± 1.52
F	0.18	0.68	0.67	1.66	0.02	0.77	0.56
P	.908	.563	.570	.174	.995	.507	.982
Themselves competent in the care of pressure injuries, mean ± SD							
Sufficient[a]	11.79 ± 2.66	2.73 ± 1.21	2.32 ± 0.94	1.01 ± 0.73	0.71 ± 0.45	2.85 ± 1.21	2.12 ± 0.99
Partly sufficient[b]	11.81 ± 2.62	2.38 ± 1.20	2.27 ± 1.06	1.02 ± 0.69	0.71 ± 0.45	3.19 ± 1.19	2.16 ± 1.05
Insufficient[c]	11.51 ± 2.57	2.15 ± 1.03	2.55 ± 1.21	1.02 ± 0.56	0.77 ± 0.42	3.02 ± 0.93	1.97 ± 1.03
F	0.22	3.51	1.33	0.01	0.30	2.35	0.63
P	.798	.029	.264	.986	.740	.096	.532
		c < a					

different courses throughout the curriculum. Although the importance of nutrition in PI prevention and healing is not repeatedly included in the curriculum, students can deduce a relationship between healthy nutrition and PI prevention.

When the etiology and development subscales were compared with other studies in the literature, extant findings reported better levels of knowledge than the students in this study. In etiology and development, Usher et al[15] reported a mean score of 54.1%; Simonetti et al,[8] 48.5%; Gunningberg et al,[24] 66.4%; and Kısacık and Sönmez,[23] 34.3%. In the present study, in the etiology and classification subtheme, 88.3% of the students lacked knowledge on the factors causing PIs, 79.4% on what will happen when patients slump while seated in a semireclined position, and 73.5% on the etiology of PIs (skin, incontinence, and tearing force). Usher et al[15] reported that more than 80.0% of the students did not know how often to check skin integrity or observe a patient at risk, and Simonetti et al[8] found that only 52.3% of nursing students grasped the importance of repositioning. Ayello et al[34] stated that although related factors such as baccalaureate nursing programs, prevalence of PIs, and support surfaces were examined in their study, no valid scale or prevention protocol was taught in any faculty to evaluate the risk for PIs.

The reasons for such low scores in PI etiology, classification, and preventive measures might include the absence of a separate class to teach student nurses about PIs and limited information about the etiology, classification systems, prevention of shear/friction, repositioning, use of support surfaces, and lack of understanding about different support surfaces. Some important content is missing from PI education in nursing curricula. In fact, previous work in the literature shows that effective PI training sessions could significantly increase knowledge, and training programs significantly improve the nurse's visual distinctive ability.[13,17]

Whereas the second-year students could not perform an optimal risk assessment, the third-year students managed to assess the risk better. The students reporting self-competency in handling PIs had higher scores for etiology and development ($P < .05$). Other researchers have observed that knowledge scores increase with time spent in a clinical setting.[15,19]

Except for risk assessment, there was no significant relationship between the years of education and knowledge subscales ($P > .05$). This is possibly because of the lack of advanced theoretical knowledge regarding PIs in the curriculum. The improvement in risk assessment by year may be related to the increase in duration of clinical practice in undergraduate education in the later

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stages of education. In the first year of nursing education, students receive limited experience in the clinical environment, whereas senior students spend most of the academic year as interns in a clinical setting.

Dalvand et al[9] and Fullbrook et al[35] found that nurses increased their knowledge level when they had more clinical experience and more competence. In addition, students who learn to think through clinical experiences will develop their knowledge base and increase their learning abilities.[34] The nursing curriculum should include information that is reinforced in clinical practice and patient care.

Attitude

The overall mean ATPUPI score was 42.2 ± 2.4 (81.2%), which is higher than those reported by researchers using the same tool, including Simonetti et al[8] (39.9, 76.7%), Usher et al[15] (40.8, 78%), and Kısacık and Sönmez[23] (40.8, 77%), but lower than that of the nurses in the study by Aslan and van Giensenberg[36] (43.7, 84.1%). Among other studies, Beeckman et al[18] found an attitude score of 71.3%, and Demarré et al,[1] 78.3%. In accordance with the literature, the present results revealed that students have a positive attitude toward preventing PIs during their education. This higher score is thought to result from a school culture that encourages lifelong learning, promotes knowledge, and supports practice and research in the profession.

An analysis of the attitude factors showed that the highest mean scores were recorded in effect size (10.8) and priority subscales (10.5), whereas the responsibility (6.4) and prevention subscales (6.9) received lower scores. The authors suggest that student nurses with the lowest scores in the PI etiology, classification, and preventive measures subscales also had low scores in the responsibility and prevention dimensions of the ATPUPI. There was a statistically significant difference between the total ATPUPI score obtained and the students' year ($P < .001$, $P < .05$). Similarly, there was a difference in the competence, priority, and responsibility subscales by year ($P < .001$, $P = .002$, and $P < .001$, respectively). The third- and fourth-year students had a more positive attitude than the second-year students. One can argue that clinical experience has a positive impact on PI attitudes during nursing education.[15,23,37]

A significant correlation was found between the number of dressing changes performed and the competence subscale ($P = .003$, $P < .05$). Self-competence increases as the number of dressing changes increases. In agreement with the current literature, increased educational experience is associated with a higher attitude score. Attitudes are influenced by students' clinical experiences. Theoretical and clinical experiences are intertwined in the nursing discipline, and clinical experience is a vital component of improving a student's experience and integrating theory into practice.[8,19,37] A study by Garrigues et al[37] reports that students working with nurses perceived as good role models tend to adopt similar positive attitudes. In the authors' study, the university hospital where students engage in practical learning has a specialized nursing department employing wound and stoma care nurses, and nursing students sometimes come into close contact with these nurses. This can contribute to the development of nurses in regard to the care of PIs.

Knowledge and Attitude

In line with previous research, a weak correlation was found between knowledge and attitude total scores in this study.[15,18] This indicates that students with a higher level of knowledge are more likely to have a positive attitude. Nurses and student nurses who attach importance and value to preventing PIs were more effective in the field (clinic and practice).[36–38]

Limitations

Although this was a single-center study, its strength lies in the large sample that provided a good representation of the population. Research instruments whose validity and reliability were previously verified in a Turkish population were used to measure the variables in the study. To ensure the accuracy of knowledge scores in particular, the questionnaires were collected immediately after completion by students to limit their chance of consulting with external sources. The lack of validity and reliability studies of the latest version of the PUPKAI (2.0) prevented researchers from identifying the differences in knowledge levels.

CONCLUSIONS

This study revealed that certain revisions are needed in nursing curricula to improve the knowledge and attitudes of students toward the prevention and care of PIs. In the classroom, simulation laboratories, and clinical settings, time dedicated to PI content should be increased. There is a need to create curricula that allow students to be supported in theoretical and practical arenas for them to gain competence, sufficient knowledge, and a proper attitude toward PIs by the time they graduate. ●

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