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ORIGINAL ARTICLE

Attitudes and Awareness of Nursing Students in Developing Evidence-based Practices for Preventing Peripheral Venous Catheter-related Infections

Hemşirelik Öğrencilerinin Periferik Venöz Kateter İlişkili Enfeksiyonların Önlenmesinde Kanıta Dayalı Uygulamaya Yönelik Tutum ve Farkındalıkları

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Abstract

Objective: The aim of this study was to determine the attitudes and awareness of nursing students regarding evidence-based practices for the prevention of peripheral catheter-associated infections.

Method: This descriptive and cross-sectional study was conducted with 2nd, 3rd and 4th year nursing students (n=327) who were studying in the nursing department of a state university's health college and practicing clinical practice. Data were collected using student introduction form, evidence-based practices in the prevention of peripheral catheter-associated infections information form, and attitude scale toward the importance and use of evidence-based nursing for students.

Results: The mean total score of the attitude scale toward the importance and use of evidence-based nursing for students. was 69.94±16.26, and the mean knowledge score of evidence-based practices in the prevention of peripheral catheter-related infections was 12.37±2.64. Nursing students had the highest knowledge (97.2%) about the practice of "Aseptic technique should be followed during insertion and care of peripheral intravenous catheters", and the lowest knowledge (74.9%) about the practice of "Infusion sets used continuously in patients who are not given blood, blood products or lipid emulsions do not need to be changed more frequently than 96 hours, but should be changed at least every seven days".

Conclusion: Nursing students' attitudes toward the importance and use of evidence-based nursing are above the medium level, and their awareness of evidence-based practices in the prevention of peripheral catheter-related infections is high. To increase the attitudes and awareness of nursing students toward evidence-based practice, evidence-based nursing courses should be added to the nursing education curriculum and students should be encouraged to conduct scientific research and participate in scientific activities.

Keywords: Infection, awareness, nurse, student, peripheral venous catheter, attitude

Öz

Amaç: Bu çalışmanın amacı, hemşirelik öğrencilerinin periferik kateter ilişkili enfeksiyonların önlenmesinde kanıta dayalı uygulamaya yönelik tutum ve farkındalıklarının belirlenmesidir.

Yöntem: Tanımlayıcı ve kesitsel nitelikteki araştırma, bir devlet üniversitesinin sağlık yüksekokulunun hemşirelik bölümünde öğrenim gören ve klinik uygulama yapan 2., 3. ve 4. sınıf hemşirelik öğrencileri ile gerçekleştirildi (n=327). Veriler öğrenci tanıtım formu, periferik kateter ilişkili enfeksiyonların önlenmesinde kanıta dayalı uygulamalar bilgi formu ve öğrenciler için kanıta dayalı hemşireliğin önemi ve kullanımına yönelik tutum ölçeği kullanılarak toplandı.

Bulgular: Hemşirelik öğrencilerinin öğrenciler için kanıta dayalı hemşireliğin önemi ve kullanımına yönelik tutum ölçeği toplam puan ortalaması 69,94±16,26, periferik kateter ilişkili enfeksiyonların önlenmesinde kanıta dayalı uygulamalar bilgi puanı ortalaması 12,37±2,64'tür. Hemşirelik öğrencileri, periferik kateter ilişkili enfeksiyonların önlenmesinde kanıta dayalı uygulamalardan "periferik intravenöz kateter takılması ve bakımı sırasında aseptik tekniğe uyulmalıdır" uygulaması hakkında en fazla (%97,2) bilgiye sahip iken "kan, kan ürünleri veya lipid emülsiyonları verilmeyen hastalarda devamlı kullanılan infüzyon setlerinin 96 saatten daha sık aralarla değiştirilmesi gerekli değildir fakat en azından her yedi günde bir değiştirilmelidir" uygulaması hakkında en az (%74,9) bilgiye sahiptir.

Sonuç: Hemşirelik öğrencilerinin kanıta dayalı hemşireliğin önemi ve kullanımına yönelik tutumları orta düzeyin üzerinde, periferik kateter ilişkili enfeksiyonların önlenmesinde kanıta dayalı uygulamalara yönelik farkındalıkları ise yüksektir. Hemşirelik öğrencilerinin kanıta dayalı uygulamaya yönelik tutum ve farkındalıklarını artırmak için kanıta dayalı hemşirelik dersinin hemşirelik eğitimi müfredatına eklenmesi ve öğrencilerin bilimsel araştırma yapma ve bilimsel etkinliklere katılmaya teşvik edilmesi önerilmektedir.

Anahtar Kelimeler: Enfeksiyon, farkındalık, hemşire, öğrenci, periferik venöz kateter, tutum

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Introduction

The peripheral venous catheter (PVC) is frequently used for administration of drug therapy, peripheral parenteral nutrition, hemodynamic monitoring, prevention of fluid and electrolyte loss, transfusion of blood and blood products, and diagnostic procedures (1-3). The PVC is used in 58-87% of hospitalized patients during their treatment (3,4). Although PVCs are a vital tool when applied correctly and effectively, they can also cause many complications, such as infiltration, tissue damage, pain, and phlebitis, due to patient-related factors and malpractise. These complications may occur during PVC application or 24-96 hours after catheter removal (1). PVC complications lead to an increased risk of repeated failed PVC procedures and catheter-related bloodstream infections. PVC-associated infections constitute a significant proportion of bloodstream infections (5). The development of PVC-associated infections leads to increased exposure to diagnostic and therapeutic interventions, prolonged hospitalization, and stress for patients and their relatives. It also increases the workload of healthcare professionals and the cost of healthcare expenditures (4,6,7). Catheter-acquired infections account for 12-35% of the mortality rate in hospitals (8).

PVC-associated infections can be prevented when the causative agents are considered and necessary precautions are taken (4,5). Increasing nurses' compliance with evidence-based practice guidelines and the use of checklists are recommended to prevent PVC-related complications (2-4,9). Nurses are responsible for the insertion, care, and evaluation of PVC in line with evidence-based information (3,8,9). Nurses' knowledge and awareness of international evidence-based guidelines for the prevention of PVC-associated infections is extremely important in terms of guiding the nursing care process and supporting clinical decisions. However, it is reported in the literature that there are deficiencies and obstacles in nurses' and nursing students' knowledge of evidence-based guidelines and reflection on research results in clinical practice (4,10-12). The use of research results and evidence-based practice in clinical settings is strongly emphasized in nursing education, although there are various challenges and barriers for nurses and nursing students related to the translation of theoretical knowledge into practice (6,11,13,14).

There is limited evidence in the literature regarding nursing students' knowledge of PVC management. Assessing students' adequate knowledge of this procedure at different levels of nursing education is important in terms of documenting learning outcomes, preventing complications, and supporting patient safety (15,16). Therefore, this study aimed to determine the attitudes and awareness of nursing students toward evidence-based practice in the prevention of peripheral catheter-associated infections.

Main Points

- Evidence-based practices can improve the quality of healthcare.
- Nursing students should understand the importance of evidence-based nursing in their undergraduate education.
- Performing peripheral venous catheterization in accordance with evidence-based guidelines can prevent complications such as infection.

Material and Method

Aim and Description

This descriptive cross-sectional study was conducted to determine the attitudes and awareness of nursing students toward evidence-based practices for the prevention of peripheral catheter-related infections.

Research Questions

What are the attitudes of nursing students toward evidence-based nursing?

What is the level of nursing students' awareness of evidence-based practices in the prevention of peripheral catheter-related infections?

Participant

The study population consisted of 2nd, 3rd and 4th year nursing students who were studying at a state university's school of health in January-February 2024 and engaged in clinical practice (n=381). No sampling calculation was performed in the study; the aim was to reach the entire population. The sample consisted of 327 students (participation rate 85.8%) who voluntarily agreed to participate in the study and completed the questionnaire forms.

Data Collection Tool

Student introduction form and information form on evidence-based practices in the prevention of peripheral catheter-associated infections and attitude scale toward the importance and use of evidence-based nursing for students were used for data collection. Research data were collected face-to-face from the students.

Student introduction form: This is a form prepared by the researchers to determine the socio-demographic and academic characteristics of nursing students, including age, gender, grade, taking research and biostatistics courses, taking evidence-based nursing courses, wanting to take postgraduate education, following scientific publications related to nursing, wanting to take part in scientific research, attending scientific meetings, and knowing how to search the literature, and consisting of a total of 10 questions (4,9,17,18).

Evidence-based practices in the prevention of peripheral catheter-associated infections information form: This form was prepared by the researchers in accordance with the Center for Disease Control and Prevention Guidelines for the Prevention of Intravenous Catheter Infections published in 2011 and the Turkish Society of Hospital Infections and Control National Vascular Access Management Guidelines

published in 2019 (17,18). The questionnaire comprises 14 questions to assess students' knowledge of evidence-based practices in the prevention of peripheral catheter-associated infections. Four of the items that make-up the form are related to the procedure of PVC insertion (1-4), three are related to the evaluation of PVC (5-7), four are related to PVC care (8-11) , and three are related to the frequency of PVC change (12-14). In the evaluation of the form, each application was considered as "I have knowledge (1 point)," "I have no knowledge (0 points)," and the evaluation was performed over the total number of known applications. The total score that can be obtained from the form varies between 0 and 14. The high number of items that the students evaluated as having knowledge indicated that their awareness of evidence-based practices in the prevention of peripheral catheter-associated infections was high. To ensure the content validity of the form, expert opinions were obtained from five faculty members specialized in the field of nursing principles and surgical diseases nursing, and a pilot study was conducted with 10 students outside the research group.

Attitude Scale on the Importance and Use of Evidence-Based Nursing for Students

The scale developed by Yanıkkerem et al. (20) in 2023 comprises 18 statements. The scale statements are in a 5-point Likert-type structure scored as "strongly agree", "agree", "undecided", "disagree" and "strongly disagree". The scale has two sub-dimensions: the importance of evidence-based nursing and the use of evidence-based nursing. The total score that can be obtained from the scale varies between 18 and 90, with higher scores indicating higher levels of attitude toward the importance and use of evidence-based nursing. In the study of Yanıkkerem et al. (20) the Cronbach's alpha value of the scale was found to be 0.94. In this study, 0.97 was found.

Data Collection Process

The data used in this study were collected from nursing students by the researchers. Students who voluntarily agreed to participate in the study were asked to read the questions carefully and answer them completely. It took approximately 5 minutes to answer the questionnaires.

Statistical Analysis

The IBM Statistical Package for the Social Sciences (version 21.0) software was used for data evaluation. The numbers and percentages were used to evaluate categorical variables, and the mean and standard deviation were used for continuous variables. Independent samples t-test and One-Way Analysis of Variance tests were used to compare quantitative continuous data between independent groups. The threshold value of statistical significance was set as $p<0.05$.

Ethical Consideration

Ethics committee approval was obtained from the Trakya University Non-Interventional Clinical Research Ethics Committee (no: 2023/518, date: 25.12.2023). The purpose of the study, the protection of personal information, confidentiality, and voluntary participation were explained to the participants in writing, and their informed consent was obtained. The Declaration of Helsinki was followed throughout the study. The principles of research and publication ethics were followed.

Results

The mean age of the nursing students who participated in the study was 21.21±1.84 years, 35.2% were studying in the second year, and 68.2% were female. 34.6% of the students took research and biostatistics in nursing and 28.1% took evidence-based nursing courses. 54.4% of the students followed scientific publications related to nursing, 69.1% wanted to take part in scientific research related to nursing, and 30.6% attended scientific meetings related to nursing. 37.9% of the students stated that they knew how to search scientific literature and 60.9% of them wanted to receive postgraduate education (Table 1).

Table 1.
Socio-demographic and Academic Characteristics of Nursing Students (n=327)

Variables	**Min-max**	**Mean ± SD**
Age (years)	**19-40**	**21.21±1.84**
	n	**%**
Classroom		
2nd grade 3rd grade 4th grade	115 98 114	35.2 30 34.8
Gender		
Female Male	223 104	68.2 31.8
Research and biostatistics course in nursing		
Yes No	113 214	34.6 65.4

Table 1.
Continued

Variables	Min-max	Mean ± SD
Having completed an evidence-based nursing course		
Yes No	92 235	28.1 71.9
Follow scientific publications related to nursing		
Yes No	178 149	54.4 45.6
To participate in scientific research related to nursing		
Yes No	226 101	69.1 30.9
Participating in scientific meetings (congress, symposium) related to nursing		
Yes No	100 227	30.6 69.4
To learn how to search the scientific literature		
Yes No	124 203	37.9 62.1
Wishing to pursue postgraduate education		
Yes No	198 124	60.6 39.4

Min=minimum, Max=maximum, SD=standard deviation

The mean total score of the nursing students on the attitude scale toward the importance and use of evidence-based nursing for students was 69.94±16.26, the mean score of the sub-dimension of the importance of evidence-based nursing was 30.73±7.11, and the mean score of the sub-dimension of the use of evidence-based nursing was 39.21±9.29. The mean score of the students' knowledge of evidence-based practices in the prevention of peripheral catheter-related infections was 12.37±2.64, the mean score of PVC insertion was 3.44±0.96, the mean score of PVC evaluation was 2.70±0.69, the mean score of PVC care was 2.84±0.56 and the mean score of PVC change frequency was 3.37±1.01 (Table 2).

In this study, the mean scores of second-year nursing students on the total and sub-dimensions of the attitude scale toward the importance and use of evidence-based nursing for students were significantly lower than those of third- and fourth-year students ($p<0.05$). The mean scores of the students who had taken evidence-based nursing courses were significantly higher than those of the students who had not taken this course ($p<0.05$). There was no significant difference ($p>0.05$) between the mean scores of the students' gender, the status of taking research and biostatistics courses in nursing, the status of following scientific publications, the status of wanting to take part in scientific research, attending scientific meetings, even searching the scientific literature, and the status of wanting to receive postgraduate education and the mean scores of the total and sub-dimensions of the attitude scale toward the importance and use of evidence-based nursing for students (Table 3).

In this study, the mean knowledge score of evidence-based practices in the prevention of peripheral catheter-associated infections was significantly higher among second-year students than third-year students, female students than male students, students who followed scientific publications related to nursing than those who did not, students who wanted to take part in scientific research related to nursing than those who did not, students who attended scientific meetings related to nursing than those who did not, students who knew how to search scientific literature than those who did not, and students who wanted to take postgraduate education than those who did not ($p<0.05$). There was no significant difference between the mean scores of the students' knowledge of evidence-based practices in the prevention of peripheral catheter-associated infections and their status of taking research and biostatistics in nursing and evidence-based nursing courses ($p>0.05$) (Table 3).

Nursing students had the highest knowledge (97.2%) about the practice of "Aseptic technique should be followed during insertion and care of peripheral intravenous catheters" and the lowest knowledge (74.9%) about the practice of "It is not necessary to change the infusion sets used continuously in patients who are not given blood, blood products or lipid emulsions at intervals more than 96 hours, but they should be changed at least every seven days" (Table 4).

Table 2.
Mean Scores of Nursing Students' Knowledge of Evidence-based Practices in the Prevention of Peripheral Catheter-associated Infections and Attitude Scale Scores for the Importance and Use of Evidence-based Nursing for Students (n=70)

	Scale range	Participant range	Mean ± SD
Attitude scale on the importance and use of evidence-based nursing for students	18-90	18-90	69.94±16.26
Importance of evidence-based nursing sub-dimensions	8-40	8-40	30.73±7.11
Use of evidence-based nursing sub-dimensions	10-50	10-50	39.21±9.29
Evidence-based practices in the prevention of peripheral catheter-associated infections information form	0-14	0-14	12.37±2.64
PVC installation	0-4	0-4	3.44±0.96
PVC evaluation	0-3	0-3	2.70±0.69
PVC care	0-3	0-3	2.84±0.56
The change frequency of PVC	0-4	0-4	3.37±1.01

PVC=peripheral venous catheter, SD=standard deviation

Table 3.
Comparison of Socio-demographic and Academic Characteristics of Nursing Students and Their Mean Scores of Knowledge of Evidence-based Practices in the Prevention of Peripheral Catheter-associated Infections Using the Attitude Scale Toward the Importance and Use of Evidence-based Nursing for Students

Variables	Attitude scale on the importance and use of evidence-based nursing for students	The importance of evidence-based nursing	Use of evidence-based nursing	Knowledge score for evidence-based practices in the prevention of peripheral catheter-associated infections
Classroom				
2nd grade 3rd grade 4th grade F p	65.25±17.85 71.47±13.99 73.35±15.38 8.075 **0.000** 2<3.4	28.72±7.84 31.19±6.17 32.36±6.54 8.152 **0.000** 2<3.4	36.53±10.10 40.28±7.99 40.99±8.93 7.839 **0.000** 2<3.4	12.78±2.38 11.77±3.22 12.46±2.22 4.033 **0.019** 2>3
Gender				
Female Male t p	69.79±15.93 70.26±17.00 -0.246 0.806	30.58±6.97 31.04± 7.43 -0.545 0.586	39.20±9.10 39.22±9.74 -0.013 0.989	12.65±2.33 11.75±3.12 2.604 **0.010**
Research and biostatistics course in nursing				
Yes No t p	71.47±16.37 69.13±16.18 1.240 0.216	31.60±7.08 30.27±7.10 1.606 0.109	39.87±9.43 38.85±9.22 0.940 0.348	12.54±2.43 12.27±2.74 0.888 0.375
Having completed an evidence-based nursing course				
Yes No t p	74.06±13.73 68.33±16.90 3.172 **0.002**	32.59±6.02 30.00±7.38 3.272 **0.001**	41.46±7.86 38.32±9.67 3.035 **0.003**	12.65±1.84 12.25±2.88 1.457 0.146

Table 3.
Continued

Variables	Attitude scale on the importance and use of evidence-based nursing for students	The importance of evidence-based nursing	Use of evidence-based nursing	Knowledge score for evidence-based practices in the prevention of peripheral catheter-associated infections
Follow scientific publications related to nursing				
Yes	70.97±17.00	31.28±7.42	39.68±9.66	13.06±1.85
No	68.71±15.28	30.07±6.68	38.64±8.83	11.54±3.15
t	1.261	1.552	1.016	5.166
p	0.208	0.122	0.310	**0.000**
To participate in scientific research related to nursing				
Yes	70.51±17.34	30.98±7.62	39.53±9.85	12.72±2.21
No	68.66±13.51	30.17±5.82	38.48±7.91	11.57±3.29
t	1.047	1.044	0.944	3.208
p	0.296	0.297	0.346	0.002
Participating in scientific meetings (congress, symposium) related to nursing				
Yes	69.63±17.53	30.73±7.73	38.90±9.89	12.89±2.06
No	70.08±15.70	30.73±6.84	39.34±9.04	12.14±2.83
t	-0.222	-0.006	-0.387	2.683
p	0.824	0.995	0.699	**0.008**
To learn how to search the scientific literature				
Yes	69.62±15.89	30.79±6.90	38.83±9.08	13.09±1.81
No	70.14±16.51	30.69±7.26	39.44±9.43	11.92±2.95
t	-0.281	0.112	-0.578	4.439
p	0.779	0.911	0.564	**0.000**
Wishing to pursue postgraduate education				
Yes	69.71±17.71	30.63±7.78	39.08±10.05	12.74±2.22
No	70.29±13.78	30.89±5.96	39.40±8.03	11.79±3.09
t	-0.330	-0.341	-0.315	3.037
p	0.742	0.733	0.753	**0.003**

t=independent samples t-test, F=One-Way Analysis of Variance

Table 4.
Distribution of Nursing Students' Knowledge About Evidence-based Practices for the Prevention of PVC-associated Infections

Evidence-based practices for preventing PVK-associated infections	I have the information n (%)	No information n (%)
PVC installation		
1. Only competent and trained personnel should be assigned for the insertion and maintenance of peripheral and central intravascular catheters.	280 (85.6)	47 (14.4)
2. In adults, peripheral catheters should be inserted into the veins of the upper extremities. A catheter inserted in the lower extremity should be removed as soon as possible, and a new catheter should be inserted in the upper extremity.	265 (81)	62 (19)
3. In pediatric patients, the back of the hand, foot, or scalp (in neonates and small infants) can be used for the insertion of peripheral catheters.	278 (85)	49 (15)
4. When selecting the catheter, the purpose of use, possible duration of use, known infectious and non-infectious complications (such as filebitis and infiltration), and experience of the person inserting the catheter should be taken into consideration.	305 (93.3)	22 (6.7)

Table 4.
Continued

Evidence-based practices for preventing PVK-associated infections	I have the information n (%)	No information n (%)
PVC evaluation		
5. The knowledge and compliance of all personnel involved in the insertion and maintenance of peripheral intravenous catheters with current guidelines should be periodically evaluated.	286 (87.5)	41 (12.5)
6. The catheter entry site should be checked daily. In cases where gauze is used, the catheter entry site should be palpated over the gauze to assess tenderness. If a transparent cover is used, daily inspection of the catheter entry site is sufficient. If the patient has no clinical signs of infection, the gauze dressing should not be removed. In the presence of local tenderness or possible signs of infection, the gauze must be removed, and the site of insertion must be visualized and evaluated.	303 (92.7)	24 (7.3)
7. PVCs should be removed if the patient develops phlebitis (warmth, tenderness, erythema or palpable vascular trace), signs of infection, or catheter dysfunction.	296 (90.5)	31 (9.5)
PVC care		
8. The aseptic technique should be followed during the insertion and maintenance of the peripheral intravenous catheter.	318 (97.2)	9 (2.8)
9. The skin should be wiped with an antiseptic solution (70% alcohol, tincture of iodine, iodophor or chlorhexidine gluconate) before inserting a peripheral intravenous catheter.	311 (95.1)	16 (4.9)
10. Sterile gauze or sterile, transparent, semi-permeable covers should be used to cover the catheter entry site.	300 (91.7)	27 (8.3)
The change frequency of PVC		
11. The catheter dressing must be changed when it becomes moist, loosened (integrity is impaired), or visible contamination occurs.	307 (93.9)	20 (6.1)
12. In adult patients, peripheral catheters do not need to be changed at intervals shorter than 72-96 hours to reduce the risk of thrombophlebitis and infection.	269 (82.3)	58 (17.7)
13. In children, peripheral catheters should be changed in the presence of clinical indications.	282 (86.2)	45 (13.8)
14. In patients who do not receive blood, blood products, or lipid emulsions, continuous infusion sets do not need to be changed more frequently than every 96 hours, but should be changed at least every seven days.	245 (74.9)	82 (25.1)

PVC=peripheral venous catheter

Discussion

Nursing Students' Attitudes Toward the Importance and Use of Evidence-based Nursing

Evidence-based nursing practices are an indispensable element for nurses, patients, and healthcare systems to improve the quality of healthcare (20). Evidence-based nursing is a problem-solving approach that evaluates the most current and best evidence with clinical expertise and considers the patient's preferences and needs (19,20). Evidence-based practices have been shown to reduce length of stay and cost of care, eliminate unnecessary practices, improve quality of care, and improve patient outcomes (9,20). Therefore, it is important to inform students about evidence-based nursing practices in undergraduate nursing education and to develop a positive attitude toward this issue (11,15,19). In this study, nursing students' attitudes toward the importance and use of evidence-based nursing were found to be above the middle level. Studies examining nursing students' attitudes toward evidence-based nursing have shown that students' attitudes are above the middle level (16,21-23). It is important to comply with evidence-based practices to prevent peripheral catheter-related infections. However, nursing students who participated in our study exhibited deficiencies regarding the importance and use of evidence-based practices.

The attitudes of 2nd grade nursing students toward the importance and use of evidence-based nursing were lower than those of 3rd and 4th grade students. It is believed that the knowledge and experience of 2nd grade students are lower than those of other grades, which led to this finding. In this study, we determined that students who took evidence-based nursing courses had higher attitudes toward the

importance and use of evidence-based nursing. In our country, evidence-based nursing courses are conducted either as elective courses or as a subject integrated into another course. Integrating evidence-based nursing courses into nursing education curricula will increase students' attitudes toward the importance and use of evidence-based nursing (24). In the institution where the study was conducted, an evidence-based nursing course is an elective course. Considering that students who take this course will have higher levels of knowledge about evidence-based nursing, their attitudes are positively affected in parallel.

Nursing Students' Awareness of Evidence-based Practices for Preventing Peripheral Catheter-associated Infections

PVC, a basic intervention in healthcare services, is the process of entering the patient's peripheral vein using a short catheter (4). It is the responsibility of nurses to ensure appropriate care of PVC application using evidence-based information and to provide the necessary follow-up information to prevent complications that may arise (4,6,8,18). In the present study, nursing students had a high awareness of evidence-based practices for the prevention of peripheral catheter-related infections. Nurses should improve their knowledge and skills to provide the necessary care for their patients. Knowledge and implementation of evidence-based practice guideline recommendations for the prevention of PVC-associated infections play an important role in the prevention of infection development (4,8). In our study, students had the highest awareness of PVC insertion and the lowest awareness of PVC replacement. In a study conducted by Dayan et al. (8) with nurses, it was reported that nurses had more knowledge about PVC insertion and less knowledge about PVC replacement.

The students had the highest awareness of evidence-based practices in the prevention of peripheral catheter-related infections based on compliance with the aseptic technique during peripheral intravenous catheter insertion and care. In the literature, it has been reported that nurses and nursing students have high levels of knowledge about ensuring hand hygiene before peripheral catheter insertion and compliance with aseptic technique (6-8). The main determinants of PVC-associated infections are hand hygiene, compliance with the aseptic technique, preparation of intravenous solutions, and duration of catheter stay (6,17,18). The necessity to comply with the aseptic technique in both PVC and all other nursing applications is one of the most emphasized aspects of education. Therefore, it is expected that students will have the highest rate of awareness for this item.

It was determined that the lowest awareness of the students regarding evidence-based practices in the prevention of peripheral catheter-associated infections was that it was not necessary to change the infusion sets used continuously in patients who were not given blood, blood products, or lipid emulsions more frequently than 96 hours, but at least every seven days. In the literature, it has been stated that the knowledge level of nurses and nursing students regarding the prevention of PVC-associated infections is not sufficient with the replacement of infusion sets more frequently than every 96 hours when neither lipid nor blood products are administered (3,8). The lack of sufficient evidence regarding the known optimum usage time can be considered as an important factor affecting the low level of knowledge on this subject. It is thought that determining and implementing a protocol regarding the frequency of change of infusion sets by utilizing evidence-based practices in clinical areas and informing students about this protocol will increase the awareness of students (6,15).

Among the nursing students who participated in the study, it was determined that students who followed scientific publications related to nursing, wanted to take part in scientific research related to nursing, attended scientific meetings related to nursing, knew how to scan scientific literature, and had a higher awareness of evidence-based practices in the prevention of peripheral catheter-related infections. It has also been reported in the literature that students who follow scientific publications and attend scientific meetings have higher attitude scores toward evidence-based nursing (22,23). To use evidence-based nursing practices, the ability to access and use scientific knowledge is essential. Participation in congresses and symposiums contributes to the foundation of nursing care practices and the development of professional developments. It is inevitable that students who follow scientific publications, participate in scientific meetings, and know how to access information will base their professional knowledge and practices on a more professional basis and use new information to perform their profession in the best way in line with evidence-based practices (22,24).

Study Limitations

The research data were based on the self-reports of the students, and no observation was made on whether the students applied evidence-based practices. The research was conducted in an institution; thus, the results of this study cannot be generalized to all nursing students.

Conclusion

Nursing students' attitudes toward the importance and use of evidence-based nursing are above the medium level, and their awareness of evidence-based practices in the prevention of peripheral catheter-related infections is high. The students had the highest awareness of PVC insertion and the lowest awareness of PVC replacement. Following scientific publications related to nursing, wanting to take part in scientific research related to nursing, attending scientific meetings related to nursing, and knowing how to scan scientific literature increase students' awareness of evidence-based practices in the prevention of peripheral catheter-related infections. Taking evidence-based nursing courses increases students' attitudes toward the importance and use of evidence-based nursing. To increase nursing students' attitudes and awareness toward evidence-based

practice in the prevention of PVC-associated infections, evidence-based nursing courses should be added to the nursing education curriculum as a compulsory course, and students should be encouraged to conduct scientific research and participate in scientific activities.

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Informed Consent: Their informed consent was obtained.

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Footnotes

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