

Oncology nurses' knowledge about central line catheter: Caring, complications, and applications among cancer patients—A cross-sectional study

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The aim of the present study was to assess the oncology nurses' knowledge about central line catheters and their care, complications, and applications. A descriptive cross-sectional design was used. A sample of 150 nurses from oncology units participated. A knowledge-based test consisting of 50 multiple choice questions was used to test the nurses' knowledge level. The results showed that overall satisfactory level of nurses' knowledge was 50% (75 nurses). The results indicated that there was a significant difference in the nurses' knowledge according to their academic qualification level ($\chi^2 = 7.256$; $P = .03$). In addition, the results showed that there was a significant difference in nurses' knowledge about central line catheters and their care, complications, and applications according to their experience length ($\chi^2 = 17.321$; $P = .000$). Expert nurses were more knowledgeable compared with nurses with less experience. Based on these results, continuing education through conducting educational programs is recommended to keep the nurses aware about recent evidence-based practices. (J Vasc Nurs 2018; ■:1-4)

Central arterial and venous catheters are used for different purposes including patient monitoring, kidney dialysis, central feeding, blood sampling, and medication administration.¹ However, wide range of serious complications is associated, such as thrombosis, contaminations, dislodgment, and pinch-off syndrome. Consequently, health professionals, particularly nurses who use these catheters, should practice ideally to prevent or minimize these complications.^{2,3}

For decades, using central line catheter is increasing worldwide; more than 150 million devices are used annually in the United States.⁴ Furthermore, central line catheters such as central lines, arterial lines, and port catheter are considered as lifesaving tools and can be used in emergency situations for critically ill patients.⁵ Unfortunately, catheter-related bloodstream infection (CRBSI) is considered one of the most common complications related to these catheters' implementation.⁶ This complication is associated with poor outcome on the patients' health condition, such as increasing length of stay, increasing mortality rate, and delaying the treatment regimen. In addition, it has a cost impact on the health-

care system. In the United States, it is estimated that the cost was more than 2 billion dollars annually.⁷ In addition, infection associated with these catheters account 10%–20% of all hospital-related infections. In fact, 70% of these incidences are preventable.⁵

For immunocompromised patients such as cancer patients, CRBSI is a common complication related to the use of central catheter. It is estimated that CRBSI occurs at a rate of 0.7–7.4 infections per 1,000 catheter.^{8,9} In fact, survival rate for cancer patients is increased in the past decades because of developing technology, informative database, increased screening, and use of advanced treatment modalities.¹⁰

CRBSI percentage is a vital and important indicator for the quality of care. Health-care professionals play a key role in preventing the catheter-related infections. Nurses are the health professionals who deal with the central catheters extensively during the insertion, dressing, and fluid administration.¹¹ In general, only limited information and knowledge regarding central line catheters are provided to undergraduate nursing students during their study.¹² Previous literature indicated that a humble number of effective training programs were provided for undergraduate nursing students.¹³ Topics related to the anatomy, indications, and overview about the procedure and equipment were only covered.¹⁴ Importantly, conducting continuous education programs for registered nurses will improve their management competencies and increase their knowledge related to caring, complications, and application. This will lead to minimize the complication rate, especially of the CRBSI. Thus, this study was conducted to assess oncology nurses' knowledge about central line catheter and their care, complications, and applications. These results of the present study will be used to determine the needs of oncology nurses and then conduct educational program based on their needs.

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MATERIALS AND METHODS

This study was conducted to assess the oncology nurses' knowledge about Central Venous Catheter: caring, complications, and applications. A descriptive cross-sectional design was used. A sample of 150 nurses from different oncology units including surgical, medical, bone marrow transplantation, pediatric, and adult outpatient clinics completed the self-reported questionnaire, with a response rate of 75%. The survey was a knowledge-based test. It had 50 multiple choice questions and was developed by the researcher to test the nurses' knowledge level. The questions were picked from related text books and literature. Face and content validities were measured by the researcher through consultation with experts in both clinical and academic fields of oncology nursing. The total score of the test was 100 (each question was weighted by a score of 2). The critical score was 60 (it is the passing score for nursing in Jordan). A score of 60 and above was considered satisfactory level, and below this was considered as unsatisfactory level. Additional information was collected, including age, gender, experience, and level of academic qualification. Inclusion criteria were the nurse should be working in oncology unit, not have undergone specific course about central line catheters, and be exposed to central line catheters. Ethical approval was granted before conducting the study, and participants voluntarily participated in the study. Information sheet including the purpose of the study and methods were provided. Data were collected by a research assistant who was qualified and working as registered nurse in a different hospital. Data cleaning and verification was done. SPSS, version 23, was used to run the analysis of the data.

RESULTS

A sample of 150 nurses participated in the present study. Of 150, 85 were female nurses (56%) and 65 were male nurses (44%). According to the age, 45 (30%) nurses were aged between 20 and 25 years, 40 (26%) were aged 26–30 years, and 44% (65) were aged 30 years and more. Data analysis of the level of academic qualification showed that majority of the participants have bachelor's degree (68%), diploma degree (26%), and postgraduate degree (6%) in nursing (Table 1).

Level of knowledge among oncology nurses were assessed in the present study. Their knowledge regarding central line catheters' caring standards, complications, and applications was assessed. The results indicated that satisfactory rate was low (53.9%) among the bachelor academic qualification nurses. In addition, even low satisfactory rate was reported among diploma academic qualification nurses (32.5%). High satisfactory rate was achieved by postgraduate academic qualification nurses (85%). Table 2 shows these results.

To identify if there is a significant difference between the nurses' knowledge according to their academic qualification, further analysis was performed using chi-squared analysis. The results indicated that there was a significant difference in nurses' knowledge according to their academic qualification level ($\chi^2 = 7.256$; $P = .03$).

Years of experience was also considered in the analysis. The results showed that there was a significant difference in nurses' knowledge about central line catheters and their care, complications, and applications According to their experience length

TABLE 1

SAMPLE CHARACTERISTICS (N = 150)

Variables	Frequency Percentage	
	(n)	(%)
Sex		
Men	65	44
Women	85	56
Age		
20–25 y	45	30
36–30 y	40	26
30 y and above	65	44
Level of academic qualification		
Diploma in General Nursing	40	26
Bachelor of Science in Nursing	102	68
Postgraduate degree	8	6
Years of experience		
1–3 y	112	74.6
4–8 y	33	22
8 y and above	5	3.4

($\chi^2 = 17.321$; $P = .000$). Expert nurses were more knowledgeable compared with nurse with less experience.

DISCUSSION

Central line catheter is a life-sustaining device that has been used for many purposes. It is considered an essential tool for wide range of patients, particularly cancer patients. Central line catheters are frequently used for patients with cancer and those who require chemotherapy administration. However, central line catheters are associated with serious and life-threatening complications such as infection. These complications happen during insertion, caring, and frequent use.

Nurses are responsible for providing continues care for the central line catheters for hospitalized and nonhospitalized patients. It could be assumed that nurses are completely aware of the standard evidenced-based guideline for central line catheters care and have optimal knowledge regarding caring, complications, and application standards. This assumption was proved to be incorrect.¹⁵ The previous literature addressed the importance of nurses' knowledge regarding central line catheters standards in prevention of the associated adverse events.^{7,11,13}

Nurses' knowledge about the central line catheters and their care, complications, and application was assessed in the present study. The results showed that a high percentage of nurses working in different oncology units had unsatisfactory level of knowledge regarding recent standards and evidenced-based caring protocol, complications, and application related to central line catheters. The explanation for these results might be that not all nurses working with cancer patients are aware of and adhere

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