American Journal of Infection Control ■■ (2017) ■■-■■

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major Article

Knowledge and practices of isolation precautions among nurses in Jordan

Mohammad Suliman PhD, RN [a,*], Sami Aloush PhD, RN [b], Maen Aljezawi PhD, RN [a], Mohammed AlBashtawy PhD, RN [a]

[a] Department of Community and Mental Health Nursing, Al al-Bayt University, Mafraq, Jordan
[b] Department of Adult Health Nursing, Al al-Bayt University, Mafraq, Jordan

Key Words:
Health care–associated infection
isolation precautions
personal protective equipment
compliance

Background: Implementation of isolation precautions from the Centers for Disease Control and Prevention (CDC) has been justified through research and clinical evidence. However, nurses' understanding and compliance with these precautions is still unknown. The aim of this study was to assess nurses' knowledge and practices in relation to isolation precautions in Jordan.

Methods: A cross-sectional, descriptive design was used. The study took place in 8 hospitals in Jordan. A self-reported questionnaire and an observational checklist were developed based on the CDC (2007) isolation precautions guidelines.

Results: A total of 247 questionnaires were returned out of 400, for a response rate of 61.7%. The results show that most nurses (90%) have good knowledge of isolation precautions. However, only 65% of nurses reported good compliance with isolation precautions. The results of a *t* test revealed that nurses with Bachelor's degrees perform better in knowledge examinations than nurses with 2-year diplomas ($P < .001$). However, there was no significant difference in knowledge and self-report practices scores based on nurses' previous training and existence of isolation guidelines in their units or wards ($P > .05$). The results of the checklists confirm that there is a low compliance with standard isolation practice. In addition, the checklist shows that a high percentage of units and wards do not use isolation signs (46.4%) and posters (34.5%).

Conclusions: This study revealed that educating nurses about isolation is not enough strategy to improve their compliance. It is important to adapt other strategies, such as supporting nurses by giving them a manageable workload, and providing more supplies and reminders of isolation precautions in the hospitals.

Globally, health care–associated infections have become a medical challenge in health care settings.[1] It is estimated that >1.4 million people worldwide get infectious complications in hospitals.[2,3] The World Health Organization reported a noteworthy incline in the rate of hospital-acquired infection in developing countries in comparison with developed countries. A recent study found that hospital-acquired infection is 5 times higher in developing countries.[4] The rates of device-associated infection range from 8.2-16.1 per 1,000 device-exposed days in developing countries.[5]

In Jordan, infectious diseases are still one of the main causes of morbidity.[6] Acute respiratory diseases and hepatitis are 2 of the leading causes of morbidity in the region.[6] In recent years, several infectious agents have emerged such as the Ebola virus, Middle East respiratory syndrome coronavirus, and Avian influenza in humans.[7] Increased national efforts are required to control the spread of these infectious diseases. Medical isolation and infection control practices should be enforced by health care workers to prevent transmission of health care–associated infections.[8]

As health care workers, nurses in Jordan form part of the health care team responsible for implementing patient isolation and following standards and disease-specific isolation precautions.[9] However, many previous studies have suggested that nurses do not strictly adhere to these precautions.[5,10,11] Other studies claim that nurses' inadequate knowledge about standard isolation precautions could explain why infection control activities are often carried out with poor results in health care settings.[12-14] However, other studies have claimed that education alone is not enough.[10,11] The Centers for Disease Control and Prevention encourage the implementation of training programs for health care workers about isolation precautions to prevent the spread of infectious diseases.

* Address correspondence to Mohammad Suliman, PhD, RN, Department of Community and Mental Health Nursing, Al al-Bayt University, PO Box 130040, Mafraq, Jordan 25113.
E-mail address: mbarahemah@aabu.edu.jo (M. Suliman).
Conflicts of interest: None to report.

0196-6553/
https://doi.org/10.1016/j.ajic.2017.09.023

The recommendation also includes frequent assessment of knowledge and isolation precautions practices.[8]

Many studies across the world have measured nurses' knowledge, attitude, and practice of standard isolation precautions. Most have used descriptive cross-sectional designs and different self-report tools to measure knowledge, attitude, and practice. The results of the studies highlighted the health care workers' inadequate knowledge about common transmission mechanisms and their improper attitude and practices in relation to isolation standards for infection control practices. The main recommendations of these studies were to focus on infection control in nursing curricula, provide more continuous education programs at the hospitals, apply more monitoring and supervision of standards and isolation precautions, and provide isolation structures and supplies in hospitals.[5,10,13,15,16]

Few studies have investigated infection control knowledge and practice in Jordan.[17-19] Al-Rawajfah et al[17] reported nurses' lack of adherence regarding principles of infection control. In addition, Al-Rawajfah and Tubaishat[19] found that students demonstrated a lack of knowledge regarding different infection control practices. Similarly, many national studies found that nurses and nurse students have some lack of knowledge regarding different infection control topics, such as prevention of central venous line infection and ventilator-associated pneumonia. These studies concluded that there might be a lack of administration of these topics into nursing curricula and lack of clinical training in the Jordanian hospitals about infection control practices.[20-22] However, no study was found that assessed nurses' knowledge of isolation precautions and its relationship with their practices. Therefore, the purposes of this study were to assess nurses' knowledge of and practices in relation to isolation precautions in Jordan.

Our research questions were as follows: (1) What do nurses know about isolation precautions?; (2) What are nurses' practices in relation to isolation precautions?; (3) Is there sufficient structure and supplies that support isolation practices?; and (4) What are the factors associated with nurses' knowledge and practice in relation to isolation precautions?

METHODS

This study used a cross-sectional and descriptive design by distributing 400 self-report questionnaires to nurses and asking trained data collectors to complete observational checklists from 33 units and 51 wards. The study was conducted in 7 governmental and 1 university hospitals in Jordan. The questionnaire and observation checklist were adapted and developed based on the Centers for Disease Control and Prevention 2007 isolation precautions guidelines and previous studies.[5,8,9] Ethical approval was obtained from AL al-Bayt University and the selected hospitals.

The questionnaires include 5 questions regarding nurses' demographics and background, 12 true or false questions about nurses' knowledge, and 14 questions about nurses' practices in relation to isolation precautions. The knowledge questions have true, false, and I do not know responses; the practice questions have 3 Likert scale responses: never, sometimes, and always. The observation checklist included 8 yes or no questions about the availability of isolation rooms and supplies and 2 questions about nurses' compliance with standard- and transmission-based infection control practices. Knowledge questions were assigned a score of 1 for correct answers and 0 for false and I do not know answers. The answers to the practice part were scored as 0 for never and sometimes and 1 for always. The total knowledge and practices scores were calculated and converted to a percentage. For this study, knowledge and practice were defined as good (>75%), acceptable (50%-75%), and poor (<50%).[16]

The questionnaire and observation checklist were assessed for content validity by a group of PhD holders from Al al-Bayt University. The doctors were asked to check the questionnaire and the checklist for clarity and comprehensiveness and modify them where necessary. In addition, to assess the questionnaire's reliability, a pilot study was conducted with 20 nurses. The questionnaire showed good internal consistency with a Cronbach α reliability of 0.77 for the practice part and 0.89 for the knowledge part.

The researcher used 3 trained data collectors from Al al-Bayt University with Master's degrees in nursing to distribute the questionnaires and to complete the observation checklist. The main researcher delivered a 2-hour training session to them beforehand. The training included looking at the content of the observation checklist and how to complete it. For the questionnaires, the data collectors were to ask nurses to participate in the study after describing the study's aim and content. During data collection, verbal consent was gained from each participant after they had read the covering letter, which included details about their rights in relation to their participation. For the observation checklist, the data collectors visited the units and wards 3 times for 1 hour each visit to complete the checklists. Later, all completed sheets were checked by the data collectors for accuracy and completeness.

Statistical analysis

All data were analyzed using SPSS version 17 (IBM, Chicago, IL). Descriptive statistics, such as frequencies, percentages, means, and SDs, and inferential statistics such as 2-group *t* tests were used. Results were considered statistically significant at $P = .05$.

RESULTS

A total of 247 questionnaires were returned out of 400, for a response rate of 61.7%. The mean age of the nurses was 34 ± 4.9 years. Approximately two-thirds were women (67.9%), and one-third were men (32.1%). The mean number of years of nurses' experiences was 11.5 ± 6.1. Most nurses had Bachelor's degrees (65%); 60.1% of them had previous training on isolation precautions (Table 1).

According to Table 2, the results of the knowledge part show that of the 12 knowledge questions, the nurses had a mean score of 10.3 ± 1.5. According to our knowledge definitions, the results show that most of the nurses (90%) have a good knowledge of isolation precautions, whereas only 10% demonstrated acceptable or poor knowledge. Nurses mainly demonstrated lack of knowledge about disease-specific isolation precautions. For example, there was a low percentage of correct answers for the precautions of contact isolation question (42.2%), airborne isolation question (40.7%), and when a negative-pressure room should be used question (40.7%).

Table 1
Nurse and unit characteristics (243 nurses)

Characteristic	n (%)
Nurses' age (y)	
20-30	60 (24.7)
31-40	161 (66.3)
41-50	22 (9.0)
Nurses' sex	
Male	78 (32.1)
Female	165 (67.9)
Nurses' education	
Associate	60 (24.7)
Register	183 (75.3)
Experience (y)	
≤10	60 (24.7)
>10	183 (75.3)
Previous training on isolation	
No	97 (39.9)
Yes	146 (60.1)