American Journal of Infection Control 42 (2014) 744-9

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major article

Nursing students' intentions to comply with standard precautions: An exploratory prospective cohort study

Ilana Livshiz-Riven PhD, RN [a,b,*], Ronit Nativ MPH, RN [b], Abraham Borer MD [b,c], Yaniv Kanat-Maymon PhD [d], Ofra Anson PhD [c]

[a] Department of Nursing, Recanati School for Community Health Professions, Faculty of Health Sciences, Ben-Gurion University of the Negev, Beer-Sheva, Israel
[b] Infection Control and Hospital Epidemiology Unit, Soroka University Medical Center, Beer-Sheva, Israel
[c] Faculty of Health Sciences, Ben-Gurion University of the Negev, Beer-Sheva, Israel
[d] School of Psychology, Interdisciplinary Center, Herzliya, Israel

Key Words:
Cohort study
Infection control and prevention
Nursing education
Occupational risk perception
Safety climate
Sense of coherence
Standard precautions
Transtheoretical model of change (TTMC)

Background: Partial compliance of health care workers with standard precaution (SP) guidelines has been extensively documented. The aim of this study was to describe the development of nursing students' intentions to comply with SPs.

Methods: Prospective cohort study. Two consecutive classes of a 4-year bachelor of nursing program completed questionnaires 3 times. The transtheoretical model of change was used to describe the change in intentions to comply with SPs. Factor analysis displayed 2 behavioral categories: commonly used standard precautions (CUSPs) and less commonly used standard precautions (LUSPs). Knowledge, risk perception, sense of coherence (SOC), safety climate (SC), and emphasis given by educators were evaluated as associated factors.

Results: Of the 91 students, 85 (93%) completed the questionnaire during their second year, 57 of 88 students (65%) completed it during the third year, and 70 of 82 students (85%) completed it at the end of the fourth year. Of the 82 students, 45 (55%) completed 3 measurements. CUSPs exhibited a rise from the second to the third year, with a moderate decline from the third to the fourth year, whereas LUSPs continued ascending. CUSPs were positively associated with SC and SOC; LUSPs were commonly associated with risk perception.

Conclusion: The different evolution of CUSPs and LUSPs and dissimilar associations may suggest that different strategies might encourage diverse SP behaviors. Improving the SC might be appropriate when aiming to encourage CUSPs, and highlighting risks may be appropriate to encourage LUSPs.

Health care—associated infections (HAIs) are adverse events occurring because of utilization of health care services.[1,2] These unnecessary complications pose needless financial burden and human suffering on patients, families, health care personnel, and health care organizations.[3-5] Isolation precaution (IP) guidelines, designed by the Centers for Disease Control and Prevention (CDC), were written to enhance biosafety in health care settings. Within the IPs, standard precautions (SPs) comprise the fundamental tier, which aims to prevent the cross-contamination of unknown and known infectious agents transmittable by contact with blood or body fluids. SPs are designed to be used by all health care workers (HCWs) when caring for all patients.[1]

The recommendations for application of SPs for the care of all patients in all health care settings includes the following: (1) hand hygiene (HH) after touching blood, body fluids, secretions, excretions, contaminated items, immediately after removing gloves, and between patient contacts; (2) using disposable gloves for touching blood, body fluids, secretions, excretions, contaminated items, mucous membranes, and nonintact skin; (3) using mask, eye protection (goggles), or face shield during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, or secretions, especially suctioning and endotracheal intubation; (4) using a gown during procedures and patient care activities when contact of clothing/exposed skin with blood/body fluids, secretions, and excretions is anticipated; (5) handling soiled patient care equipment in a manner that prevents transfer of microorganisms to others and the

* Address correspondence to Ilana Livshiz-Riven, PhD, RN, Department of Nursing, Recanati School of Community Health Professions, Ben-Gurion University of the Negev, POB 653, Beer-Sheva 8410501, Israel.
E-mail address: Livshiz@exchange.bgu.ac.il (I. Livshiz-Riven).
Conflict of interest: None to report.

0196-6553/$36.00 - Copyright © 2014 by the Association for Professionals in Infection Control and Epidemiology, Inc. Published by Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.ajic.2014.04.002

environment; (6) developing procedures for routine care, cleaning, and disinfection of environmental surfaces, especially frequently touched surfaces in patient care areas as a measure of environmental control; (7) handling textiles in a manner that prevents transfer of microorganisms to others and to the environment; (8) safe disposal of needles and other sharps; (9) patient placement by prioritizing to reduce risk of pathogen transmission; and (10) respiratory hygiene/cough etiquette instruction to symptomatic persons to cover mouth/nose when sneezing/coughing.[1,6]

The partial compliance of HCWs with SPs has been extensively researched during the last several decades, with compliance ranging from <30% in HH to >90% in appropriate sharps disposable.[7,8] A substantial proportion of research focusing on HCWs' compliance with IPs was on proper handling and disposal of sharps and HH.[7,9] The focus on HCW compliance with HH guidelines might be explained, in part, by the World Health Organization's engagement in reducing HAIs through improving HCWs' HH.[5]

In the quest for ways to enhance HCWs' compliance with SPs, studies have found that knowledge and social factors (eg, safety climate, organizational campaigns) have a positive influence on attitudes and behaviors regarding infection control and prevention.[10-12] Students of health care professions might also be susceptible to the impact of the same cognitive and social factors as the HCWs while their intentions to comply and their patterns of behavior regarding infection control and prevention are being formed.

The current study uses the transtheoretical model of change (TTMC) developed by Prochaska et al,[13] which posits that behavior change involves progress through 5 stages: (1) precontemplation, when the behavior is not under any consideration; (2) contemplation, when the behavior is under consideration, and one starts to look at pros and cons of acting; (3) preparation, when intending to take action in the immediate future and may begin taking small steps toward behavior change; (4) action, when making specific overt modifications in behavior; and (5) maintenance, when the behavior is practiced for at least several months.

Jeffe et al[14] used the TTMC to describe medical students' stages of intention to comply with SPs. They found that preclinical medical students are at different stages of intention to comply than students who were exposed to clinical rotations. In agreement with those findings, the current study aims to describe the development of nursing students' intentions to comply with SPs during the years of formal training and to explore potentially associated organizational, cognitive-social factors.[5,15-17]

METHODS

Study design

This is a prospective observational cohort study conducted by following the evolution of nursing students' intentions to comply with SPs as they progress through their formal education. The curriculum in this particular program includes SP guidelines taught in the first year of studies. This part of the program, similar to most nursing bachelor degree programs in Israel, is based on the CDC guidelines[1] that were adopted by the Israel Ministry of Health.[18]

Two consecutive classes of a 4-year bachelor of nursing program (starting their second year during 2004 and 2005 and ending in 2006 and 2007, respectively) were asked to answer self-administered questionnaires 3 times during their formal training: (1) at the middle of the second year in the program, a preclinical period with a minimal clinical exposure (time 1); (2) at the end of the third year and after major clinical rotations, under the guidance of clinical instructors affiliated with the university (time 2); and (3) at the end of the fourth year after an advanced and prolonged clinical training period conducted under the supervision of clinical preceptors working mainly at the hospital (time 3). School management and the ethics committee approved the study. Participation in the study was not obligatory. The participating students received a letter explaining the importance of the study and that anonymity would be guaranteed. The last 3 digits of students' identification numbers were used to match the 3 times they completed the questionnaire to strengthen the internal validity of the study.

Questionnaire design

The questionnaire included demographic data and the following sections. The first section included intentions to comply with SPs, based on the questionnaire by Jeffe et al[14] originally measuring medical students' intention to comply with SPs, using the stages of behavioral change developed by Prochaska et al.[13] The study by Jeffe et al[14] was published 5 years prior to the start of our cohort study and fit its theoretical framework. The current study focused on the following 6 behaviors: (1) appropriate use of disposable gloves, (2) proper disposal of sharps, (3) consistent performance of HH before and after each patient contact, (4) consistent performance of HH before and after using disposable gloves, (5) appropriate use of protective goggles, and (6) appropriate use of gowns and aprons (Table 1). Each behavior could be in any of 5 stages of change: precontemplation, contemplation, preparation, action, and maintenance (properties of this section and the statistical approach used for these measurements are subsequently presented). The 5 stages of change were represented on a 5-point Likert scale referring to the students' intentions to comply with SPs and equivalent to progression across the TTMC model. The second section included knowledge regarding bloodborne pathogens (BBPs) and included 7 questions based on the questionnaire developed by Jeffe et al.[14] Cronbach α ranged from .65 to .68 for the 3 times measured (knowledge 1). An additional 12 questions assessed the students' knowledge regarding the need for using SPs in caring for various patients. Cronbach α was .75, .77, and .79 at times 1, 2, and 3, respectively (knowledge 2). Twenty-one questions assessed students' knowledge regarding suitable selection of appropriate personal protective equipment and HH measures in various clinical situations. Cronbach α was .77, .76, and .68 at times 1, 2, and 3, respectively (knowledge 3). The third section on perception of professional risk of contracting BBPs was assessed using questions from Jeffe et al,[14] ranging from very high to very low on a 4-point Likert scale (3 questions; Cronbach $\alpha = .82, .78$, and .80 at times 1, 2, and 3, respectively), and estimation of the BBP prevalence in the general population in the region (3 additional questions; Cronbach $\alpha = .94$, .71, and .82 at times 1, 2, and 3, respectively). The fourth section included the concept of the personality trait sense of coherence (SOC) from Antonovsky,[19] which measured coping abilities with various general stressful life situations (13 questions on a 7-point Likert scale; Cronbach $\alpha = .65$, .77, and .84 at times 1, 2, and 3, respectively). The fifth section included an organizational safety climate (SC) questionnaire built by Gershon et al, [20] published 3 years prior the beginning of our cohort study, and measured HCWs' perceptions regarding hospital SC with respect to institutional commitment to BBP risk management programs. We used the questionnaire by Gershon et al[20] to assess students' perceptions regarding the SPs SC in clinical settings (20 questions on a 5-point Likert scale; Cronbach $\alpha = .90$, .88, and .91 at times 1, 2, and 3, respectively). The final section included the emphasis given on SP compliance by formal educators in various areas of nursing education and was also measured on a Likert scale (6 questions on a 6-point Likert scale; Cronbach $\alpha = .56$ and .75 at times 2 and 3, respectively). Time 1 was missing because most of the students were unfamiliar with most of the formal educational leaders in the different clinical areas of nursing.