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Influencing factors on hand hygiene behavior of nursing students based on theory of planned behavior: A descriptive survey study

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SUMMARY

Background: Hand hygiene is the single most important measure to prevent transmission of infection, but the compliance rate of healthcare workers is relatively low.
Objectives: This study was conducted to identify the knowledge, beliefs, behavior, and affecting factors about hand hygiene among nursing students.
Design: A descriptive survey study.
Settings: The study was carried out in two South Korean nursing schools.
Participants: A total 208 nursing students participated in this study.
Methods: Questionnaires were used to collect data.
Results: The percentage of correct answers in the survey section concerning hand hygiene knowledge was 68.1%. No significant difference in the knowledge, behavioral beliefs, normative beliefs, or control beliefs data was found related to general characteristics. Behavioral beliefs correlated with normative beliefs ($r = .25$, $p < .001$) and hand hygiene behavior ($r = .17$, $p = .017$), and control beliefs correlated with hand hygiene behavior ($r = .18$, $p = .010$).
Conclusion: The results suggest that knowledge is not enough to change the beliefs related to hand hygiene; positive behavioral beliefs and strong control beliefs are also needed to increase hand hygiene compliance.

Introduction

Healthcare-associated infections (HAIs) delay patients' recovery and consequently extend hospital stays, increase medical expenses, and lower the quality of medical services (Pada et al., 2010; Pittet et al., 2006). The importance of hand hygiene is emphasized as the most effective and economical method for reducing HAIs (Pittet et al., 2006). Hand hygiene is considered a behavior of cleaning the hands that includes hand-washing with soap and water and hand-rubbing using hand sanitizer without water (World Health Organization, 2009). Among healthcare workers, nurses are the ones most exposed to patients since they are in contact 24 h a day; because of this, their hand hygiene compliance is critical in preventing HAIs.

Background

Hand hygiene is the single most important measure to prevent transmission of infection. However, healthcare workers' hand hygiene compliance is not known to be high (Korniewicz and El-Masri, 2010; O'Boyle et al., 2001), and reported causes of the low compliance rate include busyness, skin irritancy, lack of related facilities and supplies, and lack of knowledge (O'Boyle et al., 2001; Pittet, 2004). Various strategies have been developed and tested for enhancing hand hygiene compliance, but most have been only temporarily effective (Jeong and Kim, 2013). A number of studies (Jeong and Kim, 2012; Lee et al., 2005; McLaughlin and Walsh, 2011; Pittet, 2004; Wandel et al., 2010) have been conducted in order to explain the factors determining hand hygiene behavior from the perspective of behavioral theory and behavioral science. Theories applicable to the promotion of hand hygiene compliance in the practice of infection control are the health belief model, the theory of reasoned action, the theory of planned behavior (TPB), the theory of self-efficacy, and the transtheoretic model (Kretzer and Larson, 1998). Of these, the TPB, which is useful in predicting positive changes in human behavior, has been applied often to research on health-related behavior. According to the TPB, behavior is determined by intention and perceived behavior control, and intention is determined by three psychosocial determinants: attitude toward behavior, subjective norm, and perceived behavioral control. These psychosocial determinants are again influenced by belief factors such as behavior beliefs, normative beliefs, and control beliefs (Montaño and Kasprzyk, 2008).

Clinical practice is an essential requirement in nursing students' curriculum, and as they work with patients in hospital settings, they risk

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becoming mediators of HAIs through transmitting germs to other patients and being exposed to HAIs themselves. Accordingly, nursing students should be able to carry out adequate hand hygiene based on correct knowledge. Because a nursing student holds a position different from that of a nurse in a hospital, the hospital pays relatively less attention to student hand hygiene practices (Yoon and Kim, 2013; Barrett and Randle, 2008), and research on nursing students' hand hygiene has also been less active than that on nurses' compliance. Studies have been conducted about hand hygiene knowledge among nursing students (Kim et al. 2012; van de Mortel, 2011; Yoon and Kim, 2013), their beliefs and attitudes (Barrett and Randle, 2008; Ko et al., 2002; van de Mortel, 2011), their performance of hand hygiene (Barrett and Randle, 2008; Kim et al. 2012; van de Mortel, 2011; Yoon and Kim, 2013), factors affecting their awareness and performance (Park, 2012), and the effect of hand hygiene education programs on their compliance (Park and Kim, 2012; Ryu and Kang, 2010). Because hand hygiene is a behavior related to human health, however, behavioral theories may need to be applied when analyzing factors affecting nursing students' hand hygiene or when designing hand hygiene education programs.

Aim

This study aimed to identify factors influencing nursing students' hand hygiene behavior by surveying their knowledge and beliefs (behavior beliefs, normative beliefs, and control beliefs) of hand hygiene and examine the relationships among those factors. The specific goals were as follows: to assess the subjects' knowledge level of hand hygiene; to assess the subjects' behavior beliefs, normative beliefs, and control beliefs about hand hygiene; to survey the subjects' hand hygiene behaviors; to analyze differences in knowledge, beliefs, and behaviors according to the subjects' general characteristics; to explain the relationships among the subjects' knowledge, beliefs, and behaviors of hand hygiene; and to identify factors influencing the subjects' hand hygiene behaviors.

Methods

Design and Sampling

This study was conducted as a descriptive survey. The subjects were 208 nursing students in their 3rd or 4th year of nursing school, sampled from two universities in the Chungcheong province of South Korea. The researcher visited the two schools, explained the study aims to the nursing students, distributed questionnaires to those who agreed to participate in the study, and recovered answered questionnaires. The questionnaire took about 10 to 15 min for a typical student to finish.

The sample size was calculated using the G-Power 3.1 program (http://gpower.software.informer.com/3.1/). When the number of explanatory variables was assumed to be 12, significance level (α) .05, power of test ($1-\beta$) 95%, and the effect size .15, the required sample size was 184. In consideration of dropouts, questionnaires were distributed to 220 students, and 208 were analyzed as valid data, with 12 surveys excluded due to inadequate answers. This study was approved by the Institutional Review Board, and all participants provided written consent.

Study Tools

This study used a structured questionnaire consisting of questions on the subjects' general characteristics, hand hygiene knowledge, hand hygiene beliefs (behavior beliefs, normative beliefs, and control beliefs), and hand hygiene behavior. The questions on hand hygiene knowledge were obtained from the questionnaire of Kim et al. (2012), developed for surveying infection control knowledge among doctors and nurses employed at hospitals of Oriental medicine, and Jeong's (2010) hand hygiene knowledge inventory for hospital nurses. With the author's permission, the questionnaire developed by Jeong (2010) was revised and supplemented in order to survey behavior beliefs, normative beliefs, and control beliefs.

General Characteristics

The questions on general characteristics included age, gender, religion, retention of hand hygiene guideline in practice hospital, experience of hand hygiene education, receiving information on hand hygiene from mass media, experience of being monitored on hand hygiene, and awareness of others (doctors, nurses, and other nursing students) hand hygiene compliance.

Hand Hygiene Knowledge

Hand hygiene knowledge was surveyed using a total of 21 questions about alcohol gel usage, causes of HAIs, hand hygiene methods, and hand hygiene situations. A correct answer was given 1 point while an incorrect one received 0 points, allowing the total score to range from 0 to 21. A high score meant a high level of hand hygiene knowledge.

Behavior Beliefs

The subjects' beliefs (Jeong and Kim, 2012) of the positive effects of hand hygiene were surveyed using 12 questions. Each question was answered on a scale ranging from "Absolutely not" (−3 points) to "Absolutely yes" (+3 points). A high score meant a high behavior belief. The Cronbach's α of this tool was .90 in Jeong's (2010) study and .76 in this study.

Normative Beliefs

Six questions assessed the belief that a study participant was expected by others to perform hand hygiene (Jeong and Kim, 2012). Each item was evaluated using a 7-point Likert scale from "Absolutely not" (−3 points) to "Absolutely yes" (+3 points); a high score meant that the subject's hand hygiene performance was affected highly by others. The Cronbach's α of this tool was .90 in Jeong's (2010) study, and .84 in this study.

Control Beliefs

A subject's belief that he/she controlled external factors that might hinder effective hand hygiene (Jeong and Kim, 2012) was surveyed with 4 negative questions. Each item was measured on a 7-point Likert scale from "Absolutely not" (+3 points) to "Absolutely yes" (−3 points) with a score given inversely; a high score meant that the subject strongly believed that he/she was able to control factors hindering his/her hand hygiene. The Cronbach's α of this tool was .72 in Jeong's (2010) study, and .61 in this study.

Hand Hygiene Behavior

In order to measure hand hygiene behavior, this study presented five situations (before touching a patient, after touching a patient, before clean/aseptic procedure, after contacting a contaminant, and after touching a patient's surroundings) for which hand hygiene behavior is recommended by the World Health Organization (WHO) (2009). The ratio of the number of hand hygiene occurrences to the number of situations during the latest 8 h' clinical practice for which hand hygiene was recommended by the WHO was then recorded as a percentile. A high compliance rate meant a high level of hand hygiene behavior.