



Evaluating the Impact of an Educational Program Based on the Health Belief Model in Promoting Preventive Behaviors for Nosocomial Infections among Nurses

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Abstract

Objective: This study aims to assess the impact of an educational program based on the Health Belief Model (HBM) in promoting preventive behaviors for nosocomial infections among nurses

Methods: A study involving 120 nurses working in a hospital was conducted. The nurses were divided into two groups: the intervention group (n=60) received the educational program based on HBM, while the control group (n=60) did not receive it. A questionnaire was used to measure HBM constructs (knowledge, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, performance, and cues to action) at baseline, immediately after the intervention, and four months post-intervention.

Results: The intervention group showed significant improvements in knowledge, perceived susceptibility, perceived severity, perceived benefits, self-efficacy, cues to action, and performance immediately and four months after the intervention compared to the control group.

Conclusion: This study demonstrates the effectiveness of the educational program based on HBM in promoting preventive behaviors for nosocomial infections among nurses. The HBM can serve as a valuable framework for designing and implementing similar educational interventions to prevent nosocomial infections.

Descriptors: Cross infection; Control groups; Perception; Surveys and questionnaires; Nurses

Introduction

Nosocomial Infections (NIs) pose significant challenges to health centers worldwide, particularly in developing countries, due to their association with increased hospitalization durations and healthcare costs. These infections not only threaten individual patient health but also contribute to community-wide infection spread. Reducing the incidence of NIs is crucial for patient recovery and economic efficiency. NIs are a leading cause of mortality and complications among hospitalized patients, with reports indicating millions of cases and thousands of deaths annually. (Kostakoğlu et al., 2016)

In regions like the East Mediterranean and Southeast Asia, NIs affect a substantial proportion of hospitalized patients, highlighting the urgent need for effective preventive measures. Nurses, being central to patient care, play a pivotal role in NI control and prevention. Their actions, such as adhering to standard

precautions, maintaining hand hygiene, and implementing infection prevention protocols, are critical in reducing NI risks. (Dawczynski et al., 2017)

Despite the importance of these measures, studies suggest that many nurses lack adequate knowledge about NIs and their control. Continuous education is therefore essential to enhance nurses' awareness and reduce NI incidence. Behavioral models, such as the Health Belief Model (HBM), are valuable for understanding and influencing healthcare behaviors. (Ghaffari et al., 2012)

The HBM, widely used since the 1950s, emphasizes factors like perceived susceptibility, severity, benefits, barriers, cues to action, and efficacy in shaping preventive health behavior. Studies have shown the effectiveness of HBM-based education in improving healthcare behaviors related to NIs. Given the global priority of NI prevention and the significant role of nurses in this endeavor, this study aims to evaluate the impact of an educational program based on the Health Belief Model in promoting nurses' preventive behaviors regarding NIs. (Jeihooni et al., 2015)

Methods

This study was conducted on 120 nurses. The sample size calculation was based on the mean and standard deviation of practice before and after the study were used to estimate the sample size. Considering $\beta = 0.90$, $\alpha = 0.05$, $S1 = 5.78$, $S2 = 5.42$, $\mu1 = 37.88$, and $\mu2 = 41.9$, 60 subjects were recruited in each group to compensate for possible attrition.

Written consent was obtained from the university authorities and hospital officials. Random allocation was used to assign 120 nurses to the intervention ($n=60$) and control groups ($n=60$).

At the beginning of the study, the objectives were explained to the participants, and a pre-test questionnaire was administered to both groups. Inclusion criteria were having at least a diploma in nursing, consenting to participate, and a minimum of three months' work experience in the ward. Exclusion criteria included refusal to continue participation and lack of cooperation due to illness or leave.

The educational intervention for the intervention group consisted of eight training sessions covering various aspects of NI prevention. These sessions included lectures, group discussions, Q&A sessions, as well as visual aids like posters, pamphlets, videos, and PowerPoint presentations. The topics covered included introduction to NIs, symptoms, and complications; principles of hand sterilization, glove and mask use, patient isolation, hand hygiene, waste disposal, and respiratory secretion prevention; benefits and barriers to standard precautions; role of self-efficacy in preventive behaviors; and review and reinforcement of materials.

Training sessions were conducted in the hospital's conference room without interfering with the nurses' schedules. Additionally, a weekly SMS about NIs was sent to each participant in the intervention group, and monthly retraining sessions were held.

Four months after the intervention, both groups completed the questionnaire. The questionnaire, based on the Health Belief Model, assessed knowledge, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, performance, and demographic information. The content validity index (CVI) was high for all constructs, and reliability was confirmed through Cronbach's alpha coefficient and test-retest method.

Ethical approval was obtained, and confidentiality of data was assured. Data analysis was conducted using SPSS version 22 with various statistical tests at a significance level of 0.5.

Results

The mean age of subjects was 27.8 ± 5.5 in the intervention group and 28.12 ± 5.3 years in the control group. The mean work experience period was 10.1 ± 5.2 years in the intervention group and 9.9 ± 5.6 years in the control group. The independent t-test showed no significant difference between the two groups. Table 1 presents demographic data, including sex, education level, employment status, marital status, and place of work. The predominant characteristics of the groups were married women with Bachelor's education, contractual employment, primarily working in emergency and medical-surgical services. The chi-square test indicated no significant difference between the two groups.

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Before the intervention, there were no significant differences between the intervention and control groups in terms of knowledge level, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, performance, and cues to action. However, immediately after the intervention and four months later, the intervention group showed significant improvements compared to the control group in each of these areas except for perceived barriers. Notably, the perceived barriers component significantly decreased for the intervention group compared to the control group. The difference in mean scores between the groups highlights these improvements.

Table 1. Demographic data of intervention and control groups

Variable	Intervention group (n=60)	Control group (n=60)	p-value
Sex			0.621
Male	10 (16.7%)	12 (20%)	
Female	50 (83.3%)	48 (80%)	
Education			0.769
Diploma	5 (8.3%)	6 (10%)	
Bachelor's	52 (88.3%)	54 (90%)	
Master's	2 (3.3%)	0 (0%)	
Employment status			0.315
Project based	8 (13.3%)	7 (11.7%)	
Contractual	40 (66.7%)	46 (76.6%)	
Permanent	12 (20%)	10 (16.7%)	
Marital Status			0.515
Single	14 (23.3%)	12 (20%)	
Married	46 (76.7%)	48 (80%)	
Place of Work			0.371
Emergency service	12 (20%)	10 (16.7%)	
Medical-Surgical	16 (26.7%)	18 (30%)	
Gynecology & Mat.	11 (18.3%)	12 (20%)	
Operating Room	4 (6.7%)	5 (8.3%)	
Dialysis & ICU	6 (10%)	7 (11.7%)	
Pediatrics	8 (13.3%)	7 (11.7%)	
Nursing Station	3 (5%)	1 (1.7%)	

Table 2. Comparison between the mean scores of participants' knowledge, HBM components, and performance

Variable	Intervention (n=60)	Control (n=60)
	Mean	SD
Knowledge		
Pre-intervention	4.7	2.4
Post-intervention	8.8	1.3
Four months later	9.3	1.3
Perceived Susceptibility		
Pre-intervention	12.8	2.3
Post-intervention	20.5	2.7
Four months later	22.8	2.1
Perceived Severity		
Pre-intervention	9.7	2.3
Post-intervention	13.3	3.5
Four months later	19.9	2.3
Perceived Benefit		

Pre-intervention	13.5	2.8
Post-intervention	18.7	2.7
Four months later	21.6	2.0
Perceived Barrier		
Pre-intervention	20.5	2.0
Post-intervention	18.2	2.0
Four months later	10.2	2.0
Performance		
Pre-intervention	7.1	1.8
Post-intervention	10.9	3.0
Four months later	14.3	1.5
Self-efficacy		
Pre-intervention	7.7	1.9
Post-intervention	10.9	2.4
Four months later	16.9	2.6
Cues to Action		
Pre-intervention	7.6	1.9
Post-intervention	12.2	1.9
Four months later	18.3	1.5

Discussion

Reducing noncompliance with hygiene guidelines is the ultimate goal of health education. The Health Belief Model (HBM) used in this study as the theoretical framework has been widely applied by various scholars for planning and evaluating behavior change interventions. The results of this study, aimed at evaluating the effect of HBM-based education on nurses' preventive behaviors against NIs, confirm the efficiency of this model in changing nurses' behavior. The findings showed a significant increase in nurses' awareness four months after the educational intervention, while no significant change was observed in the control group in this area. This finding is consistent with results from other studies by Zigheimat, Suchitra, and Ghaffari. (Zeighaimat et al., 2016)

A study in India by Sabane on 108 nursing students demonstrated a significant increase in awareness post-intervention. This increase in awareness in the intervention group underscores the positive impact of training sessions on nurses. Training and awareness-raising are among the most effective methods to combat NIs. Continuous awareness, coupled with effective disinfection and sterilization methods, can significantly reduce infections. (Sabane et al., 2011)

The mean scores of the intervention group on perceived susceptibility and perceived severity (perceived threat) significantly increased after the educational intervention compared to before, whereas no change was observed in the control group. Zigheimat's study highlighted the importance of creating a sense of vulnerability to NIs among nurses to strengthen their health beliefs. These results align with theory-based studies by Gorman et al. and Tehrani et al. The HBM proves useful in interpreting communities' responses to infectious diseases. (Zeighaimat et al., 2016)

The results also showed a significant increase in the intervention group's scores on perceived benefits post-intervention compared to the control group, while their score on perceived barriers decreased. Since nursing staff are at risk due to their job nature, creating a sense of vulnerability to infections among them and highlighting the benefits of preventive behaviors are crucial steps. Regular interventions should also target reducing perceived barriers. (Suchitra & Lakshmi Devi, 2007)

The study's findings indicate an enhancement in nurses' self-efficacy after educational interventions, consistent with previous studies highlighting the role of self-efficacy in professional development and academic education. The mean score of the intervention group on cues to action and preventive behaviors against NIs increased significantly post-intervention, emphasizing the effectiveness of educational programs in improving performance regarding infection control. (Javaheri Tehrani et al., 2014)

In conclusion, the results highlight the effectiveness of the intervention program and the necessity for educational interventions on preventive behaviors against NIs. Educational programs should focus on improving perceived susceptibility and severity, analyzing benefits, removing barriers, and enhancing self-efficacy and cues to action among nurses. Periodic in-service training based on the HBM and other health promotion models is essential. One limitation of this study was the self-reporting of performance on NIs control by nurses. (Gorman et al., 2012)

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