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Using an educational program based on health belief model to improve the preventive behaviors of nurses against cardiovascular diseases

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Abstract:

BACKGROUND: An unhealthy lifestyle can threaten the health of nursing staff, especially in the context of cardiovascular diseases (CVDs). Considering the importance of health education in promoting preventive behaviors against these diseases, this study aimed to evaluate the effect of an educational program based on the health belief model (HBM) on improving preventive behaviors of nurses against CVDs.

MATERIALS AND METHODS: This is a randomized controlled trial with a pretest–posttest design conducted on 104 nursing staff of Imam Khomeini Hospital in Kuhdasht, Lorestan, Iran, in 2017. They were randomly assigned into two groups of HBM ($n = 52$) and control ($n = 52$). The HBM group received the educational intervention for 6 weeks, one session per week each for 30–40 min. They were measured before and after the intervention using a demographic form, a researcher-made HBM questionnaire, Baecke Habitual Physical Activity Questionnaire, and the 3-day food intake record all in Persian. The collected data were analyzed in the Statistical Package for the Social Sciences (SPSS) v. 24 software using the Chi-squared test and paired t -test.

RESULTS: The educational program could only increase the perceived severity (22.64 ± 2.22), perceived benefits (50.83 ± 5.22), and perceived self-efficacy (42.37 ± 5.93) of nurses in the HBM group compared to the controls ($P < 0.05$). The nurses' perceived sensitivity was also increased, but it was not significant ($P > 0.05$). In the HBM group, a significant change was found in the food intake level for energy ($t = 4.79$, $P = 0.000$), protein ($t = -2.99$, $P = 0.004$), and unsaturated fat ($t = -2.94$, $P = 0.005$) after intervention. No significant difference was observed in the total physical activity score after the intervention ($P > 0.05$).

CONCLUSION: An educational program based on the HBM model can be used to increase the severity, benefits, and self-efficacy of the nurses' preventive behaviors against CVDs and modify their dietary regime.

Keywords:

Cardiovascular diseases, health belief model, health education, nursing

Introduction

Cardiovascular diseases (CVDs) are the leading causes of death led to about 17.9 million deaths in 2012 and 347.5 million disability in 2015 worldwide^[1] and are predicted to be the cause of more than

23 million (about 30.5%) deaths by 2030.^[2-4] About 50% of all deaths in high-income countries and about 28% of deaths in low- and middle-income countries are caused by CVDs.^[5] CVDs are the first leading causes of mortality and disability in Iran led to 46% of all deaths and 20%–23% of the burden of disease.^[4] There are two types

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of risk factors associated with these diseases including modifiable risk factors such as smoking, dietary habits, alcohol consumption, and physical activity as well as nonmodifiable factors such as age, gender, genetics, and family history.^[6] The increasing prevalence of CVDs is such that more than half of the government's health-care budget is spent on CVD treatment which necessitates the need for appropriate attention and policymaking to reduce its prevalence.^[7] Since the perception of CVD risk is positively associated with a willingness to change high-risk behaviors, addressing this issue may help to provide more comprehensive planning for the prevention of these diseases.^[8,9] Knowledge of CVDs is essential to help one make informed decisions about the continuation of certain behaviors that can increase the risk of the disease.^[10]

The high working pressure and excessive working hours in hospitals have made the health of nurses as one of the main concerns of the medical community. Poor nutrition, inadequate physical activity, overwork, work-related stresses, and long-term night shift work are all factors that threaten the health of nurses and make them prone to some diseases including CVDs. A systematic review and meta-analysis reported an association between shift work and CVD in nurses.^[11] Undoubtedly, the best way to deal with these diseases in nurses is disease prevention along with proper education, adequate nutrition, and physical activity. There are a number of theories and models in health education that can be used to design appropriate educational interventions for nurses to change their risky behaviors. One of these models is the health belief model (HBM) developed in the early 1950s in the US. It has six components including (1) perceived severity of the disease, (2) perceived susceptibility to the disease, (3) perceived barriers to having healthy behaviors against the disease, (4) perceived benefits of healthy behaviors in reducing the risk of the disease, (5) perceived self-efficacy, and (6) cues to actions. It has been used in many studies to predict health-related behaviors and screen for the early detection of symptoms. The studies that have used educational programs based on this model have shown that they can be used for predicting preventive behaviors against various diseases.^[12-22]

Several studies have been conducted in Iran on using HBM-based educational programs for screening preventive behaviors against various diseases in different study populations. For example, Mehri and Mohaghegh Nejad^[12] used the HBM model to assess the preventive behaviors of college students toward heart diseases. Ardebili *et al.*^[14] used it on female patients with hypertension. Khorsandi *et al.*^[15] employed this model on pregnant women for osteoporosis prevention. Sadeghi *et al.*^[17] employed it for skin cancer evaluation of farmers.

Khazae-Pool *et al.*^[18] used it for smoking assessment of high school students and Masoudiyekta *et al.*^[20] for breast cancer screening of women. In the studies of Tavassoli *et al.*^[13] and Alidosti *et al.*,^[23] HBM-based educational programs were used for improving nutritional behavior of homemakers toward CVD, whereas Jeihooni *et al.*^[16,19] employed it for osteoporosis and oral health behaviors of women. In other countries, few studies have been conducted. Abd El Aziz *et al.*^[24] used health educational program based on HBM model for pregnant women in Egypt to prevent their urogenital infections, whereas Wickremasinghe and Ekanayake^[25] applied it to improve the oral health behaviors among school students in Sri Lanka. To our knowledge, there is no study that used an HBM-based educational intervention to improve the preventive behaviors of nurses toward CVDs. Considering the importance of nurses' health as one of the important groups of health-care system, and given that there is no study on the effect of HBM-based educational programs on preventing CVD in nurses, this study aimed to investigate the effect of using HBM-based educational program on improving the preventive behaviors of nurses against CVDs.

Materials and Methods

This is a quasi-experimental study (a randomized controlled trial). The study population consists of all nursing staff of Imam Khomeini Hospital in Kuhdasht, Lorestan, Iran, in 2017 ($n = 250$). Using the Cochran formula, the sample size was determined as 94. Considering a 10% sample drop, the final sample size of 104 was estimated. A stratified random sampling technique was used for recruiting samples based on inclusion criteria (having no any history of CVD based on their self-report and a physician and not participation in similar educational courses). Unwillingness to continue participation in the study and having any affective disease including CVD according to the report of physician were considered as exclusion criteria. The participants were randomly assigned into two groups of HBM ($n = 52$) and control ($n = 52$). After obtaining ethical approval and necessary permissions from Lorestan University of Medical Sciences, the researchers were referred to the study hospital, and after explaining research objectives, method, and importance to the participants and assuring them of the confidentiality of their information, a written consent was obtained from them and then they underwent evaluation.

The data collection tools were:

- A demographic form surveying age, marital status, number of children, education, work experience, family CVD history, weight, height, gender, employment status, and job status

- A HBM-based questionnaire in Persian: It is a researcher-made questionnaire designed based on HBM model. First, 61 items were extracted from the previous related studies. The validity of initial drift was examined by ten academic experts in health and nutrition, and some modification was made based on their opinions until it became acceptable. In this regard, 3 items were omitted and 58 items remained and used for measuring perceived sensitivity (12 items), perceived severity (5 items), perceived benefits (12 items), perceived barriers (13 items), cues to action (6 items), and perceived self-efficacy (10 items) rated on 5-point Likert scale from 5 = strongly agree to 1 = strongly disagree. The content validity ratio and content validity index of this questionnaire were obtained 0.82 and 0.87, respectively. Moreover, its reliability was examined by conducting a pilot study on 15 nurses (not from study samples), and in the end, a Cronbach's alpha of 0.76 was obtained which is acceptable
- Baecke Habitual Physical Activity Questionnaire: Developed by Baecke *et al.*,^[26] this tool is used for evaluating the habitual physical activities of people for the past 12 months. It has 16 items rated on a 5-point scale measuring physical activities at work (items 1–8), during sports time (items 9–12), and during leisure time (items 13–16). We used its Persian version which is a reliable and valid instrument according to Sadeghisani *et al.*^[27] They reported an intraclass correlation coefficient of 0.95 for work index, 0.93 for sports index, and 0.77 for leisure index
- Three-day food intake record: This tool was used in Persian for recording food intake of participants for three consecutive days.

The HBM group received educational intervention for 6 weeks, one session per week each for 30–40 min under the supervision of the examiner. The educational lessons included the definition of CVD and its risk factors (modifiable and nonmodifiable) and healthy lifestyles including physical activity, proper diet, smoking cessation, and weight loss. For this purpose, a cardiologist, a nutritionist, and a sports physiologist helped us each for two sessions. The education was presented by giving lecture, group discussions, teaching slides, and pamphlets. The control group received no education. For collecting data, first, the nurses in the control group completed pretest measurements immediately and then (4 weeks later) underwent posttest evaluation (since controls were in contact with the HBM group and not being able to disclose information). Two weeks later, the HBM group underwent pretest measurement and then (1 month after the completion of 6-week intervention) posttest evaluation. The collected data were analyzed in the Statistical Package for the Social Sciences (SPSS) v. 24 software using descriptive

statistics and performing Chi-squared test and *t*-test at a significance level of $P < 0.05$.

Results

Of 104 participants, 35 were male (16 as controls and 19 in the HBM group) and 69 female (36 as controls and 33 in the HBM group), with a mean age of 32.28 ± 6.28 years. Table 1 presents the characteristics of the participants. As shown in this table, there was no significant difference between groups in terms of gender ($P = 0.534$), marital status ($P = 0.665$), work experience ($P = 0.761$), body mass index ($P = 0.271$), and employment status ($P = 0.383$).

The *t*-test results for HBM scores presented in Table 2 showed no significant difference between pretest and posttest scores of nurses in the control group in mean scores of HBM dimensions ($P > 0.05$), whereas a significant difference was reported in the HBM group only in mean scores of perceived severity ($P = 0.000$), perceived benefits ($P = 0.022$), and perceived self-efficacy ($P = 0.003$). The nurses' perceived sensitivity also increased, but it was not significant ($P > 0.05$).

The *t*-test results for nutritional assessment of samples presented in Table 3 reported a significant difference in pretest and posttest scores of nurses in the control group only in mean levels of fat ($P = 0.004$) and saturated fat ($P = 0.002$). In the HBM group, a significant change was found in mean levels of energy ($P = 0.000$), protein ($P = 0.004$), and unsaturated fat ($P = 0.005$). Their mean energy intake level decreased after the educational intervention; for protein and unsaturated fat intake, mean levels increased.

The *t*-test results for physical activity assessment of nurses [Table 4] reported no significant difference between pretest and posttest scores of nurses in any groups regarding the mean total score of physical activity. Their total physical activity scores increased after intervention, but it was not significant ($P > 0.05$). Hence, it can be said that the educational program had no significant effect on the physical activity of nurses.

Discussion

One of the models in health education that can be used to design appropriate interventions is the HBM model. This model proposes that people are most likely to take preventative action if they perceive the threat of a health risk to be serious. Many studies have shown that this model can be used as a suitable model for predicting preventive behaviors against various diseases. The purpose of this study was to evaluate the effectiveness of an HBM-based educational program in promoting preventing behaviors of hospital nurses against CVDs.

Table 1: Characteristics of nurses in both study groups

Characteristics	Study groups		Total, n (%)	P*
	Control, n (%)	HBM, n (%)		
Gender				
Male	16 (30.8)	19 (36.5)	35 (33.7)	0.534
Female	36 (69.2)	33 (63.5)	69 (66.3)	
Age (year)				
<30	17 (32.7)	23 (44.2)	40 (38.5)	0.011
30-39	31 (59.6)	17 (32.7)	48 (46.2)	
>40	4 (7.7)	12 (23.1)	16 (15.4)	
Marital status				
Single	16 (30.8)	14 (26.9)	30 (28.8)	0.665
Married	36 (69.2)	38 (73.1)	74 (71.2)	
Educational level				
Associate's degree	5 (9.6)	5 (9.6)	10 (9.6)	0.000
Bachelor's/master's degrees	47 (90.4)	47 (90.4)	96 (90.4)	
Work experience (year)				
1-4	19 (36.5)	19 (36.5)	38 (36.5)	0.761
5-9	18 (34.6)	15 (28.8)	33 (31.7)	
>10	15 (28.8)	18 (34.6)	33 (31.7)	
BMI (kg/m ²)				
<25	28 (53.8)	20 (38.5)	48 (46.2)	0.271
25-29.9	21 (40.4)	29 (55.8)	50 (48.1)	
>30	3 (5.8)	3 (5.8)	6 (5.8)	
Employment status				
Permanent employment	23 (44.2)	25 (48.1)	48 (46.2)	0.383
Causal employment	7 (13.5)	11 (21.2)	18 (17.3)	
Subject to the law of service (Tarh)	22 (42.3)	16 (30.8)	38 (36.5)	
Job status				
Supervisor/matron	3 (5.8)	16 (30.8)	19 (18.3)	0.003
Nurse	34 (65.4)	28 (53.8)	62 (59.6)	
Operating room nurse	15 (28.8)	8 (15.4)	23 (22.1)	

*Chi-squared test. HBM=Health Belief Model, BMI=Body mass index

Table 2: t-test results for comparing mean scores of health belief model dimensions in nurses for both study groups

Dimension	Phase	Control group (mean±SD)	Test results*	HBM group (mean±SD)	Test results*
Perceived sensitivity	Pretest	39.89±4.99	T=0.286	41.12±5.89	T=-1.01
	Posttest	39.64±4.05	Significant=0.776	42.14±4.06	Significant=0.318
Perceived severity	Pretest	20.08±2.96	T=-1.65	19.89±2.54	T=-6.38
	Posttest	20.93±3.04	Significant=0.105	22.64±2.22	Significant=0.000**
Perceived benefits	Pretest	50.04±5.14	T=-0.744	48.47±4.86	T=-2.37
	Posttest	49.22±6.08	Significant=0.461	50.83±5.22	Significant=0.022**
Perceived barriers	Pretest	33.83±9.39	T=0.182	35.43±10.46	T=1.79
	Posttest	33.50±9.71	Significant=0.856	32.20±7.16	Significant=0.081
Cues to action	Pretest	18.97±4.15	T=-0.603	20.04±4.55	T=0.633
	Posttest	19.47±4.04	Significant=0.549	19.56±3.42	Significant=0.530
Perceived self-efficacy	Pretest	39.52±5.44	T=-0.436	39.25±4.36	T=-3.08
	Posttest	39.87±5.05	Significant=0.665	42.37±5.93	Significant=0.003**

*T-test, **Significant at P<0.05. SD=Standard deviation, HBM=Health belief model

For this purpose, their behaviors against disease, physical activity, and food intake were assessed before and after the intervention.

The educational program in our study could significantly increase only the perceived severity, perceived benefits, and perceived self-efficacy of nurses in the HBM group compared to the controls ($P < 0.05$), i.e., they could

understand the depth of the risk and the seriousness of the disease in its physical, psychological, social, and economic dimensions; believed in the usefulness and effectiveness of their healthy behaviors; and believed in being able to successfully execute CVD-preventing behaviors to produce the desired outcomes; however, it had no effect on their understanding about the obstacles that can prevent from taking action (perceived barriers)

Table 3: T-test results for comparing mean scores of 3-day food intake in nurses for both study groups

Food intake	Phase	Control group (mean±SD)	Test results*	HBM group (mean±SD)	Test results*
Energy (MJ)	Pretest	1776.99±382.60	T=-1.90	1899.41±271.07	T=4.79
	Posttest	1900.07±381.64	Significant=0.063	1672.76±211.66	Significant=0.000**
Protein (g)	Pretest	58.76±20.27	T=-0.59	61.13±21.91	T=-2.99
	Posttest	61.20±22.92	Significant=0.558	77.99±26.39	Significant=0.004**
Carbohydrates (%)	Pretest	230.16±78.63	T=-0.98	235.17±57.23	T=1.21
	Posttest	242.83±64.93	Significant=0.333	224.29±47.39	Significant=0.234
Fat (%)	Pretest	74.55±28.96	T=-3.01	78.88±19.95	T=-0.38
	Posttest	92.63±28.22	Significant=0.004**	80.39±22.10	Significant=0.709
Cholesterol (mg)	Pretest	287.51±145.78	T=0.044	270.06±225.32	T=0.048
	Posttest	285.92±190.66	Significant=0.965	280.76±234.33	Significant=0.962
Saturated fat (g)	Pretest	18.09±8.41	T=-3.31	21.24±9.12	T=-0.607
	Posttest	23.88±8.75	Significant=0.002**	22.34±10.09	Significant=0.547
Unsaturated fat (g)	Pretest	26.79±14.40	T=0.44	24.38±9.65	T=-2.945
	Posttest	25.52±10.80	Significant=0.660	31.85±13.96	Significant=0.005**
Polyunsaturated fat (g)	Pretest	20.64±8.98	T=-0.56	21.36±9.65	T=-1.021
	Posttest	21.90±11.162	Significant=0.580	23.05±9.83	Significant=0.313
Sodium (mg)	Pretest	3911.12±1863.87	T=-0.66	4061.13±1520.00	T=-0.443
	Posttest	4157.89±1743.12	Significant=0.512	4291.99±1662.35	Significant=0.660
Potassium (mg)	Pretest	2427.14±1416.01	T=-0.85	2606.77±1031.96	T=0.495
	Posttest	2649.52±1218.99	Significant=0.402	2578.53±985.46	Significant=0.623
Calcium (mg)	Pretest	818.56±363.89	T=-1.42	880.91±417.81	T=0.272
	Posttest	948.37±528.64	Significant=0.163	878.94±422.57	Significant=0.787
Magnesium (mg)	Pretest	203.14±89.83	T=-0.002	230.04±75.34	T=0.588
	Posttest	203.18±102.48	Significant=0.998	227.38±71.56	Significant=0.559
Phosphorus (mg)	Pretest	1007.20±389.62	T=1.31	1097.98±394.33	T=0.422
	Posttest	891.16±500.82	Significant=0.196	1090.31±414.96	Significant=0.675
Fiber (mg)	Pretest	11.37±10.83	T=-0.203	13.06±6.09	T=0.659
	Posttest	11.04±3.94	Significant=0.840	12.62±5.76	Significant=0.513
Soluble fiber (g)	Pretest	0.55±0.24	T=-0.282	0.65±0.46	T=-0.131
	Posttest	0.56±0.25	Significant=0.779	0.69±0.44	Significant=0.896
Insoluble fiber (g)	Pretest	3.57±1.81	T=-2.006	4.88±2.62	T=-0.310
	Posttest	4.55±2.72	Significant=0.051	5.25±2.53	Significant=0.758

*T-test, **Significant at $P<0.05$. SD=Standard deviation, HBM=Health belief model

Table 4: T-test results for comparing the mean scores of total physical activity in nurses for both study groups

	Phase	Control group (mean±SD)	Test results*	HBM group (mean±SD)	Test results*
Total physical activity	Pretest	46.33±5.65	T=0.146	45.81±6.23	T=-1.225
	Posttest	46.29±5.57	Significant=0.884	47.63±7.24	Significant=0.216

*T-test. SD=Standard deviation, HBM=Health belief model

and the factors and events that can motivate them to take action in changing their bad habits (cues to action). Their perception of being susceptible to CVD (perceived sensitivity) increased, but it was not significant. Lack of significant effect on the perceived susceptibility of nurses in our study indicates that it alone cannot lead to having healthy behavior toward CVDs in them. This may be because they already had enough knowledge and nursing education in the university. The increase in the perceived benefits of nurses can be because of their involvement in paramedical and nursing disciplines in addition to being aware of the benefits of preventive behaviors toward CVDs. Lack of significant effect on the perceived barriers may be due to the unfavorable prevailing conditions of the nursing profession such as having long and forced working shifts and lack of leisure

and free time which also caused the inefficiency of the intervention in our study in motivating them to take actions in changing their unhealthy lifestyles.

Our results are consistent with the results of Mehri and Mohaghegh Nejad^[12] in terms of perceived self-efficacy who used the HBM model to assess the preventive behaviors of college students in Sabzevar, Iran, in dealing with the heart diseases but against it concerning the component of cues to action. Ardebili *et al.*^[14] also reported the ineffectiveness of an HBM-based educational program (included the definition of disease and its risk factors and conducted at three 45-min sessions) on the cues to action in female patients with hypertension in Khorramabad, Iran, but it had a significant impact on their perceived sensitivity which is

against our results. They used Robinson's hypertension beliefs and behaviors questionnaire^[28] to assess the subjects. In the studies of Tavassoli *et al.* (6-session education each for 35–45 min) in Isfahan city^[13] and Alidosti *et al.* (4-sessions education each for 40–50 min) in Behbahan County^[23] on nutritional behavior of homemakers toward CVD; Jeihooni *et al.*^[16,19] in Fasa city on osteoporosis and oral health behaviors of women (6- and 8-session educational programs each for 55–60 min); Sadeghi *et al.*^[17] on skin cancer evaluation of farmers in Sirjan County (2-session education each for 60 min); Khazaee-Pool *et al.*^[18] on smoking assessment of high school male students in Nowshahr County (5-session education each for 60 min); and Masoudiyekta *et al.*^[20] on breast cancer screening of women in Dezful County (4-session education each for 90–120 min) all conducted in Iran, the HBM-based educational program could significantly affect all components of preventive behaviors (perceived sensitivity, perceived severity, perceived benefits, perceived barriers, perceived self-efficacy, and cues to action) in samples. Our results are also in disagreement with the results of Khorsandi *et al.*^[15] In their study, the HBM-based educational program (4 sessions each for 60 min) decreased the perceived barriers of pregnant women in Arak city and increased their health action for osteoporosis prevention. The education provided by Mohammadi *et al.*^[22] for 3 weeks, one session per week each for 60 min, did not affect the perceived severity of behaviors toward CVD in high school girls but increased their perceived sensitivity. This is also against our findings. In the study of Osta *et al.*^[21] on adherence to standard precautions in operating room nursing staff, the intervention brought significant changes in all HBM constructs except in cues to action. The discrepancy between our study and other mentioned studies may be due to the difference in the study population, study area, data collection interval, disease, and the education period. In our study, education was provided for nurses in Khorramabad city for 6 weeks, 6 sessions per week each for 30–40 min in order to improve their preventive behaviors toward CVDs.

In other countries, few studies have been conducted in this field. In one study, Abd El Aziz *et al.*^[24] used health educational program based on HBM model (3 sessions each for 30–45 min) for pregnant women in Egypt to prevent urogenital infections. Two months after intervention, they observed a significant improvement in the four main HBM constructs (perceived sensitivity, perceived severity, perceived benefits, and perceived barriers). In another study, Wickremasinghe and Ekanayake^[25] applied an HBM-based education to improve the oral health behaviors among school students in Sri Lanka. Following the intervention, there was a

significant improvement in all HBM constructs between the HBM and control groups except for self-efficacy. Our results are against the results of Abd El Aziz *et al.* in terms of perceived sensitivity and contrary to the results of Wickremasinghe and Ekanayake in terms of perceived self-efficacy. The discrepancy can be related to the difference in the study population, study area, and disease. Their study samples were those who had no previous knowledge about the disease and healthy behaviors, whereas our samples (nurses) had already some knowledge about the CVDs.

The educational program in our study could significantly decrease the energy intake of nurses and increase their protein and unsaturated fat intake ($P < 0.05$), i.e., it could increase their perceived severity of having bad nutritional habit in terms of energy, protein, and fat intake; however, the intervention had no significant effect on their dietary for other nutritional intakes (carbohydrates, sodium, potassium, calcium, magnesium, phosphorus, cholesterol, fiber, soluble and insoluble fibers, fat, and saturated and polyunsaturated fat). This is against the results of Abood *et al.*^[9] In their study, nutrition education intervention for university staff using the HBM significantly reduced total calories, fat, saturated fat, and cholesterol intake. Regarding physical activity, the intervention in our study could not significantly affect the perceived benefits of nursing for having higher physical activity. The reason for this can be attributed to the policies governing the nursing profession such as lack of trained nurses and consequently many compulsive work shifts that all can result in the lack of leisure time and the time for having useful and effective sports activities and changing unhealthy nutritional habits.

To our best knowledge, our research is the first study in Iran and in the world that used an HBM-based education to improve the preventive behaviors of nurses prone to CVDs. We not only assessed their health beliefs but also their nutritional intake and physical activity. However, it had some limitations and disadvantages. For example, the large number of questions in the questionnaires could make nurses tired and affect their answers and the research outcome. Moreover, since the study was conducted in a small hospital located in a small town, the generalization of results to other cities should be made with caution. The effect of demographic factors on the preventive behaviors of nurses was not evaluated, so it is recommended that in future studies, the effect of demographic factors be evaluated and conducted in other hospitals. Organizing in-house workshops based on health beliefs for nurses, teaching nurses prone to CVDs to have healthy lifestyle and improve their current conditions, and integrating the HBM model knowledge in nursing curriculum are also recommended.

Conclusion

An educational program based on the HBM model can be used to increase the severity, benefits, and self-efficacy of the nurses' preventive behaviors against CVDs and modify their dietary regime.

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This study was extracted from a master thesis in nursing. It is a registered randomized controlled trial (registration code: IRCT20171023036955N2) approved by the Ethics Committee of Lorestan University of Medical Sciences (ethical code: IR.LUMS.REC.1396.298). The authors would like to thank the authorities of Imam Khomeini Hospital and the nurses participated in the study for their valuable cooperation.

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Conflicts of interest

There are no conflicts of interest.

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