http://www.ijwhr.net
doi 10.15296/ijwhr.2018.53
Open Access Original Article

IJWHR
International Journal of Women's Health and Reproduction Sciences
Vol. 6, No. 3, July 2018, 321–327
ISSN 2330-4456

Education of Iranian Pregnant Women About Prevention of Influenza A

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Abstract

Objectives: Type A influenza is an upper respiratory tract disease. This study evaluated the efficiency of education based on the Health Belief Model (HBM) in promoting the knowledge, attitude and practice (KAP) of pregnant women about preventing influenza type A in Sirjan, Kerman.

Materials and Methods: This was a quasi-experimental study. The population under study were 200 pregnant women who visited the health centers of Sirjan. These people were randomly divided into intervention (n = 100) and control (n = 100) groups. The educational intervention was conducted over two 60-minute sessions. Information was collected through a questionnaire (71 questions) before the intervention and three months after it. Chi-square test, Fisher exact test, independent *t* test, paired *t* test and Pearson correlation coefficient were calculated.

Results: After the intervention, the knowledge score increased in both groups; this was probably due to the routine training programs at those centers, but significant increases in attitude and practice were only observed in the intervention group ($P<0.05$). Furthermore, perceived susceptibility, perceived severity, perceived benefits, cues to action and efficacy increased significantly and perceived barriers decreased significantly in the intervention group.

Conclusions: HBM was effective in promoting the KAP of pregnant women in Sirjan for preventing type A influenza. Therefore, HBM can be used to help prevent influenza A in the pregnant women.

Keywords: Influenza type A, Health belief model, KAP, Pregnant women

Introduction

Type A influenza is an upper respiratory tract disease caused by the influenza A (H1N1) virus. The most common symptoms of this disease are sudden onset of fever, chills, cough, sore throat, malaise, headache, muscle and joint pain that can be accompanied by vomiting and diarrhea. Such symptoms may emerge in unusual and sometimes severe forms in certain groups such as pregnant women, infants, the elderly and people with immune deficiencies. Complications include pneumonia, sinusitis, otitis, carditis, pericarditis, and even neurological complications such as acute encephalitis and seizures (1).

The disease is transmitted through coughing, sneezing and contact with contaminated surfaces. Patients are infected from the day before the symptoms start until the fever stops; and up to 7 days after the onset of symptoms is considered the period in which the disease can be spread (2).

High-risk groups for influenza A are people over 65 years, children less than 5 years, pregnant women, people with chronic medical illnesses (such as asthma, diabetes, cardiovascular disease) and immunocompromised people (3).

Immunological and physiological changes happening during pregnancy affect internal systems including the respiratory and cardiovascular system, which increase the pregnant women's risk of infection and complications (4). The risks of hospitalization and maternal mortality, preterm delivery, stillbirth, neonatal death, and low birth weight are higher in the pregnant women with the influenza (5). Studies have reported that the case fatality rate in the pregnant women was between 20% - 50% during the 1918 to 1957 pandemics (6). In the 2009 pandemic, the case fatality rate in the pregnant women was 5% while the population of pregnant women with the disease was only 1% of the whole patients (7). In Iran, among 3672 confirmed cases of H1N1 between 22 May and 21 December 2009, 140 (3.8%) deaths were reported (8).

Training programs are one of the effective ways to prevent influenza and the usefulness of this education depends on the suitable use of behavioral science theories (9). One of the models used in health education is the Health Belief Model (HBM) that believes behavior is the result of knowledge and attitude. This model has been developed based on this idea that people should know about the threats to their health; and if they know, then their behavior will change toward healthy behaviors. The

Received 6 April 2017, **Accepted** 13 September 2017, **Available online** 28 September 2017

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reason for using this model is to study the reasons for not obeying health rules and to understand the behavior of people who think they will never get sick (10). The HBM is a comprehensive model that can play a role in the prevention of diseases. It also shows the relationship between belief and behavior. It is based on the premises that preventive measures are based on individual beliefs such as one's vulnerability to the disease, the impact of disease on an individual's life, and the effect of health interventions on reducing disease susceptibility and severity. The model constructs include perceived susceptibility and severity, perceived barriers and benefit, cue to action and self-efficacy (9).

Based on this model, in order to adopt influenza protective behaviors (primary prevention), the pregnant women must first feel threatened by the disease (perceived susceptibility); then they need to understand the depth of danger and importance of the problems for themselves and their fetus (perceived severity). With the help for action they receive from their surroundings (cues to action), they should believe in the usefulness and applicability of preventive behaviors (perceived benefits). They should also understand that the factors preventing the adoption of such behaviors are less expensive than their harms (perceived barriers) (11). Ultimately, they should see themselves capable of performing preventive behaviors (self-efficacy) to prevent the disease properly.

A study on the predictive factors for receiving influenza vaccination in the US showed that decrease in perceived barriers was one of the factors affecting H1N1 vaccination and only 58.1% of the participants had the intention to get the vaccine (12). The results of another study in Iran revealed that the role of perceived susceptibility and perceived benefits were greater compared to other variables. It was also shown that mass media had a major role in informing the public about influenza (13). Our literature review showed that most studies about influenza were descriptive and assessed the factors determining the behavior of getting the vaccine. No study has yet addressed the effect of educational interventions on the prevention of influenza.

Fortunately, Iran has an efficient and organized network for providing public health services. One of the most important services is educational service. This study was carried out to investigate the effect of an HBM-based educational intervention on the knowledge, attitude and behavior of pregnant women visiting health centers in Sirjan, during 2015-2016. We hope the results of this study would improve the efficiency of these health services.

Materials and Methods

Sampling

This was a quasi-experimental study carried out between November 2015 and March 2016. The population of this study included the pregnant women visiting 4 health centers in Sirjan. The participants were chosen via random sampling.

The difference between health practice scores before and after the intervention in one similar study was 3.3 ± 7 (14). According to this information and assuming $\alpha = 0.05$, $\beta = 0.80$, the sample size had to be at least 82 participants in each group. In this study, 100 people were enrolled in each group.

The inclusion criteria were being pregnant and currently living in Sirjan. The exclusion criteria were unwillingness to take part in the study or to continue cooperation.

Measures

The instrument used in this study was a questionnaire. Anonymous questionnaires were prepared and coded in 3 parts.

The first part of the questionnaire addressed demographic information with 5 questions on age, occupation, household income, education and place of residence.

Health Belief Model Questionnaire

The second part of the questionnaire contained questions regarding the HBM constructs. In this section, for each construct 7 questions were considered. The constructs included perceived severity and susceptibility, perceived barriers and benefits, cues to action and self-efficacy.

The answers to questions about perceived severity and susceptibility, perceived barriers and benefits, cues to action and self-efficacy, attitudes and practices were based on a 5-degree Likert scale. Scores 5-1 were respectively set for strongly disagree, disagree, no idea, agree and strongly agree. The scores ranged from 7 to 35 for all of them.

Knowledge, Attitude and Practice Questionnaire

In the third part, knowledge, attitude and practice (KAP) was assessed and in each construct, 8 questions were asked. The scores ranged from 8 to 16 for knowledge and 8 to 40 for attitude and practice.

Validity and Reliability

In order to design a questionnaire with sufficient content validity, initially all the studies available in this field, which had accessible questionnaires, were reviewed. Then the first draft of the questionnaire was developed. The questionnaire was evaluated and criticized in regard to face and content validity by 10 health education experts.

Therefore, in order to control the reliability of the questionnaire, test-retest was done within 2 weeks on 20 pregnant women who were not participating in the study. The correlation coefficient for perceived susceptibility was 0.82, for perceived severity 0.86, for perceived benefits 0.86, for cues to action 0.82, for perceived barriers 0.80, for self-efficacy 0.78, for awareness 0.86, for attitude 0.86 and for practice 0.85.

Intervention

After choosing the participants according to the

inclusion criteria, the researchers randomly allocated participants into the intervention and control groups. Randomization was based on a random number table. The pre-test questionnaire was filled out for everyone by the investigator during an interview. Then the educational package was delivered for the intervention group. The educational content included the definition of flu, its symptoms, transmission, prevention, diagnosis, treatment and the disease complications for the pregnant women. The control group received no intervention; however, after completion of the study, the control group received the educational material.

Training Program

The training program consisted of 2 training sessions lasting for 1 hour within 2 weeks. Participants were informed about the lectures and group discussions in advance. Delivering a lecture is a systematic, time and resource saving method for education. Group discussions were held in order to involve the participants in the learning process and help them deeply understand the educational material. At the end of each session, the training materials were given to the participants in the form of an educational booklet and pamphlets. The venue for the sessions was health houses and health centers. Three months after the training, post-test questionnaires were filled out again by the researchers for each participant in the intervention and control groups.

Prior to the beginning of the study, the purpose of the study and the privacy of data were explained to the participants. Informed consent was obtained before the participants were enrolled. Although the control group did not receive the educational intervention, the same training with similar quality and quantity was provided to them after they completed the post-test questionnaires.

Statistical Analysis

Data were analyzed by SPSS 16.0. Paired *t* test, independent *t* test, Fisher exact test or chi-square test and Pearson correlation coefficient were used to examine the relationship between the variables. The significance level of the tests was considered less than 0.05.

Results

General Information

The control group and intervention group were similar in terms of demographic characteristics (Table 1). The mean age was 29.2 ± 5.1 years in the intervention, and 28.7 ± 5.8 years in the control group and the difference was not significant ($P=0.425$).

Group Comparisons

According to Table 2, there was no significant difference between the 2 groups before the intervention in the HBM constructs (perceived susceptibility [$P=0.41$], perceived severity [$P=0.33$], perceived benefits [$P=0.34$], perceived barriers [$P=0.51$), cues to action [$P=0.44$), self-efficacy [$P=0.63$], knowledge ($P=0.54$], attitude [$P=0.57$] and practice [$P=0.12$]), but after the intervention, the independent *t* test showed a significant difference between the intervention and control groups in all the constructs ($P=0.001$).

Table 1. Comparison of Demographic Characteristics in Intervention and Control Groups

Variable	Intervention Group No. (%)	Control Group No. (%)	*P* Value
Job			0.681
Housewife	77 (77)	76 (76)	
Employed	13 (13)	14 (14)	
Income			0.682
Low	30 (30)	31 (60)	
Average	54 (54)	53 (53)	
High	16 (16)	16 (16)	
Education			0.766[b]
Illiterate	12 (12)	11 (11)	
Primary school	5 (5)	6 (6)	
Guidance school	10 (10)	10 (10)	
Diploma	60 (60)	59 (59)	
Masters and higher	13 (13)	14(14)	
Residence			0.521[a]
City	51 (51)	52 (52)	
Village	49 (49)	48 (48)	

[a] Chi-square test; [b] Fisher exact test.

As the results in Table 3 shows and according to the paired *t* test results, there was a significant difference between the mean scores of HBM constructs (perceived severity and susceptibility, perceived barriers and benefits, cues to action and self-efficacy), KAP in the intervention group before and after the intervention ($P=0.001$), while in the control group, there was no significant difference in the variables except for knowledge ($P>0.05$). Results of this test are shown in Table 3.

Results of Correlation

Pearson's correlation coefficient indicated a significant relationship between knowledge, attitude and HBM constructs, and preventive behaviors of influenza (Table 4).

Results of Regression Analysis

The results of linear regression analysis showed that among the independent variables, perceived severity ($P<0.001$) and self-efficacy ($P=0.008$) had the greatest impact on the preventive behaviors, and for each unit of increase in perceived severity and self-efficacy, 0.29 and 0.14 units of increase were respectively seen in the preventive behaviors.

Discussion

The findings of this study showed that using HBM can increase the KAP of pregnant women on influenza prevention.

Influenza type A prevention is considered as a serious

Table 2. The Mean Score for HBM Constructs and KAP in the Control and Intervention Group Before and After the Intervention

	Before the intervention			After the intervention		
	Intervention Group Mean ± SD	Control Group Mean ± SD	*P* value	Intervention Group Mean ± SD	Control Group Mean ± SD	*P* Value[a]
Perceived susceptibility	28.14±2.59	27.77±3.11	0.412	33.12±1.52	27.85±3.01	<0.001
Perceived severity	25.91±4.95	25.59±5.12	0.331	33.56±1.75	25.60±3.89	<0.001
Perceived benefits	30.19±2.37	30.71±2.83	0.345	33.50±1.78	30.71±2.78	<0.001
Perceived barriers	32.30±2.49	31.58±5.43	0.512	22.12±5.69	31.68±5.83	<0.001
Cues to action	8.72±1.41	8.08±0.18	0.447	13.11±0.77	8.09±1.93	<0.001
Self-efficacy	27.53±3.34	27.31±3.45	0.634	33.75±2.25	27.37±3.32	<0.001
Knowledge	10.22±1.45	10.94±1.42	0.549	15.42±0.64	11.89±1.56	<0.001
Attitude	25.22±1.21	25.94±1.37	0.572	36.42±1.32	25.97±1.56	<0.001
Practice	20.22±3.17	21.03±3.54	0.125	35.42±1.64	21.89±1.56	<0.001

[a] Independent *t* test.

Table 3. Comparison of HBM Constructs and KAP Within Each Group Before and After the Intervention

	Intervention Group			Control Group		
	Before Intervention Mean ± SD	After Intervention Mean ± SD	*P* Value	Before Intervention Mean ± SD	After Intervention Mean ± SD	*P* Value[a]
Perceived susceptibility	28.14±2.59	33.12±1.52	<0.001	27.77±3.11	27.85±3.01	0.442
Perceived severity	25.91±4.95	33.56±1.75	<0.001	25.59±5.12	25.60±3.89	0.345
Perceived benefits	30.19±2.37	33.50±1.78	<0.001	30.71±2.83	30.74±2.78	0.566
Perceived barriers	32.30±2.49	22.12±5.69	<0.001	31.58±5.43	31.68±5.83	0.332
Cues to action	8.72±1.41	13.11±0.77	<0.001	8.08±0.18	8.09±1.93	0.721
Self-efficacy	27.53±3.34	33.75±2.25	<0.001	27.31±3.45	27.37±3.32	0.511
Knowledge	10.22±1.45	15.42±0.64	<0.001	10.94±1.42	11.89±1.56	0.006
Attitude	25.22±1.21	36.42±1.32	<0.001	25.94±1.37	25.97±1.56	0.688
Practice	20.22±3.17	35.42±1.64	<0.001	21.03±3.54	21.89±1.56	0.447

[a] Paired *t* test.

Table 4. Correlation Between Knowledge, Attitude and HBM Constructs; and Preventive Behaviors of Influenza in the Intervention Group

Constructs	Pearson Correlation Coefficient With Preventive Behaviors	*P* Value
Knowledge	0.388	0.003
Attitude	0.253	0.027
Perceived susceptibility	0.214	0.007
Perceived severity	0.423	<0.001
Perceived benefits	0.302	0.005
Perceived barriers	-0.278	0.035
Cues to action	0.375	0.009
Self-efficacy	0.410	0.001

subject in developed countries. Influenza is a health issue and can cause psychological burden. Furthermore, it reduces efficiency and increases the number of missing workdays of individuals. During the influenza A epidemic, disease prevention should be mainly done at individual level. Therefore, it is important to increase KAP in various aspects of disease control and prevention, especially frequent hand washing, avoiding kissing and handshaking, using filtering masks, indoor ventilation, and proper nutrition.

Effect of Intervention on Constructs of HBM

In this study, after the intervention, the mean score of perceived susceptibility increased in the intervention group, which shows the increased understanding of the severity and high health risks of influenza type A. After education, significant increase in perceived susceptibility was also observed by Vakili et al and Sharifirad et al (15, 16). However, Ghafari et al showed that education did not increase the students' perceived susceptibility about AIDS, which is contrary to the results of this study (17).

The results of the present study presented a significant increase in the perceived severity after education in the intervention group. This suggests that the pregnant women consider flu as a severe disease and lethal to both the mother and fetus. This perceived severity leads to the adoption of preventive measures and behaviors. The results found by Pirzadeh et al and Shamsi et al are in line with the results of this study. They showed that perceived severity increased after the educational intervention (18,19).

Taking action to prevent a disease depends on the patients' understanding of the associated benefits. In this

study, after the intervention, the mean scores of perceived benefits significantly increased in the intervention group. Jadgal et al (20) and Taghdisi et al showed that perceived benefits were a major factor in health behavior change (21).

There was a significant difference in the mean score of perceived barriers between the two groups after the intervention, which further shows the significant influence of teaching on the perceived barriers. Thus, the perceived barriers have the potential to hinder disease. By perceiving the barriers, the patients analyze the benefits, the costs, risks, possible complications and the time of taking action. Accordingly, they adopt health behaviors. After completing the training program, there was a significant decrease in the mean score of perceived barriers, which was consistent with the results of other studies done according to HBM (22,23).

Cue to action significantly increased after education in the intervention group. This significant change shows that those surveyed had good cues and external stimuli, including health care workers, family and mass media to adopt preventive behaviors against the disease, which is in agreement with the finding of Karimi et al (24) and Bakhtariagdam et al (25), who all used HBM for education.

In this study, the mean score for self-efficacy increased after the intervention. Bandura defines self-efficacy as one's belief in his/her ability to ensure successful implementation of an action (26). The findings of similar studies also revealed that the effect of HBM-based education was significant in the improvement of the self-efficacy score (27,28).

Effect of Intervention on KAP

In this study, knowledge significantly increased after the intervention in both groups. The reason for increased knowledge in the control group was possibly due to the current routine training package in the health centers along with the curiosity of the control group participants to inquire information from others.

Significant differences between mean knowledge scores after the intervention in the intervention and control groups was also seen in a study done by Wolf et al and Farhadi et al (29,30) and the level of knowledge increased after the education only in the intervention group in a study done by Sharifirad et al (9).

In this study after the intervention, the attitude of the intervention group members improved. Education was probably effective in improving the attitude in the intervention group because group discussions and participation, which play a fundamental role in shift of attitude were allowed in the sessions. The results of Heydari et al (31) and Sadeghi et al (32) are in line with the findings of this study.

However, the results of some studies did not show the effect of education on the attitude. This can be due to the fact that shift of attitude is often a very difficult process (33).

In general, it is difficult to change people's behavior and it should be done under persistence and motivation during different stages of life (34). In this study, education improved participants' practice. The results of Choudhury et al and Motamedi et al were also consistent with the findings of this study (35,36).

Correlation of HBM Constructs

Pearson correlation test results showed that HBM constructs were good predictors of influenza preventive behaviors. These findings are consistent with the results from the studies about the promotion of self-care in the patients with tuberculosis (20) and the control of blood pressure in the patients with hypertension (23). In addition, the linear regression analysis presented that the model built in this study was capable to predict behavioral changes.

Limitations

A limitation of this study was that the participants might not have mentioned their real views. This limitation was partly overcome by the anonymity of questionnaires and confidentiality of the participants' information.

Conclusions

Education of the pregnant women based on HBM can promote KAP for preventing flu. Hence, it is recommended to use this model alongside traditional teaching methods.

Conflict of Interests

Authors declare that they have no conflict of interests.

Ethical Issues

Approval for this study was obtained from the Health Research Ethics Board at the Kerman University of Medical Sciences (Code of Ethics: IR.KMU.REC.1396.10). It was conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from all the participants..

Financial Support

This work was funded by Physiology Research Center, Kerman University of Medical Sciences, Iran.

Acknowledgements

Hereby, we would like to express our gratitude to Physiology Research Center, Kerman University of Medical Sciences, which provided funding for the study. Words of acknowledgement also go to Sirjan health centers' staff and the pregnant women who cooperated in this study.

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