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Cognitive Determinants of Influenza Preventive Behaviors among Students: an Application of the Health Belief Model (HBM)

Touraj Ahmadi Jouybari[1], Naser Hatamzadeh[2], Mohammad Fattahi[3], Hassan Gharibnavaz[1], Shiva Khashij[1], *Mohammad Mahboubi[3]

[1]Clinical Research Development Center, Imam Khomeini Hospital, Kermanshah University of Medical Sciences, Kermanshah, Iran. [2]Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.
[3]Abadan School of Medical Sciences, Abadan, Iran.

Abstract

Background

Recently, the prevalence of influenza threatening the society health; preventative strategies are effective method in reducing risk prevalence of influenza. The aim of this study was to determine the cognitive determinants of influenza preventive behaviors among high school students based on the Health Belief Model (HBM**)**.

Materials and Methods

This cross-sectional study, conducted among 300 high school students (170 girls and 130 boys) in Southern of Iran. Students were randomly selected to participate voluntarily in the study. Participants filled out a standard self-administered questionnaire. Questionnaire included three sections including influenza preventive behaviors, demographics variables and HBM variables which comprised of 46 items. Data were analyzed by SPSS software (version 16.0).

Results

The mean score of influenza preventive behaviors was 14.66 [mean female: 15.42± 4.93) and mean boy: 13.61± 4.71)], ranged from 0 to 28. The HBM variables accounted for 23% of the variation in influenza preventive behaviors (Adjusted R squared=0.23, F=15.288 and P<0.001). The best predictor was self-efficacy (ß=0.358, P<0.001). Female student, and high level of parents education was a significant association with doing influenza preventive behaviors (P<0.05).

Conclusion

Based on our results, it seems that implementation of interventional programs to increase self-efficacy about influenza preventive behaviors may be usefulness of the results in order to promotion of influenza preventive behaviors.

Key Words: HBM model, Health Education, Preventive Behaviors, Students, Infection Disease.

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Corresponding Author:

Mohammad Mahboubi, Abadan School of Medical Sciences, Abadan, Iran.

Email: health_fj@yahoo.com

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1- INTRODUCTION

Influenza is an acute respiratory disease which is caused by infection with influenza viruses; in this disease involved upper and lower respiratory and often signs systemic symptoms include fever and weakness (1). Seasonal influenza epidemics occur nearly every winter and these epidemics lead to significant afflictions in the society and increase workplace absenteeism in some patients (1). Influenza type A was discovered for the first time in 1918 in the United States and after a long period of time, this disease with the name 'Swine flu' was reported in April 2009 again in the southern California with a different form, power and pathogenesis than in the past. After that event, some cases of affliction with this disease were rapidly reported in Mexico, Canada and some European countries (2).

Mortality caused by influenza epidemics is between 2.0 to 5.0 percent. In most cases the mortality is due to the underlying diseases and the risk of influenza complications. The main high-risk conditions are pregnancy, chronic pulmonary and cardiac diseases, older age, renal and metabolic diseases and immune deficiency (3). Influenza A (H1N1) virus transmission is possible through respiratory droplets (coughing or sneezing) from the inflected person to another person. Sometimes individuals are infected with the virus through indirect contacts with items infected with the disease and then contact with mouth and nose. The possibility of transmission through tear or saliva is not known yet but all respiratory secretions and body fluids in infected patients are potentially considered as infecting and pathogenic. The transmission duration of this virus is similar to that of the seasonal influenza; in fact, the disease is contagious from one day before to seven days after the onset of symptoms (4). Considering the prevalence of this disease among the adolescents and school-age individuals, making these individuals aware of the disease through health-education programs can contribute to the prevention of the disease (5). In line with this, studies have indicated that the most effective educational programs are based on theory-centered approaches that are rooted in social psychology (6). In this regard, Health Belief Model (HBM**)** is a theory of behavior analysis that has been employed in different studies and for different aspects of preventive behaviors (7). It emphasizes how the individual beliefs and perceptions regarding the fear of health problem and the assessment of benefits and barriers of preventive behavior lead to the adoption of a healthy behavior. According to this model, in order to adopt preventive performances, individuals need to first feel at risk of the problem (perceived susceptibility), then perceive the depth of this risk and the seriousness of the different mental and physical complications of the problem which is called perceived severity and they will adopt the preventive behavior in the case of lack of serious barriers to the adoption of the preventive behavior (8). HBM has been used in different studies about health behaviors (9-12). Furthermore, studies have also shown that the studies based on social psychology theories have a valuable role in designing health promotion programs (13-19). The aim of this study was to determine the cognitive determinants of influenza preventive behaviors among students based on HBM.

2- MATERIALS AND METHODS

2-1. Study design and procedure

This cross-sectional study was conducted among 300 high school students in Shadegan city, Khuzestan province, in the Southern of Iran. Participants were randomly selected among male and female high school. Participants were asked to respond a self-report questioner.

Participants were confirmed about the aim of the study, study conduction and data security. Also, they reported their willingness to attend the study. Of the population of 300, 269 (89.6%) signed the consent form and voluntarily agreed to participate in this study, which has been approved by the institutional review board at the Abadan school of medical sciences, Abadan, Iran (ID-number:1395.89). The sample size was calculated at 95% significant level according to this formula:

$$n = \frac{\sigma^2 * z^2_{1-\frac{\alpha}{2}}}{d^2}.$$

In this regards, σ is (σ of influenza preventive behaviors) according to the results of a pilot study was 6.1 and considering the d in our study was 0.5 and a sample of 300 was estimated.

2-2. Measures

Standard questionnaire included three sections that comprised of forty-six questions and items; six questions for demographic variables, seven items about influenza preventive behaviors and thirty-three items for HBM variable (11, 12).

2-2-1. Demographics variables

First section: The demographics variables assessed in this study included: age (years), gender (male, female), mother and father education level (under diploma, diploma, and academic), parents' divorce (yes, no), and economic status (weak, average, good, very good).

2-2-2. Influenza preventive behaviors

Second section: To assess influenza preventive behaviors among the participants, we used seven questions (e.g. "washing hand" or "uses of mask cover the nose and mouth"), which the response category was never to always.

2-2-3. HBM variables

Third section: HBM variables were measured by the standard questionnaire (11, 12). Specifically, two items measured perceived susceptibility abut likelihood the risk of influenza (e.g. "at my age risk of influenza is very low"). There were five items which measured the perceived severity abut influenza side effect (e.g., "influenza complication, it could seriously affect my life"). Five items measured the perceived benefit of doing influenza preventive behaviors (e.g., "if I doing influenza preventive behaviors, it can promote my health"). Six items measured the evaluated perceived barrier of doing influenza preventive behaviors (e.g., "mask using for influenza prevention is too expensive for me"). The perceived self-efficacy to doing influenza preventive behaviors was measured by seven items (e.g. "I am sure about my ability to use mask"). Eight items measured the cues to action of doing influenza preventive behaviors (e.g., source of doing influenza preventive behaviors were: family, teachers, friends, etc.). In order to facilitate the participants' responses to the items, susceptibility, severity, barrier, benefit, and self-efficacy were standardized to a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Cues to action item were standardized to yes or no scale. Prior to conducting the main study, a pilot study was carried out. Initially the relevant questionnaires were administered to thirty students who were similar to study population in order to estimate the duration of the study conduction and to evaluate the reliability of the questionnaire. Alpha Cronbach's coefficient was used to estimate reliability of susceptibility, severity, barrier, benefit, self-efficacy and behaviors. Split-half was used to estimate reliability of cues to action. Constructs reliability were: perceived susceptibility (α=0.65); perceived severity (α=0.81); perceived benefit (α=0.70); perceived barrier (α=0.76); perceived self-efficacy (α=0.80); cues to action (α=0.80); and behaviors (α=0.57).

2-3. Ethical consideration

This study approved by the institutional review board at the Abadan school of medical sciences, Abadan, Iran (IR.ABADANUMS.REC.1395.89).

2-4. Inclusion and exclusion criteria

Studying in the academic year 2016-2017 at high schools in Shadegan city, Khuzestan province, in the Southern of Iran was considered the inclusion criterion, and unwillingness to cooperate with the research team and incomplete completion of questionnaires were regarded as exclusion criteria.

2-5. Data Analyses

The Statistical Package for the Social Sciences (SPSS) software version 16.0 was used for the purpose of data entry, manipulation, and analysis. Descriptive statistics were used to summarize and organize the data. Bivariate correlations were computed to ascertain the magnitude and direction of the associations between the HBM variables. Linear regression analysis was performed to explain the variation in the influenza preventive behaviors on the basis of HBM variables. ANOVA and t-test was performed to explain the association between background variable and influenza preventive behaviors. Cronbach's Coefficient Alpha and split half was used to estimate the internal consistency of the various measures.

3- RESULTS

The subjects ranged in age from 13 to 19 years with the mean of the 16.85 (SD: 0.93) years. Also, 40.9% (110/269) of participates boy, and 59.1% (159/269) were female. Nearly 72.5% (195), 16.7% (45), and 9.7% (26) of the respondents reported that their father were under diploma, diploma and academic education, respectively. In addition, 87% (234), 5.9% (16), and 5.6% (15) of the respondents reported that their mother were under diploma, diploma and academic education, respectively. The mean score of influenza preventive behaviorswere 14.66 [95% Confidence Interval [CI]: 14.04, 15.28], ranged from 0 to 28. **Table.1** shows correlations between the HBM constructs with behaviors, which influenza preventive behaviors were most of them statistically significant at either 0.01 or 005 level. The results showed that influenza preventive behaviors was correlated with the cues to action (r=0.220 and P=0.002), self-efficacy (r=0.403 and P<0.001), perceived benefit (r=0.167 and P=0.008), perceived severity (r=0.161 and P=0.001), and perceived susceptibility (r=0.210 and P=0.011), while inversely correlated with perceived barrier (r= -0.155 and P=0.015).

Table-1: The correlation between HBM constructs and influenza preventive behaviors

Component	Mean (SD)	Range	X1	X2	X3	X4	X5	X6
X1. Susceptibility	5.65 (1.70)	2-10	1					
X2. Severity	17.81 (4.12)	5-25	0.268* < 0.001	1				
X3. Barrier	15.86 (5.01)	6-30	0.061 0.317	-0.121* 0.048	1			
X4. Benefit	16.67 (3.65)	5-25	0.369** < 0.001	0.435** < 0.001	-0.148** 0.015	1		
X5. Self-efficacy	21.38 (6.20)	7-35	0.242** < 0.001	0.320** < 0.001	-0.125** 0.041	0.286** < 0.001	1	
X6. Cues to action	4.73 (2.16)	0-8	0.180** 0.007	0.034 0.612	-0.147** 0.028	0.055 0.413	0.158* 0.019	1
X7. Behaviors	14.66 (4.91)	0-28	0.210** 0.001	0.161** 0.011	-0.155** 0.015	0.167** 0.008	0.403** < 0.001	0.220** 0.002

* P<0.05, ** P<0.01.

As be seen in **Table.2**, HBM variables were statistically significant for predicting influenza preventive behaviors which, they were accounted for 23% of the variation in influenza preventive behaviors (Adjusted R squared=0.23, F=15.288 and P<0.001), and finally on 3rd step the procedure stopped and the best model was selected, among the HBM constructs: perceived barrier (ß=-0.123), perceived susceptibility (ß=0.136), self-efficacy (ß=0.358), and cues to action (ß=0.114) were the more influential predictors on influenza preventive behaviors.

Table-2: The regression analyses predicting HBM constructs on influenza preventive behaviors

Variables	ß	SE B	Beta	T-test	P-value
Susceptibility	0.389	0.189	0.136	2.056	0.041
Barrier	-0.126	0.066	-0.123	-1.903	0.058
Self-efficacy	0.285	0.053	0.358	5.407	<0.001
Cues to action	0.262	0.148	0.114	1.773	0.078
Adjusted R Square= 0.23, F=15.288, P<0.001					

SE B: standard error for the unstandardized beta.

The relationship between influenza preventive behaviors and gender, parent divorce, father education, mother education, and economic status was showed in **Table.3;** as be seen, influenza preventive behaviors were statistically significant with gender, and parent's education level; so that female students, students who had mother with academic education, and students who had father with diploma were had higher level of influenza preventive behaviors.

Table-3: Association between background variable and influenza preventive behaviors

Variables	Sub-group	Mean	SD	t/F	P-value
Gender	Female	15.42	4.93	2.902	0.004
	Male	13.61	4.71		
Parent divorce	Yes	15.08	6.69	0.162	0.874
	No	14.76	4.63		
Father education	Under Diploma	14.23	4.96	3.784	0.024
	Diploma	16.51	4.62		
	Academic	14.48	4.72		
Mother education	Under Diploma	14.16	4.75	9.252	<0.001
	Diploma	17.60	5.11		
	Academic	18.66	4.80		
Economic status	Weak	14.61	4.60	0.627	0.599
	Average	14.54	5.55		
	Good	15.33	4.38		
	Very Good	14.27	4.65		

SD: Standard deviation.

Finally, **Table.4** shows the most important factors that persuaded the participants to doing influenza preventive behaviors. Accordingly, 63.3% (171/269) of participants have reported family as the most effective factor that persuaded them to doing influenza preventive behaviors.

Table-4: The cues to action of participants to doing influenza preventive behaviors

Factor	Female, number (%)			Male, number (%)			P-value
	No	Yes	No answer	No	Yes	No answer	
Physician	52 (32.7)	98 (61.6)	9 (5.7)	42 (38.2)	60 (54.5)	8 (7.3)	0.501
Family	41 (25.8)	112 (70.4)	6 (3.8)	36 (32.7)	59 (53.6)	15 (13.6)	0.002
Health center staff	49 (30.8)	101 (63.5)	9 (5.7)	42 (38.2)	51 (46.4)	17 (15.5)	0.004
Televisions and Radio	60 (37.7)	88 (55.3)	11 (6.9)	40 (36.4)	53 (48.2)	17 (15.5)	0.073
Newspaper	81 (50.9)	68 (42.8)	10 (6.3)	55 (50)	106 (39.4)	27 (10)	0.037
Internet	57 (35.8)	91 (57.2)	11 (6.9)	48 (43.6)	43 (39.1)	19 (17.3)	0.003
Teachers	42 (26.4)	107 (67.3)	10 (6.3)	35 (31.8)	56 (50.9)	19 (17.3)	0.004
Friends	67 (42.1)	81 (50.9)	11 (6.9)	39 (35.5)	52 (47.3)	19 (17.3)	0.028

4- DISCUSSION

The aim of this study was to cognitive determinants related to doing influenza preventive behaviors among high school students based on the Health Belief Model. The results of the present study indicated that self-efficacy, barrier, susceptibility, and cues to action were the most influential predictors on influenza preventive behaviors. Based on our finding, the mean of influenza preventive behaviors among high school students was 14.66+4.91 (range from 0 to 28), this result indicated the participants 52.3% of obtainable the maximum score of influenza preventive behaviors questioner; this findings indicated influenza preventive behaviors was in the low level among the students. This result is not similar to the results reported by other studies; Xiang et al. in their study in urban and rural areas of China (20) and Najimi et al. in their study among students in the center of Iran (11) reported that practice of participants about doing influenza preventive behaviors were good. The comparison of our findings with similar studies indicated doing influenza preventive behaviors among high school student in southwest of Iran was low. These results can be warning to health policy makers in Khuzestan province in southern of Iran; and should be the focus of special attention. Our finding indicated HBM variables accounted for 23% of the variation in influenza preventive behaviors, and perceived self-efficacy and perceived susceptibly were the more influential predictors on preventive behaviors from type A influenza. In this regards, several studies have reported HBM variables' predictability to explain health behaviors. For example, Sharifirad et al. in their study among students in Isfahan, the center of Iran, indicated significant correlation between susceptibility, severity, and self-efficacy with doing preventive behaviors of influenza; and reported protection motivation theory variables accounted for 11% of the variation in preventive behaviors of influenza (12). Also, Najimi et al. carried out a descriptive cross-sectional study among 313 students (150 females and 163 boys) were studied from high school of Shahrekord, Iran, with aim of evaluated the preventive behaviors of high school students regarding type A influenza based on HBM and indicated significant association between susceptibility, severity, self-efficacy with the preventive behaviors from type A influenza (8). In addition, Teitler-Regev et al. reported that student who had history of taking flu vaccine had higher mean scores of perceived severity (21). Furthermore, Coe et al. carried out a research on 664 adult college students and grocery store patrons in local grocery store chain and university in the Central Virginia area and reported that participants were significantly more likely to intend to receive the H1N1 vaccine if they had lower scores on the perceived vaccine barriers domain (22). As well as,

Shahraban et al. carried out a study on nurse decision to get the flu vaccine and showed significant association between susceptibility, severity and health motivation and get the flu vaccine (23). Furthermore, Jiang et al. reported perceived threat and response efficacy more influential predictors on SARS preventive behavior (24). Several study stated perceived risk of influenza among people is low (25). It seems that designing and implementation of educational programs to increase seriousness about consequences of influenza and ability to perform preventive behaviors flu may be usefulness of the results in order to promotion of influenza preventive behaviors among high school students. According to our results, family, teacher, and physicians' advice had an important cause to action for doing influenza preventive behaviors. The results of similar to studies confirm these findings and highlight the effectiveness of the family, teacher, physicians, and Televisions on healthy behavior. For example, Coe et al. reported that participants received novel H1N1 vaccine recommendations from their physicians, pharmacists, and nurses (22). In addition, Najimi et al. reported mass media was the main source of their information regarding influenza (11). Our results among 269 high school students in the Southern of Iran, show high school students to doing influenza preventive behaviors are influenced by other people such as family, teachers, and physicians, so educational programs for family, teachers, and physicians is necessary to encourage students to doing influenza preventive behaviors. We found among backward characteristics female students, students who mother had academic education, and students who father had diploma were higher level of influenza preventive behaviors. In this regards, several study showed gender most influential predictive factor for doing screening behavior. Al Shehri et al. in their study among secondary school students in Saudi Arabia and reported female students more than male student worry about influenza (26). However in this regards Teitler-Regev et al. reported no significant different between intention to get seasonal flu vaccination and sex (21). It seems females more than boys pay attention to their health and consequently perform preventive behaviors, therefore in designing intervention programs attention on gender is recommended. Another finding of the present study was a significant relationship between the parents' education and adoption of influenza-prevention behaviors among the students. In recent years, the relationship between social factors and individuals' health status has gained increasing attention of researchers and health-related authorities; and different studies have shown a relationship between socioeconomic status and health status of individuals (26, 27). Studies have also indicated that the improvement of the parents' education status has a significant role in the child's survival (28, 29). Mother's education is related to the child's health in different ways including better family income, participation in decision makings, better use of the existing opportunities and providing the children with a better care (30). These findings show the high importance of the parents' education, especially the mother's, in family health and the necessity of paying more attention to children with low socio-economic status.

4-1. Limitations of the study

The study has several limitations. First, the information is based on self-reporting, which always faces the risk of recall bias. Second, the study sample size was low and participants were all from the Southern of Iran in Khuzestan province; results cannot be generalized to other population of Iranian students. Third, the internal

consistency the questionnaire was relatively low (α=0.57) for assessing influenza preventive behaviors.

5- CONCLUSION

Based on our result, it seems that implementation of educational programs to increase self-efficacy about doing influenza preventive behaviors may be usefulness of the results in order to promotion of influenza preventive behaviors. Also, influenza preventive behaviors were statistically significant with gender, and parent's education level; so that female students, students who had mother with academic education, and students who had father with diploma were had higher level of influenza preventive behaviors. HBM variables were statistically significant for predicting influenza preventive behaviors and the best predictor was self-efficacy.

6- CONFLICT OF INTEREST: None.

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