



The effect of education based on the health belief model on preventive substance use behaviors in male high school students

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Abstract

Introduction: Substance abuse is associated with negative impacts on mental, physical, and central nervous system processes in humans. This study aimed to investigate the effect of education based on the health belief model on preventive behavior against substance use among male students.

Materials and Methods: This study was conducted on 260 male high school students in Khorramshahr City, Iran, in 2018. The students were selected through the random cluster sampling method and they were divided into the experimental and the control groups. They completed the Masoudi Boroujeni's questionnaire based on health belief model. The training program was held in five sessions based on the health belief model, and the post-test was held three months after the intervention. We analyzed the data using descriptive statistics, Chi-square test, covariance analysis, SPSS version 20.

Results: The results showed that in the post-test stage, by controlling the effect of pre-test scores, the effect of training in variables of perceived sensitivity ($P < 0.001$), perceived severity ($P < 0.001$), perceived benefits ($P < 0.001$) and cues to action ($P < 0.001$) was effective.

Conclusion: It seems that implementing an educational intervention based on the health belief model can increase the perceived threat and prevent substance use behaviors in high school students.

Keywords: Health belief model, Prevention, Students, Substance use

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Introduction

The issue of substance use disorder is a significant health concern worldwide. Indeed, substance use is a major problem associated

with significant morbidity and mortality. Furthermore, it contributes to social and economic difficulties in societies (1,2) and generates significant expenditures on

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healthcare and medical treatment (3,4). Tobacco accounts for the deaths of more than 8 million individuals annually, with 7 million of these deaths attributed to direct tobacco consumption and 1.2 million due to secondhand smoke exposure (5). The act of smoking is responsible for 90% and 80% of the mortality rates due to lung cancer and chronic obstructive pulmonary disease, respectively (5,6). The geographical location of Iran in the Middle East necessitates the implementation of preventive measures by politicians and health officials of the country since Iran is a neighbor of Afghanistan, which is the world's largest producer of opium and has the highest prevalence of substance use among youth, as well as the decreasing pattern of the age of substance use (7). Additionally, Iran borders Iraq, where substance use is on the rise due to the effects of war and violence (8). Students are categorized as a high-risk group for substance abuse due to their lack of understanding of the illegal consequences of substance use (9). It is necessary to maintain and promote the physical, mental, and social health of young individuals and adolescents, as it is regarded as a fundamental right of every human being, and youth and adolescents are the optimal ages to acquire healthy life skills. In addition, health promotion programs for teenagers are among the most affordable programs (10). The health belief model is one of the frameworks used numerous times to guide health promotion and disease prevention initiatives. This model predicts and explains the change in health-related behaviors at the individual level (11). Various studies have been conducted using the health belief model regarding the prevention of drug addiction, smoking, and risky behaviors. All of these studies demonstrate the effectiveness of the health belief model and its structures in preventing risky behaviors such as AIDS, substance use, and smoking cessation (12,13). This study aimed to investigate the effect of education on preventing substance use among male high school students. Relevant officials can use the results of this research to formulate educational plans and policy-making to prevent substance use and manage the associated factors among adolescents.

Materials and Methods

This study was conducted on 260 male students of the second secondary level in Khorramshahr City, Iran, in 2018. We selected

the students through the random cluster sampling method. The secondary schools of Khorramshahr City were divided based on the existing regions (2 regions), and each region is considered a cluster. From each cluster, schools of the same level and similar in terms of culture, economy, and geographical location were selected. We divided randomly the selected students into experimental and control groups. The sample size of the present study was calculated using the formula, and considering the beta of 90%, the alpha of 5%, and the 10% dropout of samples, the number of 130 people in each group was calculated ($N=260$).

Inclusion criteria were the willingness of people to participate in the study and being engaged in studying. The lack of satisfaction with cooperating during the study was considered as the exclusion criteria.

Research instrument

A) Masoudi Boroujeni's Questionnaire Based on Health Belief Model: This questionnaire is developed by Daryoush Masoudi Boroujeni and it consists of three parts. The first part includes 12 questions related to the demographic characteristics. The second part of this questionnaire had 8 questions related to the performance and structures of the health belief model, 13 questions about perceived sensitivity, 12 questions about perceived intensity, 9 questions about perceived barriers, 10 questions about perceived benefits, and 5 questions about perceived self-efficacy, and 5 questions about cues to action (14). The validity of this questionnaire has been confirmed by Masoudi Boroujeni et al. (Cronbach's $\alpha=0.76$). The Likert scale is constructed with a 5-point scale, ranging from complete agreement, agreement, no opinion, disagreement, complete disagreement, and a score of 1 to 5 being considered for each question, depending on the answer given. However, the answers to the questions related to the "cues to action" are ranked from low to high (14). Also, in the present study, a group of health education and health promotion experts from Abadan University of Medical Sciences examined the validity of this questionnaire and confirmed its accuracy after adjusting some items. A preliminary study on 30 students confirmed the reliability of the questionnaire using Cronbach's α . The coefficient of reliability of the questionnaire was equal to 0.87. To conduct the present study, both experimental and control

groups fulfilled this questionnaire. The educational intervention was presented based on the pre-test (needs assessment) information. It was found that the students of the two groups obtained a lower mean score in each of the structures. Educational intervention includes substances and their harms and health belief model constructs, such as health behavior to prevent substance use, perceived sensitivity about side effects of substance, perceived severity about side effects of substance use, perceived barriers about the tendency or the lack of tendency to use substances, the perceived benefits of not using tobacco and self-efficacy (14). The educational intervention methods were lectures and group discussions. The post-test was held three months after the intervention.

The collected data were entered into the SPSS version 20. To analyze data, the descriptive statistics, the Chi-square test, independent t-tests, covariance analysis, and Kolmogorov-Smirnov test were used.

Results

In the present study, 260 students with a mean age of 16.25 ± 1.5 years participated. One hundred sixteen students (52.02%) had 2-3 siblings, and 100 (44.84%) had 2-3 siblings. One hundred eighty-eight students (71.91%) had no history of failure. Other demographic variables are presented in Table 1. Comparing the demographic variables using the Chi square test indicated no significant differences between the control and intervention groups.

Table 1. The demographic characteristics of the students

Variable	Value	Control group N (%)	Intervention group N (%)	Total (line percentage)	Result of test
Birth rank	≤ 1	42 (50.0)	42 (50.0)	84 (37.67)	X ² = 0.413 P= 0.938
	2-3	52 (52.0)	48 (48.0)	100 (44.84)	
	4-5	12 (52.2)	11 (47.8)	23 (10.31)	
	≥ 6	7 (43.7)	9 (56.3)	16 (7.17)	
Father's education	Illiterate	7 (41.2)	10 (58.8)	17 (7.80)	X ² = 3.557 P= 0.313
	Primary	38 (43.7)	49 (56.3)	87 (39.91)	
	Diploma	42 (52.5)	38 (47.5)	80 (36.69)	
	College	26 (59.1)	18 (40.9)	34 (15.59)	
Mother's education	Illiterate	15 (45.5)	18 (54.5)	33 (14.34)	X ² = 3.466 P= 0.325
	Primary	52 (45.6)	62 (54.4)	114 (49.56)	
	Diploma	36 (56.3)	28 (43.8)	64 (27.82)	
	College	12 (63.2)	7 (36.8)	19 (8.26)	
Father's occupation	Employee	19 (61.3)	12 (38.7)	31 (13.47)	X ² = 2.368 P= 0.668
	Worker	17 (50.0)	17 (50.0)	34 (14.78)	
	Self-employed	58 (47.2)	65 (52.8)	123 (53.47)	
	Retired	13 (54.2)	11 (45.8)	24 (10.43)	
	Other	8 (44.4)	10 (55.6)	18 (7.82)	
Mother's occupation	Housewife	107 (50.7)	104 (49.3)	211 (93.77)	X ² = 5.115 P= 0.164
	Employee	5 (55.6)	4 (44.4)	9 (4.00)	
	Other	2 (40.0)	3 (60.0)	5 (2.22)	
History of failure in school	Yes	6 (35.3)	11 (64.7)	17 (8.29)	X ² = 1.882 P= 0.170
	No	99 (52.7)	89 (47.3)	188 (91.70)	
Living with	Parents	106 (51.2)	101 (48.8)	207 (91.18)	X ² = 3.653 P= 0.301
	One of parents	5 (31.3)	11 (68.8)	16 (7.04)	
	Relatives	1 (25.0)	3 (75.0)	4 (1.76)	
Substance use in home	Yes	4 (26.7)	11 (73.3)	15 (6.55)	X ² = 3.866 P= 0.145
	No	111 (51.9)	103 (48.1)	214 (93.44)	
Taking substances with friends	Yes	1 (50.0)	1 (50.0)	2 (0.087)	X ² = 0.001 P= 0.999
	No	113 (50.0)	113 (50.0)	226 (99.12)	
Suggestion of friends	Yes	18 (40.9)	26 (59.1)	44 (25.88)	X ² = 0.001 P= 0.999
	No	54 (42.9)	72 (57.1)	126 (74.11)	

Table 2 shows the descriptive characteristics, including the mean and standard deviation for the variables of the health belief model before

and after the training. Also, in the pre-test stage, an independent t-test and Mann-Whitney test were used to compare the scores between the two

groups. We revealed a significant difference between the two groups in the variables of perceived severity and cues to action. A one-

variable analysis of covariance was used to examine the effect of training on each variable by adjusting the effect of the pre-tests.

Table 2. Comparison of mean constructs of the health belief model between two groups

Variable		Intervention group		Control group		P
		Mean	SD	Mean	SD	
Perceived sensitivity	Pre-test	3.25	0.48	3.29	0.41	0.45
	Post-test	3.89	0.38	3.28	0.40	
Perceived severity	Pre-test	3.97	0.43	4.08	0.49	0.04
	Post-test	4.70	0.50	4.01	0.40	
Perceived benefits	Pre-test	4.01	0.66	3.99	0.69	0.58
	Post-test	4.54	0.47	3.81	0.34	
Perceived barriers	Pre-test	3.02	0.52	2.97	0.59	0.35
	Post-test	3.13	0.52	3.02	0.31	
Perceived self-efficacy	Pre-test	4.25	0.61	4.18	0.62	0.19
	Post-test	4.24	0.45	4.22	0.46	
Cues to action	Pre-test	0.79	0.38	0.76	0.35	0.02
	Post-test	1.12	0.25	0.82	0.23	

According to Table 3, the results of covariance analysis showed that in the post-test stage, by controlling the effect of pre-test scores, training in variables of perceived sensitivity ($P < 0.001$, effect size= 0.367), perceived severity ($P < 0.001$, effect size= 0.374), perceived benefits

($P < 0.001$, effect size= 0.446), and cues to action ($P < 0.001$, effect size= 0.291) was effective. In other variables, no significant was observed. In other words, training had the most significant effect on the perceived benefits variable.

Table 3. One-variable covariance analysis test of educational groups in the studied variables

Dependent variable	Source of changes	DF	Average of squares	F	P	Effect size
Perceived sensitivity	Pre-test	1	0.050	0.332	0.565	0.001
	Group	1	20.64	135.99	< 0.001	0.367
	Error	226	0.152			
Perceived severity	Pre-test	1	0.062	0.303	0.583	0.001
	Group	1	27.84	135.35	< 0.001	0.374
	Error	227	0.206			
Perceived barriers	Pre-test	1	0.334	1.799	0.181	0.008
	Group	1	0.640	3.467	0.064	0.015
	Error	225	0.186			
Perceived benefits	Pre-test	1	0.052	0.309	0.579	0.000
	Group	1	30.791	182.206	< 0.001	0.446
	Error	226	0.169			
Perceived self-efficacy	Pre-test	1	0.012	0.056	0.813	0.000
	Group	1	0.054	0.260	0.611	0.001
	Error	225	0.209			
Cues to action	Pre-test	1	0.620	1.110	0.293	0.005
	Group	1	5.009	89.262	< 0.001	0.291
	Error	218	0.560			

Discussion

The present findings indicated the favorable impact of health education on enhancing students' beliefs in preventive addiction, as derived from the health belief model. Specifically, during the post-training sessions, participants discovered that they were inclined to engage in substance use when their perceived threat to preventive substance use behaviors was not serious. The start of smoking and other

substances is closely associated with the period of adolescence. In a cross-sectional study by Panahi et al., students aged 17 to 18 had the highest prevalence (19%) of starting to smoke (15). The observation of substance use by family members and the suggestion of substance use by friends were the only demographic variables that influenced students' substance use in this study. Family, living environment, school, friends, peers, and ease of

access are the most influential factors in substance use or non-use among teenagers (16). In the present study, a total of 15 individuals stated that one of their family members had engaged in substance use. There are few studies about the use of substances and cigarettes among teenagers that do not mention the effective role of friends in learning their habits from each other (16,17). Because they spend most of their time with their friends and classmates, they try to attract the attention of the opposite sex by smoking and using substances as a symbol of maturity and independence (16).

In the present study, after the educational intervention, the mean score of students' perceived sensitivity to substance use increased significantly in the experimental group. Therefore, educational intervention increases the perceived threat of substance use by enhancing students' awareness of the dangers, consequences, and adverse effects of substance use. In the cross-sectional study of Priabadi et al. the smoking questionnaire with the health belief model was used on women. The results showed that the desire to quit smoking has a significant relationship with the perceived susceptibility to preventive behavior. The most significant perceptions related to the structure of perceived sensitivity that required modification were the non-addictiveness of recreational substance use and its low risk from the women's perspective (18). Similar to the results of this study, the increase in the mean scores of perceived sensitivity after the educational intervention has been confirmed in different studies (19,20). Additionally, the mean score of the perceived severity increased significantly after the intervention. The most important perception related to the construct of perceived sensitivity, which necessitated modification, was underestimating the significance of preventing substance use due to the detrimental effects on one's reputation and family and social prestige resulting from its consumption. The training increases people's understanding of the severity of the side effects caused by substance use. Therefore, it plays a significant role in shaping the attitudes of students toward preventing substance use, which is consistent with the findings by Panahi et al. (9), Setoudeh et al. (21), and Baktash (22). The difference in the mean score between the experimental and control groups was significant regarding the structure of perceived

benefits after the intervention. The perceived benefits of not using substances and the use of educational strategies reduce risk and the harmful effects through avoiding high-risk behaviors. Also, Khazae-Pool et al. used the preventive smoking questionnaire with the health belief model on students. They showed that after education, the perceived benefits of smoking preventive behavior among students increased over time (23). Preventing addiction as a value for adolescents and young people is the most important perception related to the perceived benefits that need to be modified, which has received less attention. This finding was consistent with studies by Panahi (9), Baktash (22), and Priabadi et al. (18). In this study, the mean score of the perceived barriers did not increase significantly after the intervention. The most important perception of the perceived barriers was the difficulty of declining the suggestion of friends and peers to engage in substance use. According to this study, educational programs designed to reduce the perceived obstacles and enhance the intensity of the perception of peer pressure resistance skills have indirectly modulated the perceived obstacles. In the study by Panahi et al., the perceived barriers to smoking among students decreased over time, after the intervention-based health belief model (9). The mean score of the perceived self-efficacy construct did not increase significantly after training. Self-efficacy is defined as an individual's belief and confidence in their ability to perform a behavior successfully, and it is regarded as one of the most important constructs of the health belief model in preventing high-risk behaviors (24).

Like the results of the present study, in Mazloomi et al.'s study, the self-efficacy construct did not show a significant difference over time after the educational intervention on the preventive behaviors of substance use in students (25). After the educational intervention, the mean score of the guide structure for the student's actions toward substance use increased significantly in the experimental group. The symptoms and stimuli of the individuals in their environment, as well as their friends and relatives, are significant factors in motivating students to use tobacco and other substances. The most influential guides were the effect of teachers' training in schools, radio and television programs, and educational materials in books (26,27). One of

the main limitations of this study was that male high school students were an exclusive target group. Also, the data collected through a self-report questionnaire. It is suggested to pay attention to the preparation, formulation, and implementation of substance prevention educational programs for boys and girls in schools in all parts of the country.

Conclusion

Based on the results, implementing an educational intervention based on the health belief model can increase the perceived threat and prevent substance use behaviors in high school students.

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Conflict of Interests

The authors declare no conflict of interests.

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Ethical Considerations

This study results from a research project approved by the Abadan University of Medical Sciences. All students participated voluntarily and their information was kept confidential.

Code of Ethics

IR.ABADANUMS.REC.1396.21

Authors' Contributions

NG: Conception and design of the study; NG and HG: Acquisition of data; EJ: Data analysis; AZ and HG: Interpretation of data; NG and HG: Drafting the manuscript; NG, HG, EJ, and AZ: Final approval.

References

1. World Health Organization. The World health report: Shaping the future. [cited November 7, 2023]. Available from: <https://iris.who.int/handle/10665/42789?&locale-attribute=en>
2. Pagano ME, Raj NM, Rhodes C, Krentzman AR, Little M. Identifying strengths in youths at substance use treatment admission. *Am J Drug Alcohol Abuse* 2019; 45(4): 410-20.
3. Yaseen LQ, Nayyef SH. The inhibitory effect of aqueous and alcoholic extract of red pepper on some isolated pathogenic bacteria from different areas of human body. *Bionatura* 2021; 6: 1-4.
4. Ahmed MM, Younis NM, Hussein AA. Prevalence of tobacco use among health care workers at primary health care centers in Mosul City. *Pakistan journal of medical and health sciences* 2021; 15(1): 421-4.
5. World Health Organization. Tobacco. [cited 31 July 2023]. Available from: <https://www.who.int/news-room/fact-sheets/detail/tobacco>
6. Centers for Disease Control and Prevention. Smoking and tobacco use. [cited 16 July 2020]. Available from: https://www.cdc.gov/tobacco/data_statistics/fact_sheets/health_effects/e_cigs/e_cigs_cig_smoking/
7. United Nations Office on Drugs and Crime. Annual report 2017-2018; Afghanistan; 2020.
8. Ahmed MM, Younis NM, Hussein AA. Violence towards nurse's staff at teaching hospitals in Mosul City. *Indian J Forensic Med Toxicol* 2020; 14(3): 2598-603.
9. Panahi R, Ramezankhani A, Tavousi M, Niknami S. Adding health literacy to the health belief model: Effectiveness of an educational intervention on smoking preventive behaviors among university students. *Iran Red Crescent Med J* 2018; 20(2): e13773.
10. Younis NM, Naji AB. Assessing the effect of an educational intervention based on health belief model on preventive behaviors of addiction. *Pakistan journal of medical and health sciences* 2021; 15(3): 813-17.
11. Babaei S, Shakibazadeh E, Shojaeizadeh D, Yaseri M, Mohamadzadeh A. [Effectiveness the theory-based intervention based on health belief model on health promotion lifestyle in individuals susceptible to cardiovascular diseases]. *Iranian journal of health education and health promotion* 2020; 8(3): 224-39. (Persian)
12. Muwfaq Younis N. Efficacy of health beliefs model-based intervention in changing substance use beliefs among Mosul University students: A randomized controlled trial. *Revis Bionatura* 2022; 7(2): 35.
13. Joorbonyan H, Ghaffari M, Rakhshanderou S. Peer-led theoretically designed HIV/AIDS prevention intervention among students: A case of health belief model. *BMC Public Health* 2022; 22(1): 8.
14. Boroujeni MD, Baghianimoghadam MH, Sharifirad G, Fallahzadeh H. [Investigating the preventive behaviors of drug addiction and abuse based on the health belief model in boys' high schools in Borujen region]. *Journal of health system research* 2012; 8(2): 237-46. (Persian)
15. Panahi R, Ghaderi N, Latifi A, Rezaei Z. Prevalence of smoking and its related factors among Iranian adolescents. *J Subst Use* 2023; 28(6): 887-92.
16. World Health Organization. WHO report on the global tobacco epidemic, 2011: Warning about the dangers of tobacco. [cited 2011]. Available from: <https://apps.who.int/iris/handle/10665/44616>
17. Mohammadi S, Ghajari H, Valizade R, Ghaderi N, Yousefi F, Taymoori P, et al. Predictors of smoking among the secondary high school boy students based on the health belief model. *Int J Prev Med* 2017; 8: 24.

18. Priabadi ET, Devy SR. Application of the health belief model on the intention to stop smoking behavior among young adult women. *J Public Health Res* 2020; 9(2): 1817.
19. Panahi R, Osmani F, Sahraei M, Ramezankhani A, Rezaei M, Aghaeian N, et al. The predictors of health literacy based on the constructs of health belief model for smoking prevention among university students. *Modern care journal* 2019; 16(2): e87068.
20. Mohammadi K, Tavafian SS. Effect of educational intervention based on health belief model on prevention of substance abuse among the students of Khatam Al-Nabieen University in Afghanistan. *Iran Red Crescent Med J* 2020; 22(5): e101935.
21. Setoudeh A, Tahmasebi R, Noroozi A. [Effect of education by health volunteers on reducing water-pipe use among women in Bushehr: An application of health belief model]. *Hayat* 2016; 22(1): 50-64. (Persian)
22. Baktash MQ, Naji AB. Efficacy of health belief model in enhancing exercise behavior to preventing stroke among geriatrics homes residents in Baghdad city. *Indian J Public Health Res Dev* 2019; 10(2): 928-33.
23. Khazae-Pool M, Zarei F, Pashaei T, Shojaeizadeh D. [The effect of an educational intervention based on health belief model on improving smoking preventive behaviors among students]. *Iranian journal of health education and health promotion* 2017; 4(4): 300-308. (Persian)
24. Oveisi S, Zahedifar F, Atashgar E, Yadegary Z, Amole N, Taherkhane S. Prediction of dental caries preventive behaviors using Health Belief Model (HBM). *Health education and health promotion* 2019; 7(3): 105-9.
25. Mazloomi Mahmoodabad SS, Khoshab S, Sohrabi Vafa F, Fallahzadeh H, Yassini Ardekani SM. The effect of health education based on health belief model on preventive actions of synthetic drugs dependence in male students of Kerman, Iran. *Social behavior research and health* 2017; 1(2): 100-107.
26. Kissal A, Kartal B. Effects of health belief model-based education on health beliefs and breast self-examination in nursing students. *Asia Pac J Oncol Nurs* 2019; 6(4): 403-10.
27. Panahi R, Rezaie Z, Teymoori P, Nouri B, Nouri E, Ahmadi O, et al. [The factors associated to high risk behaviors in Sanandaj city students based on health belief model]. *Iranian journal of health education and health promotion* 2019; 6(4): 393-402. (Persian)