



## Effect of educational intervention based on health belief model on psychological factors of AIDS preventive behaviors in addicts

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### Abstract

AIDS is a problem threatening public health throughout the world, especially developing countries. Injecting drug users are most at risk of HIV infection and account for 68.15% of all suffering cases in Iran. This study investigated the effect of health intervention on the AIDS preventive behaviors among addicts based on HBM. This was a quasi-experimental research with pretest-posttest design. The study sample comprised 88 randomly selected male addicts being kept at rehabilitation centers in Khorramabad, Iran. The participants were randomly assigned to intervention and control groups. Data were collected through questionnaire designed to assess health belief model structures as well as knowledge, and behavior domains. The educational content was designed, edited, and executed after the analysis of pretest results. The intervention group received 3 sessions each of 90 minutes. Two months after the intervention, the posttest was performed using the same questionnaire. The results showed that mean scores of perceived benefits, self-efficacy, susceptibility, severity, knowledge, and preventive behaviors significantly increased in the intervention group after the intervention while the mean score of perceived barriers significantly decreased. Based on the results of this study, of this survey, it can be concluded that an increase in the score of health belief model structures including perceived susceptibility, perceived severity, and perceived benefits could result in adopting preventive behaviors against AIDS. Therefore, this survey confirms the efficacy of health belief model in adopting AIDS preventive practices among addicts.

**Keywords:** Addicts, AIDS, Drug Users, health belief model

### Introduction

The HIV is one of the most lethal viruses discovered in the modern age. Due to high mortality rate and excessive costs, HIV/AIDS (Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome) is as a serious health and financial concern all across the world. AIDS has turned into an epidemic

disease that threatens the global community. Drug users (Injecting Drug Users (IDUs) ) represent a group most at risk for acquiring HIV. In some Eastern European and Asian countries, almost all reported HIV positive cases are related to drug addicts. Studies show that the age of using drugs in these countries

has reduced and drug abuse is rapidly on the rise. It is unfortunate that most addicts are not aware that they are infected with HIV [1,2].

According to the Ministry of Health and Medical Education by 2013 in sum 27,041 people were infected by HIV in Iran. According to the report, 89.3% of infected cases were men and 10.7% women. 45.9% of patients with AIDS were between 25 and 34 which comprised the highest proportion among the age groups. Among all cases of HIV positive, 68.15% were infected by sequencing intravenous drug abuse, 12.66% by sexual intercourse, 0.9% by blood and blood products, 1.22% by mother to child (1.22%), and 17.05% by unknown sources. Hence, the majority of HIV infected cases in Iran are drug users (or IDUs) [3].

HIV infection is more prevalent among drug users. Drug addicts are at risk for the infection because of addiction for them is combined with issues such as poverty, illiteracy, unemployment, and homelessness. According to a report by the World Health Organization (WHO), the number of countries that report HIV infection has been rising, especially for developing countries. Injection drug use-related HIV transmission accounts for 5–10% of HIV cases in the world, 36% in the USA and more than 60% in Iran [4,5].

Studies have shown that IDUs are able to change their behaviors in a manner to protect themselves and others from HIV infection, and this point is very important to researchers who are studying in this field. According to the WHO, the only effective way in dealing with the issue of AIDS is health education where vulnerable groups should be prioritized. The emerging HIV epidemic in Iran is serious and with no doubt it will have a huge negative impact on the economic, social, and political aspects of the country. Thus, efforts to confront this epidemic in Iran are a national priority and urgent intervention strategies for at risk groups specifically injecting drug users are key to solve this problem [6].

The only way to combat AIDS alongside treatment and effective vaccines is health education and behavior change. Informing the society can be very effective in reducing HIV

infections. Designing and implementing an effective HIV prevention and control program based on reducing high-risk behaviors has turned into a major challenge for health workers and researchers all over the world [7,8]. The value of educational health programs is assessed based on their effectiveness and the effectiveness is highly dependent on the correct utilization of theories and models in health education. In other words, appropriate support theories in accordance with the major health needs can increase the effectiveness of educational health programs [9].

The effectiveness of the Health Belief Model (HBM), which was used as a theoretical framework in this study, has been proven in predicting AIDS preventive behaviors by different researchers. The HBM constructs have also proven to be effective in HIV/AIDS education programs as they help understand behaviors that prevent AIDS and drug abuse. The HBM is one of the oldest health behavior theories on which numerous researchers have worked in different behavioral fields in order to design and evaluate behavioral interventions. Moreover, the effectiveness of this model has been proven in the area of AIDS education in different internal and foreign researches. The HBM proposes that in order for an individual to take action to avoid a disease, the individual needs to believe that a) he/she is susceptible to the disease (perceived susceptibility); b) the disease could have at least a moderate to severe impact on some components of his or her life (perceived severity); c) certain behaviors could be beneficial in reducing his or her perceived susceptibility or severity in the event of affliction with the disease (perceived benefits); and d) these behaviors would not be impeded by factors such as cost, pain, and embarrassment (perceived barriers) [10,11].

Self-efficacy is a person's belief in how capable he or she is to perform a certain behavior. It is correlated with different health-related outcomes such as headache reduction, weight management, drug use prevention and reduction, relapse prevention, anxiety reduction, and contraceptive use. In addition,

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research has demonstrated that manipulation of self-efficacy is an effective strategy for reducing health risk behaviors [12].

HBM constructs have been applied as a guide for predicting health behaviors. Theoretical based interventions in several researches [9,13] have shown the predictive nature of the HBM. This research was carried out due to there have been a few educational intervention programs to lower high-risk behaviors in drug addicts based on HBM . The current research investigates the Effect of educational program based on HBM on the AIDS preventive behaviors among drug users in Khorramabad.

### Method

A quasi-experimental research with pretest-posttest design was used to assess the effect of an educational intervention program on HIV/AIDS preventive behaviors. The participant included 88 male addicts that were being kept at the rehabilitation centers in Khorramabad, Iran. The participants were selected from four different centers; a group of 44 from two centers were regarded as the intervention group and a group of 44 from the other two centers as the control group. Due to limitations in the sample size, the participants were selected through the census method. Hence, all of the addicts at the rehabilitation centers were the participant of the research. The inclusion criteria were: 1) being a full-time residence at the rehabilitation centers, 2) being admitted at least for 6 months, and 3) not receiving any educational program in regard to HIV/AIDS prevention. The exclusion criteria were unwillingness to continue with the study, failure to attend training sessions, and lack of favorable physical and psychological well-being in the participant.

At the rehabilitation centers, HIV prevention and related educational programs are not offered. Patients are monitored twenty four hours a day, seven days a week, by trained staffs. Apart from the participants who were under treatment by caregivers, no specific drugs were given to other patients. The researcher presented permission with lower case letter from Isfahan University of Medical Sciences

to the drug rehabilitation centers. At the beginning of the study, sufficient information regarding the aim of the study was given to the participants, and they were reassured that their information will remain confidential.

Data gathering was undertaken by a questionnaire designed in nine sections including: 1) personal information (age, marital status, occupation, and so on); 2) 10 questions measuring the knowledge level about HIV/AIDS which were scored on either 0 or 1; the 0 score for a wrong answer or "I don't know" choice and the 1 score for a correct answer; 3) 10 questions measuring the perceived self-efficacy which scored on a 4-point Likert scale ranging from "strongly agree" to "strongly disagree"; 4) 8 questions measuring the perceived benefits which scored on a 4-point Likert scale ranging from "strongly agree" to "strongly disagree"; 5) 7 questions measuring the perceived barriers which scored on a 4-point Likert scale ranging from "strongly agree" to "strongly disagree"; 6) 6 questions measuring the perceived susceptibility which scored on a 4-point Likert scale ranging from "strongly agree" to "strongly disagree"; 7) 8 questions measuring the perceived severity which scored on a 4-point Likert scale ranging from "strongly agree" to "strongly disagree"; 8) 4 questions regarding the cues to action related to the practice answered with yes/no choices and 9) 6 yes/no questions related to the practice, which were scored 0 or 1.

The content validity of questionnaire was assessed by a panel of experts through evaluating the clarity of the wording of the statements and rating of the responses. The panel consisted of 3 experts in the field of health education and promotion, 2 in social preventive medicine, 1 in psychology, 1 in sociology, and 3 in infectious diseases.

In order to evaluate the scientific validity, the questionnaire was given to professionals experienced in health education working at Isfahan University of Medical Sciences. As the scientific reliability of the questionnaire was examined, the internal consistency test was

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used and the Cronbach's alpha was calculated (Cronbach's alpha= 0.76). The questionnaire used in this research was previously employed by Karimi in a study entitled "The effect of health education based on HBM on preventive behaviors of AIDS in addict in Zarandieh" [14]. After gathering pretest data, the results were analyzed and then, an educational program was designed. The educational content was aimed at acquainting drug addicts with AIDS, transmission ways and prevention, improving perceived susceptibility and severity, perceived self-efficacy, benefits of and barriers to the disease prevention. The educational sessions were held for groups of 10–12 at the rehabilitation center by means of speeches, face to face, question and answer, group discussion, and displaying educational films. Each group participated in 3 sessions each of 90 minutes. To sustain the educational program, pamphlets, booklets, and educational films were distributed to the treatment group. The control group received no education as a treatment. Since the participants were retained at the centers averagely for one month period, to complete

the data gathering process, the researcher was in contact with the participants by phone call. Therefore, 2 months after the educational intervention, the participants were invited back to the center through phone or personal visits to complete posttest questionnaires.

The information from the participants was gathered through interviews (from illiterate or less literate persons) or as written (from the rest of participants). The data were analyzed using SPSS 20 software in descriptive (means, standard deviations, and ranges) and inferential statistical methods (paired t-tests, independent t-test, Chi-square, and Mac Nemar). Also, the Kolmogorov- Smirnov test showed that distribution of quantitative variables had no significant difference with normal distribution; in other words, quantitative variables followed a normal distribution ( $p>0.05$ ).

## Results

As can be seen in Table 1, the intervention and control groups did not differ with respect to demographic characteristics.

**Table 1** Personal and basic information in the intervention and control groups

Demographic characteristics	Group		p value*
	Intervention	Control	
Marital status			0.32
Married	26 (59)	22 (50)	
Divorced	5 (11.4)	10 (22.7)	
Widow	1 (2.3)	3 (6.8)	
Single	12 (27.3)	9 (20.5)	
Educational degree			0.34
Illiterate	15 (34.1)	9 (20.5)	
Below diploma	17 (34.6)	23 (52.3)	
Diploma	10 (22.7)	8 (18.2)	
Bachelor	1 (2.3)	4 (9.1)	
Masters	1 (2.3)	0	
Addiction status			0.5
Injected	18 (40.9)	15 (34.1)	
Non-injected	26 (59.1)	29 (65.9)	

\*Chi-square

The results of Paired t-test showed that after the intervention, the mean scores of knowledge and performance regarding HIV/AIDS preventive behaviors, perceived susceptibility and severity, perceived self-efficacy, perceived benefits and barriers significantly increased in the intervention group, while no significant difference was observed in the control

group. The independent t-test showed that before the intervention, there was no significant difference in the mean scores of aforementioned variables between the groups, while after the intervention the mean scores of variables in the intervention group were significantly higher than those of the control group (Table 2).

**Table 2** Mean scores of knowledge, health belief model constructs and performance before and after intervention in the two groups

Variable	Group (mean ± SD)		p value*
	Intervention	Control	
<b>Knowledge</b>			
Before	61.6±22.6	64.8±19.2	0.47
After	92.9±11.1	65.7±18.2	<0.001
p value**	<0.001	0.92	
<b>Perceived susceptibility</b>			
Before	74.13±20	75.5±19.71	0.74
After	80±23.03	74.24±19.24	0.19
p value**	0.04	0.16	
<b>Perceived severity</b>			
Before	75.75±21.45	77.27±22.74	0.75
After	81.80±15.91	77.20±21.74	0.28
p value**	0.08	1	
<b>Perceived benefits</b>			
Before	81.72±12.8	83.71±13.91	0.49
After	87.8±8.8	82.29±13.83	0.02
p value**	0.002	0.16	
<b>Perceived barriers</b>			
Before	65.8±22.03	63.09±24.58	0.001
After	38.85±15.12	52.16±25.65	0.001
p value**	0.001	0.001	
<b>Self-efficacy</b>			
Before	77.8±16.58	77.42±15.63	0.91
After	81.13±11.87	76.06±15.3	0.04
p value**	0.17	0.18	
<b>Preventive behaviors</b>			
Before	54.92±19.87	57.19±20.14	0.59
After	62.12±13.13	55.41±19.88	0.03
p value**	0.03	0.61	

\* Significant at independent samples t test.

\*\* Significant at paired samples t test.

**Table 3** Cues to action about HIV/AIDS preventive behaviors before and after intervention in the two groups

Cues to action	Group		p value*
	Intervention	Control	
<b>Rehabilitation staff</b>			
Before	79.5	88.6	0.24
After	100	88.6	0.02
p Value**	0.004	1	
<b>Family members</b>			
Before	65.9	70.5	0.64
After	59.1	70.5	0.26
p Value**	0.62	1	
<b>Friends</b>			
Before	61.4	68.2	0.5
After	27.3	68.2	<0.001
p Value**	0.003	1	
<b>Mass media</b>			
Before	70.5	59.1	0.26
After	68.2	59.1	0.37
p value**	1	1	

\*chi-square

\*\*Mac Nemar

Table 3 shows cues to action about HIV/AIDS preventive behaviors before and after the intervention in the two groups.

### **Discussion**

The results of this study demonstrated that after performing an intervention based on HBM on male drug addicts, –knowledge, perceived susceptibility and severity, and perceived benefits increased in the addicts while perceived barriers decreased, indicating an improvement in overall performance of drug addicts regarding HIV/AIDS. The knowledge levels of drug addicts in the intervention group before and after the intervention showed a significant difference. This change reveals the effects of the educational intervention by increasing the awareness of addicts. The results of this study showed that implementation of health education programs had a significant effect on improving the awareness and performance of participants under the subject of study regarding AIDS disease. These results are in agreement with the results of studies carried out by Melkote et al. [15], Siam on women [16], and Fogel et al. on incarcerated women [17]. These results inform the public about different modes of HIV transmission, preventive measures against it, and how the transmission influences people in order to make them to change dangerous and risky behaviors. Public awareness is effective in controlling the disease. In this study, the majority of drug users answered the questions on HIV/AIDS knowledge correctly. However, misinterpretation still exists in regard to transmission paths, which is consistent with the findings of Eshрати study that was conducted on prisoners. The study of Magnussen et al. [18] also showed only poor to moderate improvements in knowledge about HIV/AIDS, attitudes, negotiation and communication skills or behavior change. Hence, higher quality studies are required in this context.

The findings of this study indicate the need for continuing educational programs on this high risk group. Also, it is effective to increase

awareness about HIV transmission and prevention methods which can encourage people to change risky behaviors in order to reduce the spread of HIV. The findings indicated that in the studied population, before the educational intervention, most individuals considered themselves to be at risk of AIDS. This was due to the fact that the study was conducted on drug users and the likelihood of risky behaviors such as sexual behavior and use of intravenous drugs was high in this group. Therefore, the perceived susceptibility construct both before and after the intervention in two groups was high. As a result, the mean score of perceived susceptibility went from 74.13% to 80% after the intervention which shows a significant increase. However, in the control group, perceived susceptibility mean score decreased from 75.5% to 74.24%. The results of Ghaffari's study showed a significant increase in perceived susceptibility scores in the intervention group and a decrease in the control group [19]. The results of studies by Sharifirad and Aghamolaei indicated that the mean score of perceived susceptibility increased solely in the intervention group [20,21] that are consistent with the findings of this research. This score in the Karimi study before the intervention was 4.43 that increased to 7.15 after the intervention [14]. Correct information can influence perceived susceptibility. In fact, the increase in the mean score of the construct in the intervention group could be due to the intervention as the control group did not receive any intervention.

Carmel who reviewed 46 studies using HBM concluded that the perceived susceptibility is a powerful predictive for most behaviors [22]. Rahmati et al. found out that most students believed that AIDS is a serious, fatal disease [23]. According to the HBM, high perceived susceptibility is necessary to motivate the adoption of preventive behaviors and part of the curriculum on AIDS should be focused on this construct. One of the most important factors in infecting individuals with specific

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health conditions is not believed that they are vulnerable to catch onto the particular situation. If a person is sensitive to health problems and believes that no symptoms of the disease can lead to illness, then this sensitivity results in the prevention of high risk behaviors [24]. In this study, the mean scores of perceived severity increased from 75.75% to 81.80% after the intervention, indicating an insignificant difference. This indicates that the studied population is well aware of the fact that AIDS is a risky, incurable disease. This score in the Karimi study increased from 7.15 to 9.01 [14] that is consistent with the results of studies of Aghamolaei and Sharifirad in which perceived severity significantly increased after the intervention [20,21]. Also, it was consistent with the study findings of Rahmati et al. who demonstrated that 82.5% of participants were aware that AIDS is lethal [23]. In the Milloy research in Bangkok, 95% believed that AIDS is a disease that does not have a cure and if a person became infected with HIV, death would be indispensable [25]. It is appropriate to use HBM for HIV/AIDS because of the fatal consequences of the disease. In view point of individuals, AIDS is a fatal disease. In this study, the frequency of rehabilitation staff as cues to action after the intervention significantly increased. However, their numbers remained unchanged in the control group. At these centers, educational programs were not provided by staffs. However, in this research by doing intervention, the staffs found an interest in the topic of education for this high risk group and acted as cues to action after the intervention. Frequency of friends as cues to action after the intervention significantly decreased in the intervention group while their numbers remained unchanged in the control group. In this study, the participants found that friends as cues to action are not suitable for AIDS preventive behaviors, because their information is not valid for AIDS preventive behaviors.

Frequency of mass media and family members as cues to action before and after the intervention was similar in both groups.

However, in this study, Mass media was the most important source of information in both groups about AIDS. The study on the high school students by Pirzadeh was consistent with this study [26]

The results of this study showed that the mean score of perceived benefits after the intervention significantly increased in the intervention group. The effectiveness of education in increasing the perceived benefits related to the preventive behaviors of AIDS in addicts was also observed in the studies conducted by Koopman and Volk [11], Lollis et al. [27], and Karimi et al. [14]. Various studies have shown a strong relationship between perceived benefits and taking preventive measures; an individual's understanding of the benefits of a specific measure paves the way for him/her to take it [24].

The results of this study showed that the mean score of perceived barriers before education was 65.8, which reduced significantly to 38.85. The effectiveness of education in decreasing the perceived barriers-related to AIDS prevention was observed in the studies by Karimi et al. on drug addicts and Pirzadeh and Sharifiradon on students [26]. In other studies, it has also been confirmed that educational programs have a positive significant effect on reducing the perceived barriers, which are in accordance with our findings [14,28,29]. A study by Adih in Ghana also demonstrated that people with low perceived barriers use condoms in their sexual intercourses almost 6 times more than other people [30].

The results of this study showed that before the intervention, there was no significant difference in the mean score of perceived self-efficacy between both groups ( $p= 0.91$ ), while after the intervention, the mean score of perceived self-efficacy in the intervention group was significantly higher than that of control group ( $p= 0.04$ ). Studies examining the relationship between perceived self-efficacy and healthy behaviors have shown that self-efficacy has a strong effect on

health behaviors and some studies suggest that self-efficacy explains >50% variance of health behaviors [31]. The role of self-efficacy as an important basis for reducing risky behaviors related to AIDS has been confirmed in the studies conducted by Zamboni [32], Magura [33], and Smith [34]. Improving self-efficacy also is proposed as an intermediate factor in the reduction of HIV infection [35].

According to the social cognitive theory, a person who has low self-efficacy is more probable to engage in a dangerous-risky behavior compared to a person with high self-efficacy [35]. In Adih's study in Ghana, people with high self-efficacy had used condoms 3 times more than those with low self-efficacy [30]. Kasen's study showed that students who had a low self-efficacy had engaged in sexual activity twice more than students with high self-efficacy and they had used condoms 5 times less [36]. Lin's study in Taiwan also showed that self-efficacy is the most reliable predictor of safe or unsafe sexual behavior [37]. Future studies should focus on strategies to increase perceived self-efficacy and benefits, as well as strategies to decrease perceived barrier to adopt preventive behaviors [14].

Limitations of this study was a lack of cooperation amongst officials at the rehabilitation centers for addicts because they disliked the educational subject (AIDS). Also, the physical and psychological sickness of addicts made it difficult for them to take part in the educational sessions or complete the questionnaires. Moreover, it was time-consuming for the illiterate or less literate addicts to answer the questions. Summoning up addicts to complete posttest questionnaires and their lack of cooperation were other limitations. The results of this study showed that the health education program designed based on the HBM had a significant effect on improving the level of awareness of addicts as well as their perceived susceptibility, severity, benefits, barriers, and self-efficacy towards adopting HIV/AIDS preventive behaviors in Khorramabad, which is in accordance with the results of similar studies.

## **Conclusion**

The results of this study showed that health education program designed based on the HBM had a significant effect on improving the level of awareness of addicts as well as their perceived benefits, barriers, and self-efficacy toward adopting HIV/AIDS preventive behaviors in Khorramabad; therefore, theory-based health educational strategies are suggested as an effective alternative to traditional educational interventions.

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## **Contributions**

Study design: FB, MF

Data collection and analysis: FB, MF AH, ShN

Manuscript preparation: MH, ShN, BK

## **Conflict of Interest**

"The authors declare that they have no competing interests."

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