Original Article

The effects of an educational program based on the health belief model on information-motivation-skill-behavioral skills among women living with human immunodeficiency virus

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Abstract:

BACKGROUND: Human immunodeficiency virus (HIV) is a kind of behavioral disease in that adopting behavioral changes is the only way to control and stop the epidemic. The aim of this study is to investigate the effect of education base on the health belief model (HBM) on health-seeking behavior among HIV-positive women.

MATERIALS AND METHODS: This study is a paralleled, randomized controlled clinical trial done with control group among HIV-positive women who were registered at the voluntary and counseling testing center of Imam Khomeini hospital in Tehran. Data were gathered by using information obtained from the Motivation-Skill-Behavior questionnaire and demographic data. The women were divided by permuted block and were randomized into two groups. Interventional group participated in six HBM educational classes and used routine counseling guidelines, but the control group used only routine counseling protocol. Data were collected before, immediately after, and 3 weeks after interference among all participants. Data were analyzed by using SPSS software version 16.

RESULTS: According to the results and statistical test, before intervention, the mean score of knowledge was not significantly different in the two groups, but after intervention in the interventional group, test result and follow-up increased statistically significantly ($P = 0.000$). Both groups had increased mean score of knowledge, and there is significant trend in level of knowledge(interventional group 20.79 ± 1.88, control group: 17.36 ± 2.44) and there was a significant increase in mean attitude follow-up score ($P < 0.001$).

CONCLUSION: According to the result of the present study, counseling base on HBM by trained educator can increase information-motivation-skill-behavior among women living with HIV.

Keywords:

Behavior, educational program, human immunodeficiency virus, health belief model, information, motivation, skill

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Introduction

Human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) is one of the challengeable and treatable factors of health in the world.[1]

HIV is a type of behavioral disorder in that behavioral change is the only way to stop and control the disease. According to this fact, attention to effective intervention that leads to early detection and treatment is necessary.[2]

Two types of intervention have a significant role in the prevention of HIV, namely

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changing high-risk behavior and early detection; in both interventions, the main issue is early seeking of health services and detection. Most of the times, seeking for health services happen after finding the signs and symptoms of illness. In the case of HIV and most of the sexually transmitted diseases (STDs), there will be no specific sign and symptoms, and hence patients do not seek for health services.[3]

The most important part in the prevention of STDs is seeking for health services and knowing about the status of illness. According to the general definition of health-seeking behavior, it is a situation that any individual involves in health-seeking activity for finding ways of changing personal behaviors or environment. These changes are needed in order to achieve higher level of health.

As a conditional behavior it is triggered by the particular stimulus so any effort to promote people for health-seeking and services seeking achieve by understanding of effective factors on behaviors.[4]

Increasing knowledge about HIV as an effective preventive intervention is recommended. Increasing knowledge about HIV is associated with motivation for safer sex, test, and treatment.[5]

Lot of studies have been done on the knowledge, attitude, and practice of HIV among Iranian people; for example, in a systematic review in 2011, a high score was recorded regarding the knowledge and attitude of HIV in different communities, whereas in a study conducted in 2013, the researchers reported lower scores for knowledge and attitude on HIV in 13 provinces of Iran.[6]

Lot of studies have been conducted about the health belief model (HBM), and there is contradictory result expressed regarding the relationship between HBM and protected sexual behaviors. The issues of behavioral health and health education are an argument between researchers for finding an effective model for changing behavior.

HBM is a theoretical framework used to assess the motivation of patients to adapt to health-related behaviors. The impact of HBM on knowledge, attitude, and practice of HIV can effect on self-care.[7]

HBM, as a theoretical framework for this research, is one of the most effective models of health education, mainly focused on the prevention of diseases and adoption of behaviors to avoid illness and disease chains, and it is one of the important precise models which is used to determine the relationship between health beliefs and behaviors. The HBM posits that people will take

action to prevent illness if they regard themselves as susceptible to a condition (perceived susceptibility), if they believe it would have potentially serious consequences (perceived severity), if they believe that a particular course of action available to them would reduce the susceptibility or severity or lead to other positive outcomes (perceived benefits), and if they perceive few negative attributes related to the health action (perceived barriers). In addition, HBM scholars later suggested that self-efficacy – the belief that one can successfully complete the behavior of interest despite considered barriers – be added to the model[7-9] [Figure 1].

The pattern of HBM was introduced by a group of psychologists in the 1950s to explain why some people use health services and others do not use it? Rosen Stueck, who was looking for reasons for the low acceptance of diagnostic and preventive programs, developed this pattern in 1966, and in 1974, Becker and Mieham explored their behavior in responding to diseases and diets and completed the pattern.[7]

In order to change behaviors, researchers recommend realistic program or interventions such as decision-making model, HBM, theory of reason action, theory of planned behavior, and self-care.[8]

One of the most important models for changing behavior is HBM, which was developed to explain and predict health-related behavior. This model focuses on the knowledge, attitude, and practice of individuals.[9] The HBM helps in changing behavior in a short time.[7]

According to this model people should understand about health problems, perceived benefits of action and barriers to action, and self-efficacy explain engagement (or lack of engagement) in health-promoting behavior. By understanding the effect of this problem on different aspect of their life like social and economic and psychologic part, and find cost effective solution they
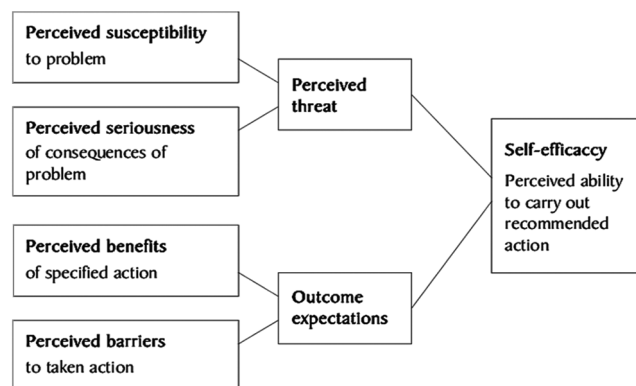

Figure 1: Theoretical framework of the Health Belief Model

decide to change the behavior. according to this model the people can take presentational decision.[10]

In several studies, contradictory results have been made on the relationship between the pattern of health belief and safer sex and in some studies, researchers used some part of structures to decrease high-risk behavioral intervention.[11]

According to our research, some studies have been conducted using this model on even healthy groups such as men who have sex with men (MSM) or students, and no interventional study with the goal of behavioral change has been done in this group.[12-14]

Knowledge about health and health-seeking behavior related to sexual diseases can help programmers in the early detection of barriers, effective treatment of STD, and effective intervention.

According to this issue, our hypothesis was that educational intervention base on the HBM has effect on the knowledge, attitude, and practice of HIV-positive women.

Materials and Methods

Design
This study is a paralleled, randomized controlled clinical trial that was carried out on HIV-positive women who were registered at the voluntary and counseling testing (VCT) center in Imam Khomeini Hospital in 2018.

Participants and recruitment
According to the study by Kazemi *et al*.,[15] with $\alpha = 0.05$ and $\beta = 0.02$, the mean difference before and after the perceived sensitivity score in the test group was 2.38 ± 3.90 and in the intervention group was 3.90 ± -0.56. According to the sample size of each group which was determined to be 40, and with a dropout rate of 92, each group was determined.

Inclusion criteria
Iranian women aged 18–45 years; those who were HIV positive who were registered at the VCT center, based on CD4 records below 500; those who had sex during the past 3 months; those who had no drug abuse or no psychiatric addiction during the study, so that they have the ability to answer questions; and those who had no history of mental disorders and psychiatric problems. According to the self-report by patients, not in AIDS phase, minimum literacy

Exclusion criteria
Maximum do not attend in two sessions of training session.

In this study, information was collected by using a sociodemographic checklist and the Information-Motivation-Skill-Behavior questionnaire.

This questionnaire comprises six sections including personal profile, knowledge and awareness with17 questions, attitude toward illness consisting of 17 questions, motivation for safe sex with9 questions, skills for safer sex with10 questions, and performance with9 questions. The score was such that in the awareness section, the scores were 0 and 1. The correct questions are rated 1, with a maximum score of 29 and the wrong questions are awarded –1, and the score for "do not know" is 0. Ultimately, a person with >74% of the maximum score of awareness is regarded as having "high awareness," score between 74% and 50% is regarded as having "moderate awareness," and <50% is regarded as having "low awareness." For attitude toward the disease, for each correct answer (agrees or disagrees), was assigned one point. Otherwise, the score would not be the same. The final attitude score was the sum of the points scored (maximum score of17 and minimum score of 0). At the end of the median, the points scored by the individual were added; individuals whose score is less than the median were considered to have a negative attitude and those with scores more than the median were considered to have a positive attitude.

Motivation for safer sex
The total score was the sum of scores of these questions (minimum5 and maximum 45). The lowest score for this section means higher motivation or better support for for his or her environment for safe communication, and vice versa.

Skill for safer sex
From questions1 to 4, the options were 4–1. For questions5 to 10, the scores are reversed, meaning that the options are 4, 3, 2, and1, and the individual score will be the total score of theseten questions (a minimum of10 and a maximum of 40). The higher the score in this section, the more the ability of the person to take preventive HIV/AIDS behaviors.

Function for prevention section
In the questionnaire, if the answers is yes for at least one question (except for question 7, if the answer is good), the person is considered to have a high-risk behavior. For assessing The reliability and validity of questionnaire in Iran by Sara Ahsani e*t al*.they used the coefficient Cronbach's alpha and retest test.[16] The result was reliable in 4 domains; but a Cronbach's alpha of 0.6 was reported for the fifth domain (HIV-related behaviors).

The sociodemographic checklist included questions about age, level of education, occupation, income level, number of partners, and marital status.

Processor

This study was reviewed and approved by the Ethical Committee of the Alborz University of Medical Sciences (AUMS) (ethic code: Abzums. Rec: 1396.145) and Iranian Research Center for HIV/AIDS's Ethics Committee IR. TUMS. VCR. REC.1397.15 and the Iranian Clinical Trials Registry IRCT20160503027728N10. At first, the researcher attended the center and after identifying qualified people, the goals of the study were expressed to them and if they were willing to participate in the study, they received written consent. The data collected were anonymous, and the transcriptions and records, in their entirety, were secured and coded in a protected file. Refusal to participate in the study had no interference with the service or treatment received at the center.

The participants were first introduced to the study. Then, they were divided into two intervention and control groups based on random four blocks.

Before entering the intervention, both groups completed the questionnaire, and this information was considered as the baseline information. The participants were then divided into two groups such as intervention and control groups. In the control group, during the six sessions of training, they received the information about HIV care and treatment according to the national HIV guideline, and at the end of sessions, they received a package containing all the contents provided in the intervention group to observe ethical principles. In the intervention group, with an additional routine national counseling protocol, the participants received 6 training sessions of 60–45 min duration based on the HBM approach in relation to the health-seeking behavior. Meetings were held once a week, by group discussion, and answers to the questions. Participants enrolled in educational class weekly for 6 weeks were asked to take part in group discussions and using educational materials Immediately and 3 weeks after the end of the sessions, all the participants completed the questionnaire again. During the study, seven patients in the intervention group and 5 in the control group were excluded from the study due to their unwillingness to attend the center, lack of referral, adverse conditions of the patient, and migration. Finally, the study was completed by 39 participants in
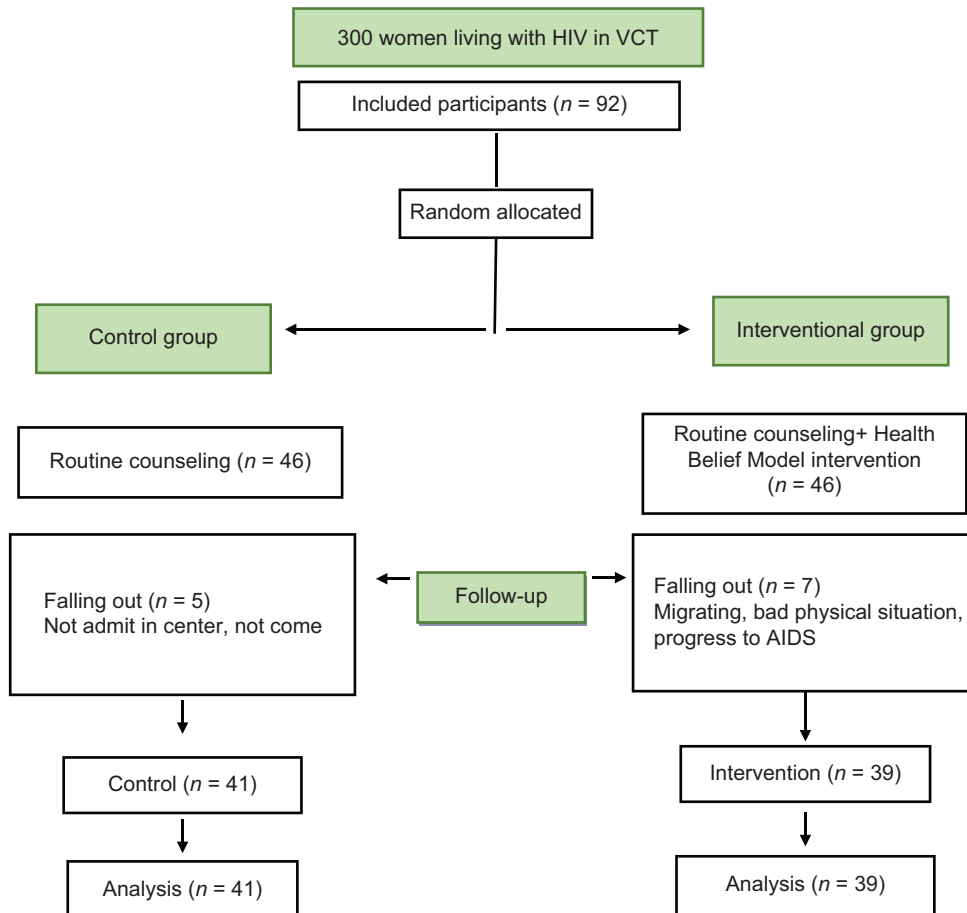

Figure 2: Inclusion flowchart. HIV: Human immunodeficiency virus, VCT: Voluntary and counseling testing

the intervention group and 41 participants in the control group [Figure 2].

Statistical analysis

Intention-to-treat analysis was considered to deal with noncompliance and missing.

Outcome in our randomized controlled trial was health-seeking behavior, and data analysis was performed with SPSS software version 16 (IBM company, Armonk, NY, U.S.A) by using statistical tests such as *t*-test and independent repeated-measures test.

Results

In this study, eighty HIV-positive patients in two groups of intervention (39 patients) and control (41) were assessed. Based on the results of Mann–Whitney, Chi-square, and Fisher's exact tests, the two groups were homogeneous in terms of the variables in sociodemographic factors such as age ($P = 0.99$), education level ($P = 0.1$), job status ($P = 0.05$), and income level ($P = 0.98$) [Table 1].

No significant difference was observed between the two group before intervention such as

level of knowledge ($P = 0.286$), the attitude of the subjects to the patients and the disease ($P = 0.87$), the level of motivation for safe sex behavior ($P = 0.86$), safe behavior skills ($P = 0.43$) And the level of performance of their behavior regarding risk behaviors ($P = 0.17$).

About level of knowledge before intervention, the results show that 65.9% of the control group and 53.8% of the interventional group were in moderate level of knowledge; after 3 weeks of intervention, the results showed that 97.4% in the interventional group and 65.9% in the control group had a positive knowledge.

Results of attitude among all participants showed that, before intervention, 71.8% of the intervention group and 90.2% of the control group had a positive attitude. After 3 weeks of intervention, the attitude of the intervention group increased to 100% and in the control group, 95.1% of the individuals had a positive attitude.

Regarding the status of safer sex skills before intervention, 59% in the intervention group and 66.3% in the control group were categorized in low level of safer sex behavior, but after 3 weeks of interventions, 94.9% of the

Table 1: Sociodemographic data of women living with human immunodeficiency virus referred to voluntary and counseling testing center of Imam Khomeini Hospital

Valuable	Control group (*n*=41), *n* (%)	Interventional group (*n*=39), *n* (%)	P
Age (years)			
25-40	28 (68.3)	24 (61.5)	0.99*
≥41	13 (31.7)	15 (38.5)	
Mean±SD	35.73±5.9	35.74±6.7	
Educational level			
Illiterate	4 (9.8)	1 (2.7)	0.1*
Secondary school	11 (26.8)	20 (51.3)	
High school and diploma	21 (51.2)	15 (38.5)	
University level	4 (9.8)	3 (7.7)	
Mean±SD	9.7±4.5	8.07±4.23	
Job			
Jobless	1 (2.4)	0	0.20**
Full-time job	6 (14.6)	2 (5.1)	
Part-time job	11 (26.8)	9 (23.1)	
Marital status			
Single with some partners	7 (17.1)	11 (28.2)	0.43*
Married	30 (73.2)	19 (48.7)	
Widow and divorced	1 (2.6)	11 (28.2)	
Number of partners			
1	24 (58.5)	16 (41.0)	0.25*
2-3	16 (39)	19 (48.7)	
>3	1 (2.4)	4 (10.3)	
Years of marriage			
<5	4 (9.8)	6 (15.4)	0.37
5-10	15 (36.6)	11 (28.2)	
>10	21 (51.2)	22 (56.4)	
Mean±SD	6.17±12.75	12.64±6.54	

*Independent *t*-test, **Chi-square test. SD=Standard deviation

Table 2: Comparison between knowledge, motivation, skill, behavior among women living with human immunodeficiency virus in two groups of intervention and control

Variable	Group	Before intervention		Immediately after intervention		3 weeks after intervention		P
		Mean±SD	P	Mean±SD	P	Mean±SD	P	
HIV-related knowledge	I	18.07±3.60	0.286	20.79±1.88	0.00	18.4±1.39	0.00	0.00
	C	16.536±2.44		17.36±2.44		14.58±2.1		
Attitudes toward PLWH	I	10.76±2.8	0.87	10.58±2.7	0.33	12.10±1.39	0.49	0.00
	C	10.85±1.7		10.09±1.6		11.87±1.5		
Motivation to practice safe sex	I	30.28±7.7	0.86	28.94±3.87	0.49	27.2±3.3	0.05	0.00
	C	30.53±6		29.87±7.4		29.8±7.5		
Skill 1: Perceived difficulty of AIDS-preventive behaviors	I	22.05±9.52	0.43	29.97±2.6	0.00	30.05±2.5	0.00	0.00
	C	20.39±9.5		22.82±5.9		23.37±6.3		
Skill 2: Perceived effectiveness of AIDS-preventive behaviors	I	7.1±1.2	0.17	7.6±0.9	0.31	7.58±0.9	0.47	0.00
	C	7.4±0.67		7.46±0.63		7.46±0.63		

I=Intervention, C=Control, SD=Standard deviation, HIV=Human immunodeficiency virus, PLWH=People living with HIV

interventional group were categorized to higher skills of safer sex. There was no change in the performance status before and after the intervention [Table 2].

In order to evaluate the follow-up process in each group and in two groups, we used repeated-measures ANOVA. In this evaluation, according to the significance of the Mauchly test, we announced the results of the Greenhouse-Geiser correction. After the intervention, the results of the follow-up process in each group and in both groups showed a statistically significant difference over time in the mean of knowledge score ($P = 0.000$). Comparison of the meanings indicated an incremental trend immediately after the intervention in both groups, but the increase in mean score in the intervention group was high in control group (score in intervention group was 1.88 ± 20.79 and score in control group was 2.44 ± 17.36). The scores of attitude indicate an increase in the mean score of attitude over time in the intervention group compared to the control group ($P < 0.001$). In the field of motivation for safe sexual behavior of high-risk individuals, the trend of comparison, the effect of training over time, indicates a decrease in the mean score of motivation in the intervention group compared to the control group ($P < 0.001$). Based on the results at the beginning of the study, the mean score in the intervention group was 30.28 ± 7.7 and in the control group, it was 30.53 ± 6, and these rates changed after intervention, i.e. in the intervention group, it was 27.2 ± 3.3 and 29.8 ± 7.5 in the control group. Considering how the questionnaire is interpreted, this decrease reflects the increasing trend of motivation over time in the intervention group.

In the safe behavior skills section, the effect of the intervention has been significantly increased, i.e. the average score in both groups, but the incremental trend in the intervention group was statistically significantly higher than that of the control group ($P = 0.001$).

In the performance section of the safe behavior, the results indicate an increase in the mean score in the stage immediately after the intervention in the intervention group at 0.5 and in the control group at 0.06. According to the results, significant improvements were found in knowledge, attitude, motivation, skills, and behavior of safe behavior by health belif model in high-risk behaviors among women living with HIV.

Discussion

Today, the knowledge of epidemiology and prevention of transmission of immunodeficiency virus infection has increased among high-risk groups. However, still, we have lack of information and wrong attitude and belief about HIV and also inequality to access to the health services, especially in high-risk women. value-expectancy theory that considers the value one assigns to seeking health in the face of health problem, and people's beliefs about the effect of taking action.

According to this model for avoiding the high risk behaviors subject should belief into the especially healthy act and healthy behavior and have access to health services.[17] In the present study, the findings showed that the two groups were homogeneous in the level of knowledge, attitude, safer skill, and motivation for safe behaviors, and this is one of the strengths of this study. Another positive aspect of the study was collaboration with HIV-positive peer group at the training sessions. The supports of the peer group consist of helping to disclose the disease and support for adherence to HIV care and treatment.

According to the findings, for level of knowledge in the interventional group, 97.4% were in the positive knowledge group, whereas 65.9% were in the control group, and the mean score of knowledge after the intervention was significantly higher in the intervention group than that in the control group. It seems that the educational intervention in this study, which has been done during several sessions in the form of slideshows and group discussion sessions with the peer group, has increased the knowledge of HIV-positive women. The

results of this study are similar to the study of Karimi *et al.* in 2009. They assessed the effect of education on the basis of the HBM on the prevention of high-risk behavior related to HIV in drug addiction at an addiction care center in Zarandiyeh. They found that the implementation of the health education program has a significant effect on improving awareness on HIV prevention.[18] Another study done by Bastami *et al.* showed that training and education based on the HBM led to an increase in knowledge, self-efficacy, perceived benefits, performance, and reduction in perceived barriers in addicts.[19] Vakili *et al.* and Fallahi *et al.* also showed that educational intervention can increase the susceptibility to the disease.[20,21] In addition, Shahnazi *et al.* conducted a research among pregnant women and found that education on some of the HBM constructs resulted in increased perceived susceptibility and self-efficacy of pregnant women.[22] However, the educational intervention has not responded in every aspect, which was supported by Ghaffari *et al.* who conducted a study but were not successful. They found in their study that educational intervention had no effect on perceived sensitivity of students,[23] difference results achive because of difrrent study population and methos that resurchers not using peer educator, kind of intervention that not include using group discussion. The authors found that interfering with the use of other interventional models that affect health policies could increase the effectiveness of this model.

Three weeks after the intervention al class, we have 100% changed in attitude about patients and illness in interventional group and 95.1% in the control group. In addition, according to the findings, after intervention and during follow-up, the mean score of the intervention in the intervention group was significantly higher than that of the control group. According to the studies, the level of awareness and attitude of people about the disease and other STDs is very important for early detection, early treatment, and adherence to treatment, as those diseases are very effective in transmitting the disease. In other words, the duration of STDs or high rate of viral load is the most important determinant for the transmission of disease.[24] Therefore, the success of sexually transmitted infection interventions in reducing the transmission rate of disease during the time of infection or doing high-risk behaviors depends on the interval between the time of disease detection or initiation of treatment or the lack of knowledge of individuals about their condition.[25]

The results of the study by Malek *et al*. in 2013 showed another aspect; he found that the main reason for delay in receiving treatment was a negative attitude toward the onset of treatment.[26] In the study by Kutnick *et al*. in 2017, the acceptance of HIV status and the action for treatment were under triple influence, where the following three

factors can make barriers for access to services and behaviors: levels of individual attitude (fear and medical mistrust), social aspects (stigma and discrimination), and structural impacts such as poverty.[27]

Furthermore, Zarei *et al*. in another city of Iran found that fear of social stigmatized attitude is the main impediment to dealing with patients and providing services to them. Moreover, effective knowledge about transmission and correcting the sociocultural beliefs of health providers are two key factors that play role in access to services for HIV-positive people.[28]

The attitude of people about illness and patients is an important factor for attending classes and relation with peers. cultural influences could be due to the fact that health care providers decisions are more influenced this norms and it is one of factors for stigma about people living with HIV. Cultural norms can effect on the health-care provider's attitudes about people living with HIV (PLWH) and Couse stigma. These attitudes and stigma is one of the important sources for denying care and treatment among patients. In another study, results showed that gender-based discrimination, inequality, and discrimination in education and treatment in HIV-positive people can be improved by education.[29]

The practice and skills of safer sex among people are related to the knowledge and motivation for safer behavior of individuals. In the practice of safer sex, having multiple sex partners, having sex without condom, high-risk behaviors were classified as negative functions. Increasing access to health services and the information level of individuals based on the HBM could not affect the function of individuals, although intervention changed the level of knowledge and attitudes. Paying attention to each components of the model and improving the level of knowledge and access to the services cause positive health-seeking behavior. Creating change is not easy at all. People may stay a long time in each level and sometimes never improve in any part of the model.

Support groups such as families or peer educators or close friends have a very important role in creating awareness about high-risk behaviors, changing attitude, and adherence to the treatment. The results of a systematic and meta-analytic review indicated that educational interventions by peer education group were significantly associated with increasing the knowledge of HIV among PLWH. In addition, the effect of the peer educational group was significant on improving the knowledge of individuals for using sterile syringe and needle and condom and safer sex. Individuals with similar effects help others to adhere to the treatment modalities.[30]

This model has been used to treat smokers, alcoholics, and addicts. It is also a good way to think about habits and behavior. Social workers, therapists, and psychologists can use this model to identify the process of behavior and way of changing them.[31]

Study limitations or weak point

Because of some mental and social problems, working with HIV-positive people is a very challengeable issue. Sometimes, the response and participation to the study are affected because of drug abuse. In addition, with regard to the different levels of access to the virtual or media, the status of receiving information was not controlled during the study.

Study power

Ability of working with vulnerable group and access to them and successful intervention for changing the behaviors are the powers of the study. Furthermore, there is any significant difference between two groups before intervention in level of knowledge attitude and practice and 'motivation for safe sex behavior' safe behavior skills و.

Conclusion

People's performance is related to the knowledge and awareness and motivation for safe behavior. The results of the study indicated that the effectiveness of educational intervention with the HBM can improve the level of knowledge, attitude about HIV and patients, and changing behaviors for decrease high risk behaviors. Based on this, it is suggested that such interventions, especially by health-care providers, can increase positive health behaviors and consequently, promote knowledge and attitude and positive performance of the patients. This model is a good way to think about unsafe habits and behaviors and also can be more effective if peer educators are involved in the interventional classes.

Conflicts of interest

There are no conflicts of interest.

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