Original Article

Using education based on the health belief model to modifications in performance of behaviors related to sexually transmitted infections in vulnerable women

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Abstract:

BACKGROUND: Sexually transmitted infections (STIs) have always been considered as a health problem in the world. Also, vulnerable women (addicts, jail breakers, and prostitutes) are at the highest risk. According to the World Health Organization's (WHO) approach, the only effective way to prevent and control this disease is public health education, and high-risk and vulnerable groups should be prioritized in educational programs. The aim of the study was to investigate the effect of health belief model (HBM)-based education on changing the behaviors related to STIs in vulnerable women.

MATERIALS AND METHODS: The present study is an intervention (field trial) study in vulnerable women. Convenience sampling method was used in this study and the sample size was determined to be 84 subjects. Through tossing a coin, the social support center was selected as the intervention group and the drop-in center as the control group. Quantitative data analysis was performed, and descriptive and inferential statistical methods were used.

RESULTS: The mean scores of perceived threat, perceived benefits, perceived barriers, and perceived self-efficacy and changes in performance between the three measurement stages, as well as changes in the scores of perceived threat, perceived benefits, perceived barriers, and perceived self-efficacy over three measurement times were significantly different between the two groups (interaction) ($P < 0.001$). The mean score of performance 3 months after the intervention was significantly higher than before the intervention ($P = 0.001$).

CONCLUSIONS: The present study confirmed the effectiveness of the HBM in promoting behavioral modifiers that lead to STIs. Therefore, educational interventions with emphasis on understanding the threats, benefits, barriers, and self-efficacy and, ultimately, performance improvement in relation to STIs are recommended.

Keywords:

Educational, health belief model, prevention, sexually transmitted infections, vulnerable population

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Introduction

Sexually transmitted infections (STIs) have always been considered as a health problem in the world.[1] Among the most prevalent STIs, mention may be made of human immunodeficiency virus (HIV) (26%), chlamydia (49%), gonorrhea (26%), trichomonas (8%–16%), herpes (8%), genital wart (13%), and syphilis (primary, secondary, and early latent stages: 5.[2] The presence of STIs in vulnerable people gives it a great significance. Vulnerable groups and those at the risk of STIs include prostitute women and those women who either themselves or their husbands are drug users.[3,4]

Prostitutes do not have enough knowledge and appropriate awareness with regard to the transmission ways, symptoms, and some common treatments for STIs and how they can prevent the transmission of STIs.[5] The prevalence of STIs among prostitutes was 8.9% for papillomavirus, 6.2% for gonorrhea, and 5.12% for chlamydia.[6] Studies show that vulnerable women, especially prostitutes, are at risk for STIs and HIV infection.[7,8] This is due to the increased number of sexual partners and the high percentage of unprotected sex in them.[9]

On the other hand, vulnerable women are relatively more affected by STIs and their serious complications such as pelvic inflammatory disease, infertility, ectopic pregnancy, and genital cancer.[10] Also, due to extensive communication with other people in the community, especially young people, they affect more people than other high-risk groups.[10,11] That is why the World Health Organization (WHO) and the United Nations Programme on AIDS UNAIDS emphasize that, as STIs are a problem in today's society, integrated health care includes empowerment and promotion of condom use. Also, effective treatment of STIs should focus on high-risk groups, such as prostitutes, and provide education on the dangers and threats of the disease and their self-efficacy.[12]

Therefore, interventions for the prevention of STIs in this group of women should be expanded to the promotion of social support and mental health programs, as well as these women's perception of their self-efficacy.[6] One of the best models for designing educational interventions is the health belief model (HBM), which has been developed exclusively for health-related behaviors. HBM is based on the premise that if people feel and perceive that they are at the risk of a disease and that avoiding it is beneficial (preventable) to them, they will be more motivated to change and quit their behavior.[13] In a study, the perceived severity, perceived benefits, selfefficacy, and HIV knowledge were used as an effective strategy for increasing behavioral prevention. So, it can be supposed that perceived severity and perceived benefits can lead to HIV-preventive behaviors. In this regard, the authors believe that the HBM is valuable to predict HIV-preventive behaviors among vulnerable women.[14] In another study, the perceived score of Pap smear screening was different between the experimental and control groups before and after the intervention and showed the effect of training on reducing perceived barriers. In this regard, the authors believe that the application of educational models of stages of behavior change and health beliefs to bring people to the stage of action will be effective in improving the quality of practical and effective education for target pop ulations and other educational programs.[15] To

this end, HBM-based education has a positive effect on human papillomavirus protection behaviors in vulnerable women.[16,17] Therefore, while there is a low level of perceived sensitivity and perceived severity of the risk of complication in these women, they perceive more obstacles.[18] As such, the aim of the present study was to investigate the effect of HBM-based education on changing the behaviors related to STIs in vulnerable women.

Materials and Methods

Study design and setting
The present study is an intervention (filed trial) study conducted in vulnerable women referring to social support centers covered by Isfahan (Iran) Welfare Organization in 2018.

Study participants and sampling
The eligible participants were vulnerable women (sex worker, drug user, women with addicted spouses) who were willing to participate in the study and having at least primary education. Exclusion criterion included having chronic debilitating physical illnesses or severe mental illness. Convenience sampling method was used in this study, and the total number was determined to be 84 subjects, with a confidence level of 95% and a test power of 80% ($n = \frac{(z1 - z2)^2 \ (s1^2 - s2^2)}{(m1 - m2)^2} = 42$). The size of each group (intervention and control) was determined to be at least 42 participants.

Data collection tool and technique
The data measurement tool was a three-part researcher-made questionnaire consisting of 1. demographic characteristics and 2. HBM-based education questionnaire containing 16 questions. This questionnaire included the constructs of perceived threat, perceived benefits, perceived barriers, and perceived self-efficacy, each of which had four questions. The questions of each section were ranked based on a 5-point Likert scale ranging from strongly disagree (+1) to strongly agree (+5). In each section, the scores ranged from 4 to 20. An increase in the score in the constructs of perceived threat, perceived benefits, and perceived self-efficacy and a decrease in the score in the construct of perceived barrier means that the situation has improved. The questionnaire on the performance of preventive behaviors related to STIs consisted of 13 questions. Each question was answered with "not at all," "never," "sometimes," and "always," which were given scores of 0–3, respectively. The scores ranged from 0 to 39. The higher the score, the better has been one's performance with regard to the behaviors associated with STIs. Any item in the questionnaire with a content validity ratio[17] score greater than 59% was considered

"essential" and a content validity index score higher than 0.79 was considered appropriate.[17] The reliability of the questionnaire of health belief constructs and performance questionnaire was estimated to be 0.82 and 0.79, respectively.

Intervention

When the number of the samples reached the intended size, that is 42 participants in each group, through tossing a coin, the social support center was selected as the intervention group and the drop-in center as the control group. Group educational intervention was considered for the intervention group in three 1.5-h sessions and a total number of 12 sessions (for four groups of 10–11 people). The educational content was based on the model constructs and according to the necessity and benefits of modifying the behaviors leading to STI. The training sessions were held using PowerPoint, which contained images of these infections in men and women and questions and answers about the male and female reproductive system, STIs, types of infections that are prevalent in Iran and should be considered, transmission of infections through different types of sex, symptoms, progress of the infection, treatment and prevention of STI of trichomonas, genital herpes, gonorrhea, and syphilis, safe sexual behaviors, and strengthening self-efficacy and courage in dealing with and correcting behaviors that may lead to STIs. Two role-plays were performed by the researcher and three participants with regard to assertiveness and rejection of high-risk sexual behaviors. Then, 3 months later, the questionnaires were completed. After completion of the questionnaires, a booklet about STIs was distributed to the samples of the control group. Validity of the HBM questionnaire was examined using content validity method (content validity ratio, and content validity index). , So that according to Lavoshe model[19] and after reaching a consensus, see panel members (10 people), the amount content validity ratio (CVR) was calculated to be 0.71, which is greater than 62%, and for content validity index (CVI), according to the Waltz method,[20] was calculated to be 80%, which was greater than 79%. The reliability of the instrument was assessed using the method (pretest–posttest) in two stages with an interval of 10 days in 15 vulnerable women, and using the correlation coefficient, the reliability of the questionnaire was estimated to be 0.85.

Data analysis

In order to determine and compare the demographic characteristics between the two groups, descriptive statistical tests were used: independent *t*-test, Chi-square test, and Mann–Whitney test were used for the qualitative ordinal variable of education level. In order to obtain the mean scores of the constructs of the HBM and performance, repeated measures analysis of variance (ANOVA) was used to examine the main and combined effects. Then, Bonferroni post hoc test was used to compare within each group and between the two groups.

Ethics consideration

The study was approved by the research ethical team of Isfahan University of Medical Sciences (IR.MUI.RESEARCH.1398.256). Ethical considerations including obtaining an informed written consent from the participants to attend the study and participants' right to leave the study any time they liked were all followed, respecting anonymity and confidentiality.

Results

A total of 84 venerable women entered the study. The mean age of participants in the intervention group was 22.25 years (standard deviation [SD] = ±2.87) and in the control group was 23.12 years (SD = ±2.33). There was no significant difference between the two groups before the intervention with regard to age ($P = 0.197$), education level ($P = 0.581$), job ($P = 0.483$), marital status ($P = 0.382$), having multiple sexual partners ($P = 0.513$), husband's job ($P = 0.581$), and husband's education [Table 1]. Furthermore, results presented in Table 1 show that the two groups of intervention and control did not have a significant difference in terms of the demographic variables.

Based on the results of the repeated measures ANOVA, the effect of intervention in the interventional group was significant at the level of 5% error. Therefore, the assumption that the mean scores of perceived threat, perceived benefits, perceived barriers, and perceived self-efficacy are the same between the two groups is rejected ($P < 0.001$). Moreover, the effect of time and the interaction of group and time (change in different time levels between the two groups) were significant ($P < 0.001$). Thus, the mean scores of perceived threat, perceived benefits, perceived barriers, and perceived self-efficacy between the three measurement stages, as well as changes in the scores of perceived threat, perceived benefits, perceived barriers, and perceived self-efficacy over three measurement times were significantly different between the two groups (interaction). Based on the results of Bonferroni post hoc test, in the intervention group, the mean scores of perceived threat, perceived benefits, and perceived self-efficacy were significantly higher immediately and 3 months after the intervention than before the intervention and the scores of perceived barriers were significantly lower immediately and 3 months after the intervention than before the intervention ($P < 0.001$). Finally, the mean scores of perceived threat, perceived benefits, perceived self-efficacy ($P = 1.00$), and perceived barriers ($P = 0.978$) at 3 months after the

intervention were not significantly different from the scores immediately after the intervention. This shows the stability of the intervention over these 3 months [Table 2].

Based on the results of the repeated measures ANOVA, the effect of the intervention on the scores of women's performance was not significant at the level of 5% error in the intervention group. But the effect of time ($P = 0.015$) and the interaction of group and time (change in different time levels between the two groups) were significant ($P < 0.001$). Therefore, the mean scores of performance between the three stages of measurement, as well as the changes in performance score during the three times of measurement were significantly different between the two groups (interaction). According to the results of

Bonferroni post hoc test, in the intervention group, the mean score of performance before the intervention was not significantly different from the score immediately after the intervention ($P = 0.971$). The mean score of performance 3 months after the intervention was significantly higher than the score before the intervention ($P = 0.001$) [Table 3].

Discussion

Results showed that the mean score of perceived threat in the intervention group was significantly higher than that in the control group. Other studies have shown that education based on the HBM for prostitutes has been associated with an increase in perceived severity of condom use[21] and increased knowledge, attitude, and function of women about the Pap smear test

Table 1: Study participants' characteristics in the two groups of intervention and control (*n*=84)

Variable	Intervention group *n* (%)	Control group *n* (%)	Test statistics	*P*
Marital status				
Single	6 (14.3)	4 (9.5)	χ^2=3.103	0.221
Married	25 (59.5)	27 (64.2)		
Divorced	6 (14.3)	5 (11.9)		
Living together without marriage	5 (11.9)	6 (14.3)		
Level of education				
Illiterate	26 (61.9)	23 (54.76)	*U*=589.00	0.493
High school	8 (19.04)	10 (23.8)		
Diploma	5 (11.9)	6 (14.3)		
Above diploma	3 (8.3)	2 (5.6)		
Occupation				
Jobless	27 (64.2)	26 (61.9)	χ^2=0.955	0.336
On job	15 (35.7)	18 (42.8)		
Substance abuse				
Yes	16 (38.09)	19 (45.2)	χ^2=1.431	0.234
No	26 (61.9)	23 (54.7)		
History of sexually transmitted infections				
Yes	33 (78.5)	31 (73.8)	χ^2=2.016	0.147
No	9 (21.4)	11 (26.1)		

Table 2: Comparison of mean scores of perceived threat, benefits, barriers, and self-efficacy in modification of behaviors related to STI before and after the intervention in the intervention and control groups

Variable	Time	Intervention group M (SD)	Control group M (SD)	Effect of group	Effect of time	Time and group interaction
Perceived threat	Before the intervention	9.88 (1.73)	9.40 (1.30)	<0.001	<0.001	<0.001
	Immediately after the intervention	15.50 (0.67)	9.88 (1.52)			
	3 months after the intervention	15.45 (0.71)	9.83 (1.52)			
Perceived benefits	Before the intervention	9.45 (1.06)	9.14 (1.03)			
	Immediately after the intervention	9.83 (1.38)	15.38 (0.99)	<0.001	<0.001	<0.001
	3 months after the intervention	9.80 (1.40)	15.36 (0.96)			
Perceived barriers	Before the intervention	15.00 (1.82)	14.75 (1.92)			
	Immediately after the intervention	8.48 (1.45)	14.80 (1.79)	<0.001	<0.001	<0.001
	3 months after the intervention	8.55 (1.33)	14.88 (1.80)			
Perceived self-efficacy	Before the intervention	9.02 (1.49)	8.95 (1.54)			
	Immediately after the intervention	14.74 (1.74)	9.03 (1.64)	<0.001	<0.001	<0.001
	3 months after the intervention	8.559 (1.55)	8.98 (1.64)			

STI=Sexually transmitted infection

Table 3: Comparison of mean of performance score in in modification of behaviors related to STI before and after the intervention in the intervention and control groups

Variable	Time	Intervention group M (SD)	Control group M (SD)	Effect of group	Effect of time	Time and group interaction
Performance	Before the intervention	16.48 (3.02)	16.35 (3.96)	0.322	<0.015	<0.001
	Immediately after the intervention	17.98 (3.47)	16.14 (3.57)			
	3 mounts after the intervention	30.43 (4.26)	17.18 (3.49)			

STI=Sexually transmitted infection

of providing useful.[22] Therefore, emphasis on the construct of perceived threat seems to be necessary in the interventions related to the change in behaviors leading to STIs. This is because the perceived threat is related to the individual's mental beliefs about the extent of harm that can be caused by an illness or the harmful consequences of a particular behavior. According to the results of the study, the mean score of perceived benefits of the participants in the intervention group was significantly higher than that in the control group. The results of a study conducted with regard to the effect of HBM-based group training on the cervical cancer screening behavior showed that after training, there was a significant increase in the mean score of perceived benefits along with other constructs of the HBM in the intervention group.[23] According to researchers, a person's perceived benefits pave the way for doing an action, and the individual performs a behavior or avoids it based on an analysis of the benefits minus barriers to action.[24]

The present study showed a reduction of perceived barriers of the participants after being trained based on the HBM. A study reported that factors associated with sexual behaviors included age (18 and 21 years), having a normal male partner, self-efficacy of acquired immunodeficiency syndrome (AIDS) prevention behaviors, and health belief in AIDS (perceived barriers to condom use and signs of HIV/AIDS prevention measures).[25] Additionally, in a study entitled "Factors related to condom use in Kenya," which was conducted based on the pattern of health beliefs, it was shown that for both groups of men and women, perceived barriers are only a part of this pattern, which are significantly accompanied by the use of condoms.[26]

In this study, the perceived barriers and perceived benefits were identified as the most important predictors for the correction of the behaviors leading to STIs. This result is in line with the results of the above-mentioned studies.

Results of this study showed that after the intervention, the mean score of perceived self-efficacy of the participants in the intervention group was significantly higher than that in the control group. Zhao *et al*.[17]

examined in their study the prediction of condom use behavior based on the HBM in Chinese prostitutes. As their results showed, self-efficacy had a direct effect on perceived severity, benefits, and barriers and was indirectly associated with condom use in these women. Thus, although self-efficacy may not directly affect the use of condoms to prevent AIDS in prostitutes, it is effective when it is accompanied by other constructs of the HBM.[25] Perceived self-efficacy is a component affecting one's performance; it has the greatest effect on human mood and psychological motivation and contributes to the increase of productivity.[27] Given that in the present study, the mean score of perceived benefits was high and the mean score of perceived barriers was low, the high score of self-efficacy is justifiable. Accordingly, it seems that the more the benefits and the fewer the barriers to behavior, the higher the ability of the individual in doing that behavior. As the results showed, the mean score of performance in the intervention group was significantly different before and after the implementation of the self-care program. In a study conducted on the prostitutes of eastern India, after the intervention, a significant improvement was observed in the use of condom. Thus, in the last sexual intercourse, the occasional use of condom increased from 31.2% to 72.4% and the regular use of it increased from 25.8% to 57.7%.[22] According to the study of Ye *et al*.,[28] women in Shanghai, China, who had more social support, had more protected sex. Additionally, those with a higher perceived risk of the disease had more protected relationships.[29] These results are in line with the results of the present study. As can be seen, after the first evaluation performed immediately after the intervention, no significant change was observed in the performance of the participants. The reason was that the focus of the performance assessment questionnaire was on high-risk sexual behaviors and safe and unsafe sex by the spouse or sexual partner of the study participants. It was clear that the change in high-risk sexual behaviors in the participants depended on the cooperation and support of their spouses, and without access to their spouses for teaching high-risk sexual behaviors and prevention or self-care, this change would not be possible in the participants. Based on the data, despite the increase in the perceived self-efficacy, there was no statistically

significant difference between the performance of the participants before and immediately after the intervention. However, the change in the participants' behavior was significantly different after 3 months of the intervention. The researcher believed that during the progress of the study, the participants' engagement and participation in the study and their interaction with the researcher increased, which led to a change in their performance. So, during the 3-month period, the researcher helped the participants to make a correct decision through having a close contact with them.

Limitation and recommendation

The participants were a special group of vulnerable women (specially sex workers) in Iran and, consequently, the findings cannot be generalized to all vulnerable women in Iran. Also, since in this study, the short-term effect of the intervention has been measured, it is suggested that another study be conducted with a longer follow-up period.

Since unsafe sex and the resulting STIs are a two-way relationship between a man and a woman, a similar study is suggested in the spouses and sexual partners of this group of women. Also, further qualitative research on other groups of vulnerable women in different cities of Iran is recommended.

Conclusion

The findings of this study show that the educational program for modifying the behaviors leading to sexually transmitted diseases designed based on the HBM has a positive effect on vulnerable women's perceptions of the threats, benefits, and obstacles of these behaviors and their self-efficacy in avoiding the behaviors leading to sexually transmitted diseases.

Conflicts of interest
There are no conflicts of interest.

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