

Effect of Education Based on the Health Belief Model on Prevention of Sexually Transmitted Diseases in Female Victims of Sexual Assault

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Abstract

Background: Preventing sexually transmitted diseases is one of the main needs of the victims of sexual assault which their risks could be restricted by providing education to the victims. Therefore, the present study was conducted to evaluate the effect of education based on the Health Belief Model on the prevention of sexually transmitted diseases in female victims of sexual assault.

Methods: The present randomized clinical trial was conducted at the forensics center of Babol. Samples were selected randomly and included 70 eligible women and girls who had complained of sexual assault. The intervention group was educated during a half an hour session based on the Health Belief Model with phone follow-up and educational pamphlets; the control group received routine care from the forensic center. Information was gathered at two stages before and after the intervention and then was analyzed.

Results: Comparing the intervention and the control groups after the education showed a significant difference in perceived sensitivity and intensity ($p = 0.001$), perceived benefits ($p = 0.04$), perceived barriers ($p = 0.001$), and the performance of complained women and girls after sexual assault in preventing sexually transmitted diseases ($p = 0.001$).

Conclusions: Education based on the Health Belief Model was effective on preventing sexually transmitted diseases. Therefore, it is recommended that this model would be used for the education of sexual assault victims for preventing sexually transmitted diseases.

Trial registration: IRCT 2014101413542N3

Background

No society is immune from sexual violence (1). It has been estimated that 19.3% of women and 1.7% of men in the United State have been sexually assaulted during their lifetime. Also, other types of sexual violence have been reported in 439% of women and 234% of men (2). According to the results of a review study, the highest rate of sexual violence was reported in Africa and the lowest rate was reported in Asia (3). In Iran, there is not accurate and reliable statistics of sexual assault exist due to various factors such as being taboo, fear of social stigma and most importantly lack of attention and education about the manner of registering in relevant organizations. But, lack of statistics does not mean lack of this problem (4). The rate of sexual assault to incestuous women in the researches about prostitution has been reported as 22–25% and it has been reported as 12–36% among runaway girls (5).

Women and girls who have been victims of sexual assault would be exposed to various health, mental and social complications (6, 7). The risk of unwanted pregnancy, getting infected with sexually transmitted diseases and HIV are some of the short and long term complications related to fertility health among female victims of sexual assault (8, 9). Sexually transmitted infections is one of the serious problems that would compromise the victims of sexual assault (10, 11). Although it is hard to estimate the risk of sexual infections through sexual assault, but it has been estimated that the risk of gonorrhoea,

trichomonas's, chlamydia and syphilis are 6–12%, 12%, 2–12% and 5%, respectively (12). In a study that was conducted in Amsterdam and investigated 1066 victims of sexual assault, the rate of positive STD tests was reported as 11.2% (13). In a study that was conducted on the girls from 9th to 12th grades, STD and HIV tests of 38.8% of them were positive and 51.6% reported that they have experienced forced sexual intercourse (14). Therefore, preventing sexually transmitted diseases is one of the primary needs of the sexual assault victims (15, 16). Unfortunately, few female sexual assault victims had received health services after sexual assault. Studies about the rate of receiving medical services after sexual assault showed that only 26% of the sexual assault victims have sought medical help after the incidence (1). Therefore, educating the sexual assault victims for receiving medical services is of great importance.

To increase the effectiveness of health education for preventing sexually transmitted diseases, using appropriate health theories and models such as Health Belief Model has an important role (17). Education based on Health Belief Model, has been used in different studies including selecting and using contraceptive methods (18), performing Pap smear test (19), preventing cigarette smoking among the youth (20), and risky behaviors (21). Also the effectiveness of this model for educating the prevention of sexually transmitted diseases in different groups such as students (22), teenagers (22) and sex workers (24) has been approved. Based on this model, to make preventive measures, the individuals should first understand the danger of getting infected with sexually transmitted diseases (perceived sensitivity); then they should understand the depth of this risk and the seriousness of different aspects of its complications and the effect of these complications on their lives (perceived intensity) and with the positive signs that they would receive from their environment and their inner self including usefulness and applicability, they would believe in the program for preventing sexually transmitted diseases (perceived benefits) and would find the weight of the inhibiting factors for action less than the benefits (perceived barriers) so that eventually, by increasing their awareness and using encouraging and supportive preventive measures, they would take measures to prevent sexually transmitted diseases (action instructions) (25, 26).

In advanced countries, all the preventive and therapeutic measures provide comprehensively at the sexual assault crisis centers (27). Although in Iran there are centers titled behavioral diseases' counselling center (triangular clinics), that are aimed to present health services to these victims, most of the sexual assault victims would not refer to these centers. Instead those victims who are looking for filing a complaint, would be referred to forensics offices for forensic examinations. The measures that would be taken for these women at forensic centers include hymen and anal examination, investigating and recording the injury marks and bruises, issuing testimony and if possible, taking forensic samples from anus, vagina and etc. and gathering the clothes contaminated with semen for sending to the laboratory to check for sperm. But providing counselling and education to the sexual assault victims about health problems including preventing sexually transmitted diseases is not a part of the forensics offices' duties. On the other hands, since the patients who refer to the forensics offices do not have any focus on their physical problems due to their psychological problems, they would not receive any recommendation for attending their physical problems including referring to the behavioral diseases centers.

Considering the importance of preventing sexually transmitted diseases among this high-risk group as a protection of the rights of the raped individual, referring to the forensics office could be a good opportunity for educating primary health and guiding these individuals toward reference centers to receive preventive services. The aim of the present study was to evaluate the effect of education based on Health Belief Model on prevention of sexually transmitted diseases in female victims of sexual assault who referred to the forensics office of Babol city.

Methods

The present study was a randomized controlled trial with two groups of intervention and control that was conducted to evaluate the effect of education based on Health Belief Model on prevention of sexually transmitted diseases in female victims of sexual assault who referred to the forensics offices of Babol city, Mazandaran province, Iran. The protocol of this study was approved by the Ethics Committee of Tehran University of Medical Sciences (RefNo: 92/d/829/130). This study was registered in the Iranian Registry for Clinical Trials (Ref No: IRCT 2014101413542N3). This study adheres to CON-SORT guidelines for a randomized controlled trial (CONSORT checklist, supplementary material). The inclusion criteria were being a female victims of sexual assault who had at least experienced one of the vaginal, rectal or oral penetration by the rapist that had been confirmed by the forensics office or had been reported by the victim herself. Other inclusion criteria were having a personal cellphone or the accessible home line and the ability to use it, being able to read and write, and not having received any health services for preventing sexually transmitted diseases after sexual assault. The exclusion criteria were previous referral to the service providing centers, having any kind of injury that required immediate attendance, occurrence of any diagnosed psychological problems during the follow up period and not answering the phone or unwillingness to continue the study. All women provided written informed consent before data collection.

Sample size calculation

The sample size for each group was calculated to be 45 considering $p_{01} = 0.5$, $p_{11} = 0.9$, confidence interval of 95%, test power of 80% and a sample loss of 25%.

Randomization and Recruitment

At first, those who had the inclusion criteria were asked to participate in the study. After acceptance, individuals were assigned randomly into the intervention or the control groups based on their number in the admission list. For this purpose, codes of A and B have been assigned to the numbers 1 to 90 using table of random numbers by one of researchers. Code A indicated the control group and code B indicated the intervention group.

Measurement

Data gathering tool for this study was a multi-sectional researcher-made questionnaire. The first section included demographic characteristics such as age, marital status, educational level, occupation, parents' educational level, parents' occupation and economic status and information about assault accident. The second part measured the primary outcomes and included attitude questions in the form of the components of the Health Belief Model which contained 4 dimensions of perceived sensitivity, perceived intensity, perceived benefits and perceived barriers; each dimension is evaluated through 6 questions. Each question was scored from 1 (totally disagreed) to 5 (totally agreed) using 5-point Likert scale. The score of each dimension varies from 6 to 30 and higher scores indicated better conditions. Performance was evaluated through 5 questions about referring for receiving services and performing examination, vaccination, medication, and revisiting. If the answer to the first question about referring for examination was positive, the next four questions were also answered. The options for answering these four questions were not requested, requested but not performed, and requested and performed. To determine the scientific validity of the tool, content validity was approved using the opinions of 10 faculty members. The reliability of the data gathering tool was desirable using test-retest method ($\alpha = 0.84$).

Intervention

Participants of the control group received the pre-intervention questionnaires and completed them in the presence of the researcher to solve any possible ambiguity; then they received the routine care from the forensics office of Babol city. Participants of the intervention group, besides completing the pre-intervention questionnaires, were educated during an individual half an hour session based on the Health Belief Model (perceived sensitivity, perceived intensity, perceived benefits, perceived barriers and action instructions). Also, some information in the form of educational pamphlets was given to them. The content of the educational pamphlets was about the important risk of getting infected with sexually transmitted diseases, their complications, symptoms of diseases and introducing behavioral diseases counselling centers and the address of these centers in Mazandaran province.

Also, phone call follow-ups were performed for the intervention group by the researcher as follows:

- *The first call:* the following day after giving the pamphlets to the participants, they were called to be reminded of their visit to the behavioral diseases center and studying the pamphlets.
- *The second call:* one week after the first call they were called to determine whether they have visited the behavioral diseases center and whether they have read the pamphlets. If the participants had visited the behavioral diseases center, they would be encouraged to follow up the measurements that have been performed by the center and if they had not visited the center, they would be encouraged visit.
- *The third call:* four weeks after the first call they were called to determine whether they had visited the center and read the pamphlets and to remind them of completing the post-intervention questionnaire. If the participants had visited the behavioral diseases center, they would be encouraged to follow up the measurements that have been performed by the center and if they had not visited the center, they would be encouraged by the researcher to visit.

Also, the researcher gave her phone number to intervention group participants so that they would call her in case of having questions. The post-intervention questionnaire was completed one month after the start of the intervention through researcher's phone call to the participants of the intervention and the control groups.

Considering the sensitivity of the subject, the researcher tried to respect all the ethical considerations. Specifically, the researcher made special efforts for confidentially keeping the participants' information. Also, after the post-intervention questionnaires were completed, participants of the control group were educated through phone calls and they were asked to visit appropriate centers.

Statistics

For analyzing the data based on their type, descriptive statistics, as presenting the data in tables of absolute and relative frequency distribution, chi square test, Fisher's exact test, independent t test, and paired t test and were used. All of the calculations were performed using SPSS version 16.

Results

In the beginning of the study, 39 participants were in the control group and 43 in the intervention group and eventually, data from 35 participants was analyzed (Fig. 1). The start date of this study was in December 2015 and the completion date was March 2016. The mean \pm SD age of the participants in the control and intervention group were 21.17 ± 4.58 years and 21.34 ± 4.22 years, respectively. 88.6% of the control group and 91.4% of the intervention were single. The educational level of 54.3% of the control group and 74.3% of the intervention group was high school. Respectively, the educational level of the fathers and mothers of 72.8% and 77.2% of the control group and 82.8% and 94.3% of the intervention group was lower than high school. 17 participants in the control group and 12 in the intervention group were students. In the control and intervention groups, respectively, 51.4% and 45.7% of the fathers were freelancer 60% and 77.1% of the mother were housewife. The economic status of 54.3% of the control group and 48.6% of the intervention group was average. Comparing the demographic characteristics showed that both groups were homogeneous (Table 1). Also according to the results of Table 2, the two groups had no significant difference regarding the characteristics of sexual assault incidence including family relation between the rapist and the victim, the number of rapists and informing the family ($p > 0.05$). Respectively, 12 (34.3%) and 6 (17.2%) of the participants in the control group and 10 (28.6%) and 8 (22.8%) of the participants in the intervention group were aware of sexually transmitted diseases and preventive measures, with no statistically significant difference ($p > 0.05$) (Table 2).

Table 1
Demographic characteristics of participants in control and intervention groups

Variables		Control N (%)	Intervention N (%)	P value
age	≤ 19	11 (31.4)	13 (37.1)	0.87 ¹
	20–29	22 (62.9)	19 (54.3)	
	≥ 30	2 (5.7)	3 8.6	
	total	35 (100)	35 (100)	
Marital Status	Single	31 (88.6)	32 (91.4)	1 ²
	Married	1 (2.9)	0	
	Other	3 (8.5)	3 (8.6)	
	Total	35 (100)	35 (100)	
Education	Elementary	1 (2.9)	0	0/45 ²
	Middle School	5 (14.3)	3 (8.6)	
	High School	19 (54.3)	26 (74.3)	
	University	10 (28.5)	6 (17.1)	
	Total	35 (100)	35 (100)	
Father Education	Illiterate	3 (8.6)	4 (11.4)	
	Elementary	8 (23.9)	9 (25.7)	
	Middle School	12 (40.3)	16 (45.7)	
	High School	10 (21.5)	6 (17.2)	
	University	2 (5.7)	0	
	Total	35 (100)	35 (100)	
Mother Education	Illiterate	6 (17.1)	4 (11.4)	0/08 ²
	Elementary	9 (25.7)	10 (28.6)	
	Middle School	12 (34.4)	19 (54.3)	
	High School	8 (22.8)	1 (2.9)	
	University	0	1 (2.9)	
	Total	35 (100)	35 (100)	
Occupation	Student	17 (48.6)	12 (34.3)	0/4 ²
	Employed	10 (28.5)	11 (31.4)	

Variables		Control N (%)	Intervention N (%)	P value
	Unemployed	8 (22.9)	12 (34.3)	
	Total	35 (100)	35 (100)	
Father Occupation	manual worker	12 (34.3)	16 (45.7)	0/5 ²
	Employee	5 (14.3)	3 (8.6)	
	Free	18 (51.4)	16 (45.7)	
	Total	35 (100)	35 (100)	
Mother Occupation	Housewife	21 (60)	27 (77.1)	0/8 ²
	Employed	14 (40)	8 (22.9)	
	Total	35 (100)	35 (100)	
Economic Status	Good	7 (20)	11 (31.4)	0/6 ³
	Moderate	19 (54.3)	17 (48.6)	
	Bad	9 (25.7)	7 (20)	
	Total	35 (100)	35 (100)	
1 Independent T Test, 2 Fisher exact test, 3 χ^2				

Table 2
 Characteristics of assault incidence in control and intervention groups

Variables		Control N (%)	Intervention N (%)	P value
Perpetrator	Strange	21 (60)	19(54.3)	0.6
	Familiar	14 (40)	16(45.7)	
	Total	35 (100)	35(100)	
Perpetrator's Number	1	29 (82.8)	28 (80)	0.7
	≥ 2	6 (17.2)	7 (20)	
	Total	35 (100)	35(100)	
Time interval (Accident to visit to forensic medicine)	24 hr	5 (14.3)	6 (17.2)	0.9
	24–72 hr	16(45.7)	14 (40)	
	> 72 hr	14 (40)	15 (42.8)	
	Total	35 (100)	35(100)	
Is the family aware of the incident?	Yes	26 (74.3)	24 (68.7)	0.6
	No	9 (25.7)	11 (31.3)	
	Total	35 (100)	35(100)	
Awareness of STD	Yes	12 (34.3)	10 (28.6)	0.6
	No	23 (65.7)	25 (71.4)	
	Total	35 (100)	35(100)	
Awareness of preventive measures	Yes	6 (17.2)	8 (22.9)	0.5
	No	29 (82.8)	27 (77.1)	
	Total	35 (100)	35(100)	

As shown in Table 3, the score of perceived sensitivity ($p = 0.3$), perceived intensity ($p = 0.2$), perceived benefits ($p = 0.4$) and perceived barriers ($p = 0.16$) had no significant difference between both groups before the intervention. After the intervention, only the score of perceived sensitivity was significantly increased ($p = 0.03$) in control group. But in the intervention group the score of all domain was significantly increased ($p < 0.05$). At the end of the study, 17 (48.6%) of the participants in the control group and 30 (85.7%) of the participants in the intervention group referred to receive preventive cares for sexually transmitted diseases and results of chi square test showed that the difference was statistically significant ($p = 0.001$). Referring to the midwife or gynecologist, behavioral diseases counselling, hospital and general practitioner in the center in the control group was respectively 9, 3, 3 and 2 and in the

intervention group was 12, 13, 2 and 3. There was no significant difference between both groups regarding the performed measures after visiting the center ($p > 0.05$) (Table 4).

Table 3
Health Belief Model Scores in control and intervention groups before and after intervention

Variables		Control N (%)		Intervention N (%)		P value
		Before	After	Before	After	
Perceived sensitivity	Good*	5(14.3)	9(25.7)	9(25.7)	25(71.4)	0/3 ¹
	Moderate**	27(77.1)	25(71.4)	24(68.6)	10(28.6)	0/001²
	Bad***	3(8.6)	1(2.9)	2(5.7)	0	
	Total	35(100)	35(100)	35(100)	35(100)	
	Mean ± SD	17.37 ± 4.5	22.11 ± 4.35	18.69 ± 6.3	23.66 ± 4.3	
	P (Paired T)	0/003		< 0/001		
Perceived intensity	Good*	9(25.7)	6(17.2)	10(28.6)	18(51.4)	0/2 ¹
	Moderate**	25(71.4)	27(77.1)	23(65.7)	17(48.6)	0/001²
	Bad***	1(2.9)	2(5.7)	2(5.7)	0	
	Total	35(100)	35(100)	35(100)	35(100)	
	Mean ± SD	20.11 ± 4.3	18.03 ± 4.5	18.69 ± 5.8	21.9 ± 5.2	
	P (Paired T)	0/08		< 0/001		
Perceived benefits	Good*	6(17.2)	8(22.8)	9(25.7)	15(42.9)	0/4 ¹
	Moderate**	25(71.4)	24(68.6)	24(68.6)	20(57.1)	0/04²
	Bad***	4(11.4)	3(8.6)	2(5.7)	0	
	Total	35(100)	35(100)	35(100)	35(100)	
	Mean ± SD	16.94 ± 5.6	18.94 ± 5.2	18 ± 6.3	21.6 ± 5.5	
	P (Paired T)	0/07		< 0/001		
Perceived barriers	Good*	4(11.4)	6(17.1)	5(14.3)	19(54.3)	0/16 ¹
	Moderate**	30(85.7)	28(80)	30(85.7)	16(45.7)	0/001²
	Bad***	1(2.9)	1(2.9)	0	0	

Total	35(100)	35(100)	35(100)	35(100)
Mean ± SD	17.63 ± 4.7	18.26 ± 4.7	18.86 ± 2.1	22.11 ± 4.3
P (Paired T)	< 0/06		< 0/001	

Table 4
Performance scores after intervention in control and intervention groups

Variables		Control N (%)	Intervention N (%)	P value
Laboratory Tests	recommended, I did not do	9 (52.9)	13(43.3)	0.52
	recommended that I did	8 (47.1)	17 (66.7)	
	Total	17 (100)	30 (100)	
Vaccination	Did not recommended	8 (47.1)	8 (26.6)	0.22
	recommended, I did not do	8 (47.1)	14 (46.8)	
	recommended that I did	1 (5.8)	8 (26.6)	
	Total	17 (100)	30 (100)	
Medication	Prescribed, I did not Used	7 (41.2)	9 (30)	
	Prescribed, I did Used	10 (58.8)	21(70)	
	Total	17 (100)	30 (100)	
Re-Visit	Did not recommended	3 (17.6)	8 (26.6)	
	recommended, I did not do	9 (52.9)	12 (40)	
	recommended that I did	5 (29.5)	10 (33.4)	
	Total	17 (100)	30 (100)	

Section/Topic	Item No	Checklist item	Reported on page No
Title and abstract			
	1a	Identification as a randomised trial in the title	P1-L2
	1b	Structured summary of trial design, methods, results, and conclusions (for specific guidance see CONSORT for abstracts)	P2

CONSORT 2010 checklist of information to include when reporting a randomised trial*

Variables		Control N (%)	Intervention N (%)	P value
Introduction				
Background and objectives	2a	Scientific background and explanation of rationale	P3-5	
	2b	Specific objectives or hypotheses	P5, L 105–107	
Methods				
Trial design	3a	Description of trial design (such as parallel, factorial) including allocation ratio	P5, L 109	
	3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	NA	
Participants	4a	Eligibility criteria for participants	P5, L117-126	
	4b	Settings and locations where the data were collected	P5, L110-112	
Interventions	5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	P7-8, L 153–188	
Outcomes	6a	Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed	P6-7, L136-152	
	6b	Any changes to trial outcomes after the trial commenced, with reasons	NA	
Sample size	7a	How sample size was determined	P6, L127-129	
	7b	When applicable, explanation of any interim analyses and stopping guidelines	NA	
Randomisation:				
Sequence generation	8a	Method used to generate the random allocation sequence	P6, L133-135	
	8b	Type of randomisation; details of any restriction (such as blocking and block size)	P6, L133-135	

CONSORT 2010 checklist of information to include when reporting a randomised trial*

Variables		Control N (%)	Intervention N (%)	P value
Allocation concealment mechanism	9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	P6, L133-135	
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	P6, L133-135	
Blinding	11a	If done, who was blinded after assignment to interventions (for example, participants, care providers, those assessing outcomes) and how	P6, L133-135	
	11b	If relevant, description of the similarity of interventions	NA	
Statistical methods	12a	Statistical methods used to compare groups for primary and secondary outcomes	P9, L190-193	
	12b	Methods for additional analyses, such as subgroup analyses and adjusted analyses	NA	
Results				
Participant flow (a diagram is strongly recommended)	13a	For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analysed for the primary outcome	P9, L195-196	
	13b	For each group, losses and exclusions after randomisation, together with reasons	Diagram	
Recruitment	14a	Dates defining the periods of recruitment and follow-up	P9-L196	
	14b	Why the trial ended or was stopped	NA	
Baseline data	15	A table showing baseline demographic and clinical characteristics for each group	P9, L197-212, Table 1, 2	
Numbers analysed	16	For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups	Diagram	

CONSORT 2010 checklist of information to include when reporting a randomised trial*

Variables		Control N (%)	Intervention N (%)	P value
Outcomes and estimation	17a	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)	P10,L213-224	
	17b	For binary outcomes, presentation of both absolute and relative effect sizes is recommended	All Tables	
Ancillary analyses	18	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory	NA	
Harms	19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)	NA	
Discussion				
Limitations	20	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses	P13,L306-313	
Generalisability	21	Generalisability (external validity, applicability) of the trial findings	P10,L227-235	
Interpretation	22	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	P10-13	
Other information				
Registration	23	Registration number and name of trial registry	P5,L112-114	
Protocol	24	Where the full trial protocol can be accessed, if available	P5,L112-114	
Funding	25	Sources of funding and other support (such as supply of drugs), role of funders	P5,L112-114	

*We strongly recommend reading this statement in conjunction with the CONSORT 2010 Explanation and Elaboration for important clarifications on all the items. If relevant, we also recommend reading CONSORT extensions for cluster randomised trials, non-inferiority and equivalence trials, non-pharmacological treatments, herbal interventions, and pragmatic trials. Additional extensions are forthcoming: for those and for up to date references relevant to this checklist, see www.consort-statement.org.

CONSORT 2010 checklist of information to include when reporting a randomised trial*

Discussion

The present study has evaluated the effect of education based on Health Belief Model on preventing sexually transmitted diseases in female victims of sexual assault who referred to the forensics office of Babol in two groups of control and intervention. Both groups were homogeneous regarding demographic and assault characteristics. Since demographic characteristics are some of the effective factors on the components of Health Belief Model including the rate of understanding the potential of infecting with sexually transmitted diseases, its caused intensity, and perceived benefits of and barriers to preventing diseases, that would eventually affect the individual's performance (28), by homogenizing these variables, their confounding effect was mostly eliminated in this study.

In the beginning of the study, both groups were homogeneous regarding their score of perceived sensitivity, intensity, benefits and barriers. After the intervention, the scores of all domains were significantly increased in the intervention group comparing to before the intervention. Also comparing the score between the intervention and the control groups after the intervention showed that the scores were significantly higher in the intervention group. Another significant result of the present study was that after education based on Health Belief Model, the performance of female victims of sexual assault in the intervention group in referring to the centers that provided care for the sexual assault victims was significantly better than the control group. These results were also observed in the studies of Pirzadeh et al (2011) (19), Mirmohammad Ali et al (2005) (29), Jao et al (2014) (24) and Karimi et al (2009) (30) that performed education based on Health Belief Model for preventing sexually transmitted disease in different groups.

According to the results of the present study, although the score of perceived sensitivity was significantly increased in the control group after the intervention, the scores of other domains showed no significant difference. The researcher believes that this significant increase in the score of perceived sensitivity before and after the intervention was caused by confounding factors that were not a part of the researcher's intervention. Gaining information from the social media, friends and acquaintances could be one of the confounding factors. The questionnaire itself could be a confounding factor in the study because it could be a stimulus for learning its content (31). It seems that, in the present study, the participants' fear of sexually transmitted diseases after completing the questionnaire, has caused them to be more willing to gain information about this subject than before. Considering the comparison of the other score of the control group, although the score of perceived sensitivity was increased after the intervention in the control group, their beliefs in the benefits of medical interventions and seeking it were not changed.

Individuals with low understanding of their potential to catch sexually transmitted diseases would more possibly perform inappropriate and risky sexual behaviors (32, 33). In the contrary, the more sensitive and susceptible an individual finds themselves to a disease, they would perform preventive measure more probably (33). Therefore, the first step is to create the sensitivity in the sexual assault victims that they might be infected with sexually transmitted diseases. On the other hand, the long-term complications of sexually transmitted diseases such as pelvic inflammatory diseases, infertility and cervix cancer could look so small and unlikely to the youth. Therefore, the emphasis should be on the asymptomatic nature

of these disease and the serious risk of their complications including pelvic inflammatory diseases, ectopic pregnancy and infertility (34). This way, by expressing serious negative complications and stating them, perceived intensity should be presented to the clients. In the following, to facilitate the use of the structure of perceived intensity or benefits, health educators should determine the exact behaviors that should be performed and highlight the benefits and benefits that would be achieved from that exact behavior. In general, individuals with positive beliefs about the sensitivity and intensity of a disease, would not perform the recommended behaviors unless they would understand that performing that behavior would potentially decrease the risk or threat (18, 28). In the present study also, after expressing the advantage of performing preventing measures to sexually transmitted diseases against the existing barriers, and following them up and making phone calls to them and making the decision by the participants of the intervention group, this change was observed, in comparison to the control group. So, the efficacy and value of the recommended behaviors for preventing sexually transmitted infections could be explained for the female victims of sexual assault and they could be encouraged to perform health behaviors. Through education using Health Belief Model, it would be possible to reach a better understanding of the barriers to perform preventive behaviors and then make efforts to eliminate these barriers so that the path would be paved for performing health behaviors. Conducted studies have shown that perceived barriers is the most important part of the Health Belief Model for performing the recommended behaviors (25). On the other hands, to help decreasing the perceived barriers, question and answer method could be used; meaning that, the individuals would be asked about their opinion of the existing barriers to performing the recommended behaviors. Or a list of the barriers to taking action would be given to them and a solution for eliminating each of them would be provided (29).

The main aim of the present study was that sexual assault victims would refer to the centers that provide care services after sexual assault. According to the results, more than four-fifth of the participants in the intervention group visited these centers for receiving services and this number was significantly higher than the same number in the control group. In other studies, the rate of seeking help was reported as 60% in America (35), 20% in France (36), 58.6% in Congo (37), and 21% in South Carolina (38). Lack of a significant difference between both groups in the performed measures after visiting the centers in the present study might be due to the fact that, although half an hour of education in the forensics office could be effective on the victim's referral to the centers for receiving preventive cares, the services that they would receive depends on the providers of the health services at the determined centers.

Strengths And Limitations Of The Study

The strength of the present study was that it was the first study that was conducted in the field of educational interventions for sexual assault victims in Iran. Results of the present study could lead to provision of health services with higher quality to sexual assault victims and employment of the graduates of the new major of forensics midwifery in the forensics offices.

As a limitation, since the sexual assault victim does not have an appropriate psychological condition at the time of referring to the forensics office, it might be possible that their answers to the self-report

questionnaire would be biased. The researcher was present with each participant at the time of completing the questionnaire and answered all of their questions to minimize the effect of this limitation. It must be noted that all of the sexual assault cases have been reported by the victims themselves and the participants had claimed the incidence of sexual assault; and the researcher is not aware of the accuracy of their claim. However, the participants of the present study were considered as complainants of sexual assault.

Conclusions

Health education based on the Health Belief Model has a positive and significant effect on perceived sensitivity, perceived intensity, perceived benefits, perceived barriers and performance of women who had complaints of sexual assault in preventing sexually transmitted diseases. In fact, educational intervention by increasing the perceived sensitivity and intensity in the individuals and improving the condition of perceived benefits and barriers, has led to improved performance of the participants of the intervention group in preventing sexually transmitted diseases.

Abbreviations

HBM

Based on the Health Belief Model STD; Sexually Transmitted

Declarations

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Authors' contributions

ZK, AM, KA and MM were contributed to the conception of this study. AM collected the data. KA and MM was responsible for data analyzing and interpretation. AM and KA was responsible to writing and finalizing the manuscript in English. All authors agree with the content of the manuscript. The author(s) read and approved the final manuscript.

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Availability of data and materials

Data of this study will be available upon the request from the corresponding author.

Ethics approval and consent to participate

The protocol of this study was approved by the Ethics Committee of Tehran University of Medical Sciences (Ref No: 92/d/829/130). This study was registered in the Iranian Registry for Clinical Trials (Ref No: IRCT 2014101413542N3). All participants provided written informed consent before the data collection.

Consent for publication

N/A

Competing interests

The authors declare that they have no competing interests.

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Figures

CONSORT 2010 Flow Diagram

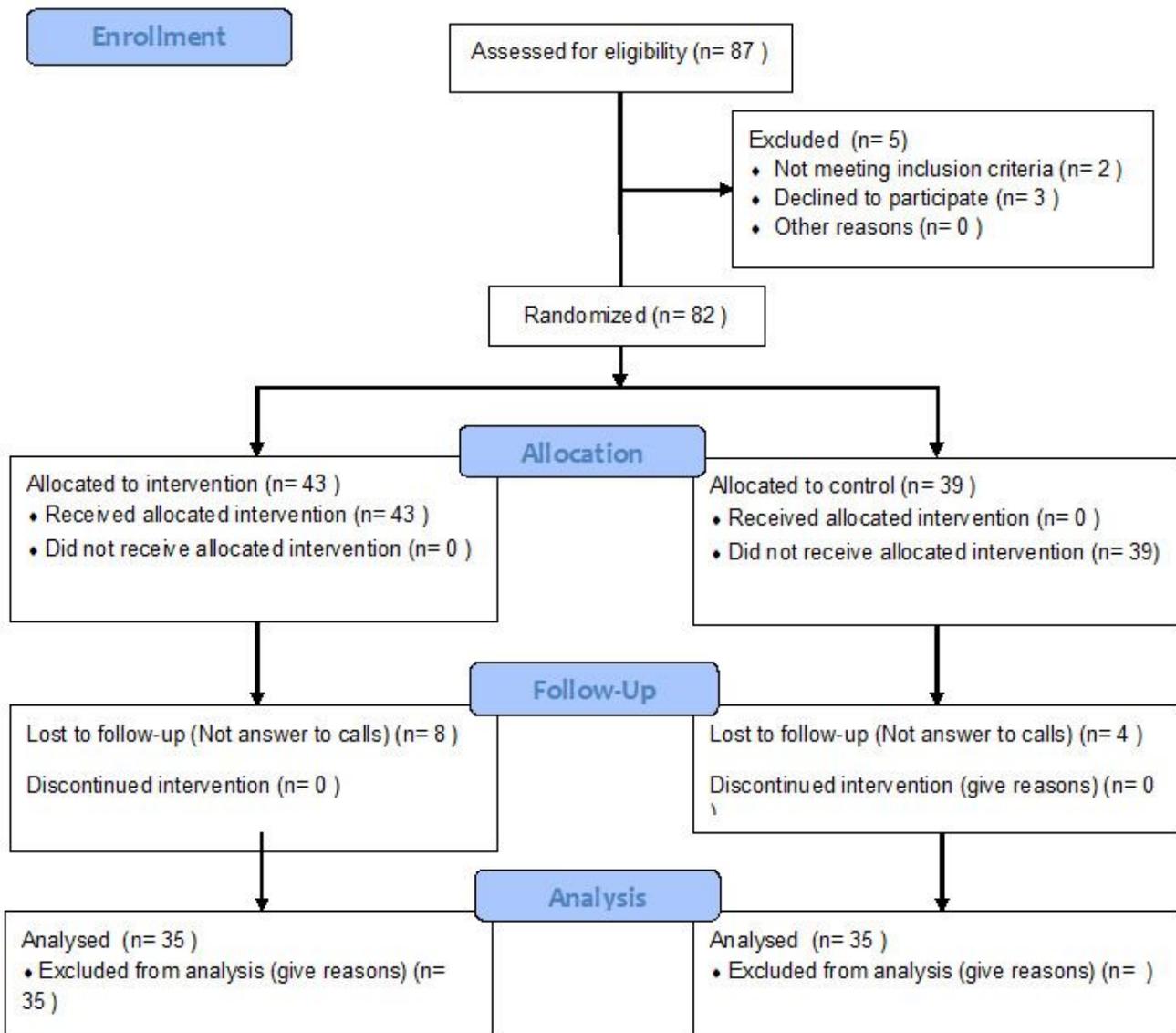


Figure 1

Flow diagram of recruitment and retention of participants in the study

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