RESEARCH ARTICLE

Effect of an Educational Intervention Based on Protection Motivation Theory on Preventing Cervical Cancer among Marginalized Women in West Iran

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Abstract

Objective: This study aimed to determine the effectiveness of an educational intervention to prevent cervical cancer among marginalized Iranianwomen based on the Protection Motivation Theory (PMT) as a theoretical framework. **Methods:** This quasi-experimental study was carried out on 143 women of Kermanshah City in western Iran during 2017. Participants were recruited through cluster and simple random sampling and randomly divided into experimental (n=72) and control groups (n=71). All completed a self-administered questionnaire including PMT constructs and demographic variables. An intervention over six sessions was then applied to the experimental group. Reassessment was conducted three months after the intervention, with data was analyzed with SPSS-16 using chi-square, McNemar, paired T- and independent T-tests. **Results:** The mean scores for the constructs of PMT, and cervical cancer screening behavior showed no significant differences between the two groups before the intervention (P>0.05). The educational manipulation had significant effects on the experimental groups' average response for perceived vulnerability, perceived severity, perceived reward, self-efficacy, response efficacy, response cost and protection motivation (all p < 0.001). Also, the prevalence of regular Pap smear testing and referral to health centers were significantly increased after 3 months in the experimental (P=0.048), but notthe control group (P>0.05). **Conclusions:** The results show that applying an educational intervention based on PMT might help prevent cervical cancer and improve regular Pap smear testing.

Keywords: Papanicolaou test- protection motivation theory- uterine cervical neoplasms- women

Introduction

Cervical cancer is the second common cancer and the most prominent cause of mortality among the women in the developing countries (Asonganyi et al., 2013). According to the World Health Organization, malignant tumors account for 25% of female mortality, 18% of which is due to cervical cancer (Jowzi et al., 2013). Almost 10% of aggressive cancers in women occur in the uterus, and about 30% of them arise from the cervix (Tabeshian and Firozeh, 2009). Approximately one million women are annually affected by advanced cervical cancer throughout the world, and 50% of the cases lead to death. In 2009, the National Program of Cancer Registry in Iran Ministry of Health and Medical Education reported a prevalence of 2.17 cases per 100,000 people for cervical cancer. This rate is indicative of the increasing prevalence of this disease, compared to the previous years (World Health Organization, 2012). Although cervical cancer may occur in all age groups, the majority of the cases diagnosed with

the aggressive tumors are within the age range of 35-65 years, and the non-aggressive types are mostly observed in ages of 10-15 years younger (Tabeshian and Firozeh, 2009).

The most important risk factors for cervical cancer include early age at first sexual intercourse, multiple sex partners, high birth rate, and low socioeconomic status (Tabeshian and Firozeh, 2009). Unofficial and marginal settlement is one of the main problems in big cities, which may negatively affect people's health through generating an unsuitable environment. The inhabitants of these quarters confront two problems of poverty and improper environment, which are considered as destructive factors for quality of life (Rajabi-Gilan et al., 2015). Moreover, according to the literature, the women living in these areas are more prone to social problems, such as poverty, deprivation from social facilities, and unsuitable living environment. Therefore, these individuals can be classified as vulnerable group of the society with poor QoL (Izutsu et al., 2006; Heidarnia et al., 2013). Accordingly,

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the health-related QoL has been reported to be at an unfavorable level among the women living in the marginal areas of Kermanshah, Iran (Rajabi-Gilan et al., 2015).

It is estimated that more than one third of the cancers are preventable and could be well treated in case of early diagnosis (Tabeshian and Firozeh, 2009). In addition, cervical cancer has a long incubation period and is among the preventable cancers due to its curable initial symptoms and availability of effective screening methods (Logan and Mcilfatick, 2011). Screening programs can highly improve the chance of treatment success for the cancer, resulting in reduced mortality rate. The present evidence indicates that the administration of the screening tests can decrease the prevalence and mortality of cervical carcinoma up to 90% (Jowzi et al., 2013). The Pap smear test is an easy and cost-efficient diagnostic tool with high sensitivity for cervical cancer. This test is recommended to be annually repeated for the women who are sexually active (Ozdemir and Bilgili, 2010). The evidence has shown that women who have experienced the Pap smear test are highly probable to repeat it in future (Gu et al., 2013). According to the reports conducted in Iran, only 27.1% of the women aged 18 years and older have undergone the Pap smear test in their lives (Rezaie Chamani et al., 2012). This rate is lower than the values reported in other Asian countries, such as Pilippines, China, Japan, Vietnam, India, and Korea (Ozdemir and Bilgili, 2010).

This low rate is due to limited screening programs and lack of sufficient information about these programs resulting in lots of cervical cancer cases diagnosed in the last stages (Rouhollahi et al., 2014). Additionally, the relationship between the socioeconomic situation and cervical cancer incidence has been emphasized (Berek, 2004; Najafi et al., 2016). For instance, in the USA, the immigrant Latina women were reported to perform Pap smear less frequently and have higher mortality rate due to cervical cancer, compared to the women born in this country. These people have to deal with more obstacles for screenings, including lack of treatment insurance, English fluency, access to suitable and free health care, and knowledge about screening programs (White et al., 2012).

According to various studies, awareness of the warning signs of cancer, knowledge about the rapid diagnostic interventions, and early treatments are among the factors encouraging females to undergo Pap smear test (Rahaei et al., 2015; Karami-Matin et al., 2016). It is noteworthy that all this information is accessible through education and trainings (Rahaei et al., 2015). Moreover, the evidence suggests that free screening services cannot alone prevent the aggressive lesions of cervix, and that sufficient trainings for these methods are crucial (Ghahramaninasab et al., 2014). The first step in designing an efficient educational program is the selection of a suitable and influential theory or model for behavioral change (Glanz et al., 2008). In this regard, the Protection Motivation Theory (PMT) proposed by Rogers (1975) is a widely accepted approach, which is applied as a general framework for the prediction of the health behaviors and the health-associated interventions. The PMT is one of the social cognitive theories used for the evaluation of the protective behavior and factors affecting motives.

Rogers believes that fear has the capacity to enhance positive protective motivations through six elements, namely self-efficacy, response efficacy, response costs, perceived vulnerability, perceived severity, and perceived reward (Rogers, 1975). The studies on this field have also demonstrated that the elements of this theory are of high importance in the prediction of the preventive behaviors for cancer (Babazadeh et al., 2017; Bai et al., 2017; Ghahremani et al., 2016; Hassani et al., 2014). In a meta-analysis conducted on 65 PMT-based studies for 20 health behaviors, it was suggested that the PMT elements have substantial impact on behavior prediction (Miler et al., 2000).

Health education is the main base for all preventive interventions concerning cancer among women. Accordingly, the previous studies have highlighted the role of health education in the improvement of the screening behaviors. With this background in mind, the present study aimed to determine the effect of a PMT-based educational intervention on the adoption of screening behaviors and preventing cervical cancer among the women living in the marginal areas of Kermanshah, Iran.

Materials and Methods

Participants

This quasi-experimental study was conducted among marginalized women in Kermanshah during 2017 that were selected through cluster and simple random sampling. Among the 8 health centers of the margin of city, 4 health centers with the lowest rate of Pap smear in the recent years were selected from which, 2 center were randomly selected as the control and 2 as the experimental group. Finally, 38 women were selected through simple sampling method from each center. This included a total sample of 152 of which 72 participants as experimental and 71 as control groups were enrolled voluntarily at the baseline survey. The inclusion criteria of the study were being above 20 years old and living in margin of Kermanshah, no diagnosis of cervical cancer, and being married or sexually active. On the other hand, the exclusion criteria of the study were not continuously present at the training sessions and not available when completing the post-test questionnaire. This study was conducted with approval from Hamadan University of Medical Sciences' institutional review board and ethical committee (No. IR.UMSHA.REC.1395.395). Pretest data were collected 1 week prior to the intervention, posttest measures were collected 3 months after the end of the intervention.

Intervention program

The educational intervention was developed and implemented based on the two groups' pre-tests findings during the five sessions within 4 weeks (Table 1). Participants in the experimental group received the cervical cancer educational program. Each session lasting 45 min which was organized for small groups of 10 to 15 women. During the sessions, the participants educated based on active learning methods which included lectures, group discussions, and questions–answers and

pamphlets and a booklet were given to the women after each educational session. The content of sessions included basic information regarding cervical cancer facts (e.g., epidemiology, signs and symptoms, and risk factors of cervical cancer development), important early detection, recommended screening methods, guidelines for Pap smear screening, and role of Pap smear in early diagnosis cervical cancer. Furthermore, prior to intervention 7 participants who were commitment to mediate cervical cancer prevention program's message to women in the experimental group, were selected as the mediator. Consequently, 7 subgroups were formed as experimental group that were coordinated by one responsible mediator.

Measures

The self-administered questionnaire comprised two sections: (a) demographic and background factors: including age, marital status; education; husband's education; job status; family income; number of children and having cancer in family members; (b) PMT theoretical constructs: PMT scales were measured in relation to cervical cancer prevention that were modified from scales of Jowzi et al., (2013) and 35 items were composed under 8 major constructs: a) perceived vulnerability; b) perceived severity; c) perceived reward; d) self-efficacy; e) response efficacy; f) response cost; g) fear of cancer; and h) protection motivation. Perceived vulnerability and perceived severity were measured with 3 and 7 items (A sample item is "*If I get cervical cancer, I cannot take care of my children.*"), respectively. The items were rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Moreover, the perceived rewards with 5 items (A sample item is "*With no Pap smear test, I have more comfort.*"), perceived self-efficacy with 4 items (A sample item is "*I can perform a Pap smear test, even if it is painful.*"), response efficacy with 3 items (A sample item is "*With performing a Pap smear test, I will be aware of my genital infections.*"), response costs with 6 items (A sample item is "*Due to the time consuming, I do not perform a Pap smear test.*"), fear of cancer with 3 items (A sample item is "*When I think to cervical cancer, I become anxious.*") and protection motivation with 1 item

were measured. The items were rated on a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Cervical cancer screening behaviors were measured using three items. For example, it was asked "*Have you done the Pap smear test regularly?*". This items included 2 options, "*No*" and "*Yes*". Score of 1 was given to option "*Yes*" and score of zero was given to option "*No*".

Data analysis

Data were analyzed by Chi-square, Independent t-test, Paired t-test and McNemar tests in SPSS-16. The level of significance was set at P<0.05.

Results

The participants' ages ranged from 20 to 50 years, with the mean (SD) age of participants being 33.31 (±SD: 8.01) yr in experimental group and 32.15 (±SD: 9.87) yr in control group. Table 2 is a comparison of demographic characteristics in experimental and control groups. Cross tabulation analysis revealed that there were not significant differences regarding demographic characteristics between two experimental and control groups before implementation of educational program (P>0.05). These results showed that homogeneity of participants.

Table 3 presents the comparison of PMT constructs regarding cervical cancer screening behaviors before and after educational program in experimental and control groups. According to the result, no statistically significant differences were found in the mean scores of PMT constructs between experimental and control groups before the intervention (P>0.05). As it shown in the table perceived vulnerability, perceived severity, self-efficacy, response efficacy and protection motivation values significantly increased and response cost and perceived reward decreased in the experimental group (P<0.05), while most constructs worsened in the control group. No significant changes were reported in the control group except response cost and perceived reward values. The between-group differences proved significant for all constructs apart from fear values.

To assess efficiency of educational program in

Table 1. Organization of Educational Sessions in the Experimental Group

Sessions	Objectives	A summary of topics and activities
First	To increase the perceived threat about cervical cancer	- Women's maladaptive beliefs regarding lack of vulnerability to cervical cancer were discussed - Group discussion regarding various effects of cervical cancer on the life of the women
Second	To increase awareness of the benefits of early detection and timely treatment of cervical cancer	- Instructional booklet was given to the women - Broadcast an educational film on the effectiveness of Pap smear test in preventing cervical cancer
Third	To reduce the cost of the Pap test	- Group discussion on the obstacles to performing the Pap smear test - It was emphasized to women that the prevention of death and the costly cost of the disease could be prevented and tested at the right time.
Fourth	To increase the efficiency of the Pap test	- The participants were instructed on ways of overcoming barriers of getting the Pap test - Problem-solving approach was educated in this session.
Fifth	To induce fear of cervical cancer	- the women were asked to reflect their experiences and positive or negative feelings toward cervical cancer

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Table 2. Comparison of Background Variables in Experimental and Control Groups

Variables	Experimental group n (%)	Control group n (%)	P value*
Age (yr)			0.066
20-30	25 (34.7)	36 (50.7)	
31-40	37 (51.4)	23 (32.4)	
41-50	10 (19.9)	12 (16.9)	
Marital Status			0.712
Single	4 (5.6)	3 (4.2)	
Married	68 (94.4)	68 (95.8)	
Education			0.901
Illiterate	9 (12.5)	6 (8.5)	
Primary School	11 (15.3)	10 (14.1)	
Middle School	29 (40.3)	29 (40.8)	
High School	19 (26.4)	20 (28.2)	
Academic	4 (5.6)	6 (8.5)	
Husband's education			0.179
Illiterate	1 (1.4)	5 (7)	
Primary	20 (27.8)	11 (15.5)	
Secondary	22 (30.6)	28 (39.4)	
Diploma	24 (33.3)	21 (29.6)	
Academic	5 (6.9)	6 (8.5)	
Job Status			0.218
Housewife	68 (94.4)	63 (88.7)	
Employed	4 (5.6)	8 (11.3)	
Family Income (per month)			0.653
<$200	26 (36.1)	22 (31)	
$200 - $600	18 (25)	16 (22.5)	
≥$600	28 (38.9)	33 (46.5)	
Number of Children			0.496
No child	4 (5.6)	6 (8.5)	
1	18 (25)	24 (33.8)	
2	32 (44.4)	29 (40.8)	
3	9 (12.5)	4 (5.6)	
≥ 4	9 (12.5)	8 (11.3)	
Having Cancer in Family Members	16 (22.2)	13 (18.3)	0.561
Age (yr)	33.31 (±8.01)	32.15 (±9.87)	0.445**
Age at marriage (yr)	20.14 (±4.93)	20.46 (±4.31)	0.674**

Note. Experimental group, (n=72); Control group, (n=71); *Chi-square; **Independent sample t-test

preventing cervical cancer, cross-tabulation analysis was performed (Table 4). The results showed no significant difference regarding cervical cancer screening behaviors between two groups before intervention (P>0.05). According to the results, the prevalence of regular Pap smear and referring to health centers for awareness of time of Pap smear in experimental groups were significantly increased after 3 months (P<0.05), but, no significant changes were reported in the control group. In terms of important findings, the percent of regular Pap smear in the experimental group was 26.4% that it was increased to 48.6% after intervention. However, the percent of regular Pap smear was increased from 31% to 32.4% in

Table 3. PMT Constructs About Cervical Cancer Screening Behaviors Before and After Educational Program

Variables*	Experimental Group (n=72)				Control Group (n=71)				Pvalue***
	Before	After	Difference	Pvalue**	Before	After	Difference	Pvalue**	
Perceived Vulnerability	12.1 (±1.1)	13.6(±1.7)	1.58(±1.9)	<0.001	12.3 (±2.3)	12.4(±1.8)	0.12(±1.4)	0.471	<0.001
Perceived Severity	20.1 (±2.1)	25.2(±4.2)	5.11(±4.9)	<0.001	20.6 (±3.4)	21.3(±5.2)	0.67(±5.9)	0.338	<0.001
Perceived Reward	11.2 (±2.1)	8.2(±3.1)	-3.04(±3.6)	<0.001	10.5 (±3.3)	11.2(±3.1)	0.67(±2.2)	0.015	<0.001
Self-Efficacy	11.3 (±1.6)	13.6(±2.7)	2.31(±3.2)	<0.001	9.9 (±3.8)	9.6(±3.6)	-0.23(±2.1)	0.339	<0.001
Response Efficacy	9.1 (±1.2)	10.8(±1.4)	1.72(±1.9)	<0.001	10.2 (±1.9)	9.6(±1.8)	-0.64(±1.5)	<0.001	<0.001
Response Cost	12.0 (±1.9)	8.4(±2.9)	-3.56(±3.2)	<0.001	11.0 (±3.7)	11.5(±4.1)	0.53(±3.3)	0.178	<0.001
Fear	9.1 (±1.2)	9.8(±2.3)	0.79(±2.5)	0.01	8.4 (±1.9)	8.5(±1.8)	0.07(±1.7)	0.773	0.05
Protection Motivation	3.1 (±1.1)	3.7(±0.5)	0.61(±0.8)	<0.001	2.7 (±0.9)	2.8(±0.9)	0.01(±0.5)	0.843	<0.001

* Descriptive data, before and after intervention, are expressed as Means ± SD; absolute difference (end-of-study minus baseline values); ** p values obtained by comparing means in the variable values within each group, using t test for paired data; *** p values obtained by comparing differences in the variable values between the two groups, using Student t test

Table 4. Cervical Cancer Screening Behaviors before and after Educational Program in Two Groups

Variables*	Experimental Group (n=72)			Control Group (n=71)			P_{value}***
	Before	After	P_{value}**	Before	After	P_{value}**	
Perform a regular Pap smear	19 (26.4)	35 (48.6)	0.002	22 (31)	23 (32.4)	0.999	0.048
Refer to Health Centers for awareness of time of Pap smear	34 (47.2)	48 (66.7)	0.003	52 (73.2)	43 (60.6)	0.093	0.448
Following the result of Pap smear test	6 (8.3)	9 (12.5)	0.508	9 (12.7)	7 (9.9)	0.5	0.616

* Descriptive data, before and after intervention, are expressed as N (%); ** p values obtained by comparing percent in the variable values within each group, using McNemar test; *** p values obtained by comparing differences in the variable values between the two groups after intervention, using Chi-square.

the control group.

Discussion

The current study was performed to evaluate the effectiveness of educational intervention to preventing cervical cancer among marginalized women based on the PMT as a theoretical framework. The results showed that significant changes in perceived vulnerability, perceived severity, perceived reward, self-efficacy, response efficacy, response costs and behavioral intention in experimental group compare to the control group after intervention.

As the findings of the present study indicated, the mean perceived vulnerability and severity scores of the experimental group showed a significant increase after the educational intervention, compared to that of the control group. This elevation revealed the effectiveness of the executed educational program. This result is in line with those reported by Khiali et al., (2017), Pirzadeh and Mazaheri (2012), Shobeiri et al., (2016), Ghahremani et al., (2014), Rakhshani et al., (2013), Bebis et al., (2012), and Wichachai et al., (2016). Nevertheless, this finding is inconsistent with the results obtained by Dehdari et al., (2014), Demirtas and Acikgoz (2013), and Park et al., (2005). This contradiction can be due to the women's limited knowledge of cervical cancer complications and the insufficiency of intervention period for changing their attitudes in this regard. In addition, the findings of the current study revealed that the mean score of perceived reward about not performing the screening tests was significantly lower in the experimental group, compared to that in the control group. This result is in agreement with the findings of Tesval et al., (2013), Babazadeh et al., (2016), and Baghianimoghaddam et al., (2010). Based on the assumptions of PMT, people first evaluate the risk seriousness and susceptibility, and then assess the efficiency of the recommended responses in case the perceived threat is high. In this theory, threat-appraisal process is a combination of perceived severity and vulnerability minus the perceived reward (Rogers, 1975). It seems that the reason for augmented perceived threat in this study was the emphasis of the educational intervention on the consequences of cervical cancer and screening behavior benefits among the participants of the experimental group. These results suggest that women are more probable to perform the screenings if they logically address the benefits and understand the severity and harms of the disease as well as the associated consequences.

In line with the results of other similar studies, the mean scores of self-efficacy and response efficacy increased in the experimental group after the intervention in comparison with those in the control group. For instance, Babazadeh et al., (2016), Baghianimoghaddam et al., (2010), and Sangchan et al., (2008) reported the effectiveness of educational intervention on the enhancement of self-efficacy and response efficacy of screening behaviors for skin and breast cancers. Furthermore, the present study demonstrated that the mean score of response costs significantly diminished in the experimental group after the educational intervention, compared to that in the control group. These findings are in congruence with the findings of similar studies (Dehdari et al., 2014; Babazadeh et al., 2016; Baghianimoghaddam et al., 2010; Milne et al., 2002). According to the PMT assumptions, coping-appraisal process is the second assessment considered by people when encountering high-risk situations. In such conditions, people evaluate their own efficacy level besides the efficacy of the recommended responses. In the mentioned theory, coping-appraisal process is a combination of the response efficacy and perceived self-efficacy minus the response costs. However, the presence of obstacles to screening behaviors leads to diminished efficacy evaluation (Barati et al., 2016). The identification and discussion of the screening obstacles for cervical cancer by the women of the experimental group was one of the major objectives of the present study. Additionally, the enhancement of the females' self-efficacy through the presentation of successful examples and the encouragement of those having regular screening behaviors were among the other aims of the current study, which led to the improvement of efficacy in the experimental group. Regarding this, the health field personnel are recommended to consider these points in the execution of the educational interventions.

In the present study, there was no significant difference between experimental and control groups regarding the mean score of fear after the intervention, which is inconsistent with the results of studies by Khiali et al., (2017), Ghahremani et al., (2014), and Baghianimoghaddam et al., (2010). This discrepancy is probably due to the differences in the number of sessions and educational methods. However, similar results were obtained in a study conducted by Dehdari et al., (2014). In the present study, the experimental group was more determined to perform the screenings for cervical cancer after the educational intervention in comparison to the control group.

Other finding of the present study showed that the success educational intervention to increase the protection motivation (intention) of participants of the experimental group in comparison to the control group. This result is in agreement with those reported by Khiali et al., (2017), Babazadeh et al., (2016), and Dehdari et al., (2014). As observed in the present study, it seems that individuals get more motivated to control the danger and accept the recommended responses when the perceived threat and efficacy are at a high level. In other words, people confront danger with more prudent and knowledge in case they believe that the harms are serious and that they can effectively hinder the threat.

Other findings of this study were demonstrative of augmentation in Pap smear test performance in the women of the experimental group after the educational intervention, compared to that in the control group. In the present study, the rate of Pap smear test application and referral to health centers in order to enquire about the times of test raised by 22.2% and 19.5%, respectively. This was indicative of the positive impact of educational intervention in this regard. Likewise, Khiali et al., (2017), Shobeiri et al., (2016), Pirzadeh and Mazaheri (2012), Karimi et al., (2012), and Abedian and Dormohamadi (2013) reported an increase in Pap smear test implementation among the women of the experimental group after the administration of the educational interventions.

The limitations of the present study included the use of self-report method for data collection and statistical population that limit the generalizability of the results. Therefore, further similar studies are recommended to be conducted on other groups, such as rural and urban women. Regardless of these limitations, this study has some advantages. This study was conducted among marginalized women with the lowest rate of Pap smear which were more eligible for receiving intervention. Another advantage of this study was the peer education approach in educational strategy used as a mediator. Advantages of using this strategy include acceptability, ability to transfer information, access to out-of-the-way people and hidden population, modeling and continuous contact.

The results show that applying educational intervention based on the PMT would be an efficient strategy for preventing cervical cancer among females living in the marginal areas. Consequently, the application of this theory in the educational programs of the health centers might lead to some alterations regarding cervical cancer prevention and Pap smear test administration, all of which are promising of beneficial impacts in future.

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