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Skin cancer preventive behaviors among rural farmers: An intervention based on protection motivation theory

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Abstract

Background: Skin cancer is a serious public health problem in the world. Its prevalence in many countries has been increased in recent years. This study aimed to assess the effects of a theory-based educational intervention to promote skin cancer preventive behaviors (SCPBs) among rural farmers in Chalderan County, Iran.

Methods: This was a quasi-randomized controlled field trial study conducted on 238 rural farmers. The data were collected by a questionnaire containing the constructs of the Protection Motivation Theory (PMT) as well as the items of SCPBs. The differences between the groups before and 3 months after the intervention were determined by independent t-test, paired t-test, and chi-square applying SPSS software.

Results: Before the intervention, no significant difference was found in the scores of the PMT constructs between the two groups ($p>0.05$). However, significant differences were found between the scores of all the variables, as well as SCPBs, in the two groups after the intervention ($p<0.05$).

Conclusion: The PMT was found to be an appropriate framework for designing educational interventions aiming at promoting SCPBs among rural farmers. It was concluded that designing an educational program with a focus on promoting perceived susceptibility increased the level of performing SCPBs among the rural farmers.

Keywords: Skin cancer, Preventive medicine, Motivation, Education.

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Introduction

Skin cancer is a serious public health problem in the world. Its prevalence in many countries has been increased in recent years (1). In particular, the incidence of the disease is high among the people exposed to sunlight (2). This cancer is the most common cancer among men (3), and, also, the most common cancer in the Middle East (4). According to data released by the World Health Organization, the incidence of skin cancer increased from 6.7 million in 1985 to 9 million in 1995 and to 10.5 million in 2000. It is estimated that the incidence of skin cancer will increase to 20 million new cases in 2020 (5). Based on the recorded cancer cases in 2008, skin cancer was the most common cancer among Iranian men. This report also showed that the incidence of skin cancer among men with 248 cases per 100000 people was the second most common cancer in Western Azerbaijan (6). Many factors cause skin cancer, but exposure to sunlight and sunburn are the main reasons (7-10). Factors affecting sunburn such as avoiding the sun and using sun protection while exposing sunlight can reduce skin cancer. Hence promoting pro-

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tective behaviors is essential in skin cancer prevention (11).

Previous studies have identified several factors in relation to the adoption of protective behaviors. Sensitive skin to the sun is a factor that makes the skin more easily damaged, and people with this type of skin are more likely to use sun protective equipment (12,13). In proportion to people with dark hair, those with red and blonde hair are more likely to use sun protective behaviors. Those who underestimate the risk of sunbathing and who regard having tan skin better than sunburn use protective equipment less than others (14,15). In contrast, people with better knowledge and higher awareness of the risk of skin cancer and those who consider themselves at risk of skin cancer use sunscreen and other protective equipment more (13).

One of the most important efforts to control and prevent diseases is educating groups of people at risk (16). The impact of education depends on the appropriate use of scientific behavioral theories; there are several models in the literature to describe the health behavior (17). One of the theories used widely is Protection Motivation Theory (PMT). This theory was introduced by Rogers in 1975, then used largely as a framework for interventions related to health behaviors (18,19). PMT is one of the social cognitive theories that has the potential to account for the cognitive mediation process of behavioral change regarding threat and coping appraisal (20). Threat appraisal focuses on maladaptive behaviors and factors that increase the likelihood of engaging in risky behaviors; also it includes internal and external rewards for unhealthy behaviors and perceived threats (perceived susceptibility and severity). Received rewards from abusive practices will increase the probability of maladaptive behaviors while perceived threat can reduce maladaptive behaviors (21,22).

The coping appraisal process focuses on the ability to cope with and avert the threat. Increased coping appraisal increases protection motivation and increases the probability of behavior; it includes perceived response efficacy, self-efficacy, and response costs(23). Response efficacy includes beliefs; adopting a particular behavioral response will be effective in reducing the diseases' threat; it is expected that the effectiveness of proposed preventive behavior increases the response (24). Self-efficacy is one's belief in one's own ability to complete tasks and reach goals. It is expected that high self-efficacy perception causes a more positive response in person (21). The response costs are the costs associated with the recommended behavior, including financial and non-financial costs such as time, effort, discomfort, pain, suffering, etc. Increased costs in health behaviors decrease motivation behaviors that are recommended (25). Coping appraisal increases Response Efficacy and Perceived Self-efficacy Subtraction response costs. Increase of response efficacy and reducing the response costs are coping appraisals. Response efficacy and self-efficacy increase the probability of adaptive responses (23).

PMT has increasingly been used to improve knowledge, attitudes, and practice about skin cancer. For example the study by McClendon et al. presented that it can be used to change the cognitive factors and unhealthy behaviors related to the risk factors of skin cancer (1).

Considering that the occupation of the most of the population in Chaldoran County are farming, there is a high exposure to the sun in the region. An electronic search within several databases did not produce any skin cancer education interventions applying Protection Motivation Theory among farmers.

This study aimed to assess the effects of a theory-based educational intervention to promote skin cancer preventive behaviors (SCPBs) among rural farmers in Chalderan County, Iran.

Methods

Design and participants

This was a quasi-randomized controlled

field trial study conducted on 238 rural farmers in Chalderan County, Iran, from April to September 2014. Considering previous studies (26) and 95% confident interval, s=7, d=3, and 90 % test power and losing rate of 10 %, the sample size was calculated to be 348. Four participants in the intervention group and 10 in the control group refused to take part in the study. Finally, 324 farmers were enrolled in the study (120 in the intervention and 114 in the control group). The sampling method was multi-stage randomization. Two health houses were selected out of four rural healthcare centers, randomly. The subjects were chosen randomly based on their health records in the health houses and invited to participate in the study.

The inclusion criteria were being male, farming in spring and summer, having at least a primary literacy, with no history of skin cancer in the family. The exclusion criteria were refusal for participation and not attending the educational sessions. The ethical code was: IRCT 2015010315422 N2.

The study data were collected by a questionnaire containing the constructs of the PMT as well as the questions of SCPBs. This questionnaire was provided by Tazval et al. (27). Two groups completed the questionnaires before the intervention and 3 months after the intervention.

Study instrument and measures

Demographic variables, PMT structures, and behavioral items were assessed using questionnaires. This questionnaire has been used in a similar study (27). The instrument characteristics as well as the reliability and validity of the scales was presented in a previous study (28).

Design of educational intervention

The educational intervention designed based on the results found in the pretest data (28). The characteristics and key content areas of the program are presented in Table 1. The training sessions were conducted in a room at the health houses by a health educator and a trained health worker. At the end of the educational intervention, an educational booklet was given to the farmers. Also, an educational package was given 3 months after the intervention and data collection to the respondents in the control group.

Analysis

The SPSS statistical software (SPSS Inc., Chicago, IL, USA) was used for analysis of the data. For assessment of the data homogeneity at baseline, the Chi-square test was used for demographic variables, and PMT variables of the two groups were analyzed through independent samples t-test. The normality of the data was also assessed by the Kolmogorov-Smirnov test. Differences between the data before and 3 months after the intervention in both groups was determined using independent t-test, paired t-test, and chi-square.

Results

The demographic characteristics of the respondents in the pretest and post-test

Table 1. Education Program characteristics and Key Content Areas

Target Population	Farmers of rural areas
Method/ Duration	45-minute sessions; 4sessions
Personnel/ Training	Two-person team (health professional and trained health worker)
Program Costs	Training costs, personnel time , meeting room
Key Content Areas	- First session: Familiarity with objectives of the intervention and the importance of using protective behaviors - Second session: Present of Skin cancer statistics in Iran Express social, economic, family complications and mental diseases - Third session: Providing of information about importance and effectiveness of behaviors such as use sunscreen The use of role models - Fourth Session: Reducing barriers and familiarity farmers with the proper use of protective equipment

Table 2. Descriptive statistics (means and percentages) in the intervention (n=120) and the control group (n=118)

Variables	Before the intervention		After the intervention
	Group	Mean+ SD	Mean+ SD
Perceived vulnerability	Intervention	8.17+2.19	12.01+2.87
	Control	8.01+2.28	8.29+2.31
	P-value	0.567	<0.001
Perceived severity	Intervention	19.60+2.55	23.27+2.19
	Control	19.55+2.58	19.20+2.64
	P-value	0.863	<0.001
Intrinsic rewards	Intervention	44.55+3.70	38.73+2.92
Extrinsic rewards	Control	44.50+2.19	44.54+3.70
	P-value	0.917	<0.001
Response cost	Intervention	48.76+3.33	38.73+4.30
	Control	48.86+3.14	48.38+3.20
	P-value	0.816	<0.001
Self-efficacy	Intervention	9.61+2.19	14.81+2.48
	Control	9.65+0.87	9.94+1.69
	P-value	0.772	<0.001
Response efficacy	Intervention	15.16+1.76	19.73+2.81
	Control	15.09+1.93	15.16+2.78
	P-value	0.622	<0.001
Protection motivation	Intervention	7.50+2.15	10.77+2.58
	Control	7.41+2.01	7.38+1.96
	P-value	0.754	<0.001

were very similar. All participants in the study were men. According to the results, 42.5% (n=51) of the subjects in the intervention group and 37.3% (n=42) in control group were 30-39 years old (p=0.748). Table 1 shows the characteristics of respondents.

In the control group, no significant difference was found in the mean (SD) scores of Protection Motivation Theory variables before and after intervention (p>0.05), but the results of paired t-test showed a statistically significant difference in the intervention group (p<0.05).

Before the intervention, no significant difference in mean (SD) scores of the constructs of the Protection Motivation Theory was found between the two groups (p>0.05). However, there was a significant difference between mean (SD) scores of all the variables in the two groups after the intervention (p<0.05) (Table 2).

The comparison of SCPBs (use of sunscreen or sun block lotion, long-sleeved shirts, wide-brimmed hats, and stay in shade) in the intervention and control groups before and after the intervention is presented in Tables 3 and 4 (p<0.05).

Discussion

The present study was conducted to assess the effect of a PMT-based educational intervention on SCPBs among rural farmers in Chaldoran County, Iran. The results indicated that three months after the educational intervention statistically significant differences were found between the mean scores of all the structures of PMT and SCPBs in the intervention group. This result is in line with those reported by Baghi-

Table 3. The comparison of mean (SD) of constructs of Protection Motivation Theory before and after intervention in the intervention and control groups

Variable	Group	Before the intervention			After the intervention		
		Yes	No	p	Yes	No	p
Use sunscreen or sun block lotion	Intervention group	66(55%)	54(45%)	0.341	87(72.5%)	33(27.5%)	0.001
	Control group	69(58.5%)	49(41.5%)		66(51.7%)	57(48.3%)	
Long-sleeved shirts	Intervention group	20(16.7%)	100(83.3%)	0.249	69(67.5%)	39(32.5%)	<0.001
	Control group	15(12.7%)	103(87.3%)		20(14.4%)	101(85.6%)	
wide-brimmed hats	Intervention group	8(6.7%)	112(93.3%)	0.054	15(69.2%)	37(30.8%)	<0.001
	Control group	2(1.7%)	116(98.3%)		8(3.4%)	114(96.6%)	
Stay in shade	Intervention group	12(10%)	108(90%)	0.411	2(27.5%)	87(72.5%)	<0.001
	Control group	14(11.9%)	104(88.1%)		12(10.2%)	106(89.8%)	

Table 4. Sun protection behaviors before and 3 months after the educational intervention in the intervention (n=120) and the control group (n=118)

Variable		Intervention group (n=120)	Control group (n=118)	p
Age	20-29	32 (26.7%)	33(28%)	0.748
	30-39	51 (42.4%)	44 (37.3%)	
	40-49	32 (26.7%)	33 (28 %)	
	≥50	5 (4.2%)	8 (6.7%)	
Level of education	1-5Grade	36(30%)	41(37.7%)	0.474
	6-11 Grade	44(36.7%)	46(26.3%)	
	≥12 Grade	40 (33.3%)	31(26.3%)	
Financial status	Good	48(40%)	45(38.1%)	0.357
	Moderate	51(42.5%)	59(50%)	
	Weak	21(17.5%)	14(11.9%)	
Family size	1-3	99(82.5%)	97(82.2%)	0.825
	3-5	12(10%)	10(8.5%)	
	≥5	9(7.5%)	11(9.3%)	

ani-Moghadam et al. who worked on SCPBs among students (29), and also, Ghahremani et al. who worked on malaria preventive behaviors among rural households (30). Moreover, Brain0020et al. working on skin cancer risk reduction among students (1) and McMath et al. aiming at reducing skin cancer risk among students (26) found similar findings.

The findings showed that perceived susceptibility in the intervention group increased significantly compared to the control group 3 months after the intervention, showing that the educational program has been effective on perceived susceptibility among the rural farmers in the intervention group. In other words, after conducting the educational intervention in the farmers of the intervention group, their perception that they are vulnerable to skin cancer was increased. Perceived susceptibility, in turn, as a psychosocial predictor may have an effect on conducting SCPBs (31). Therefore, it is essential to increase farmers' knowledge about vulnerability to skin cancer. In the study of Baghhiani-Moghaddam et al. (29), applying PMT to prevent skin cancer, it was reported that educational intervention is effective in increasing perceived susceptibility among the students. Consistent with these results, in another study, conducted by Sadeghi et al. (32) it was shown that implementation of a theory-based educational intervention could improve perceived susceptibility of Iranian farmers regarding the skin cancer preventive behaviors. Dehdari et al., also, reported similar results (31).

Significant differences were, also, found 3 months after the educational program in the mean scores of perceived severity between the intervention and control groups. Perceived severity shows that health threat is serious and may be accompanied by severe complications (30). The findings showed that the educational intervention had taken effect on perceiving the seriousness of the disease. Similarly, Baghhiani-Moghaddam et al. (29) and Dehdari et al. (31) emphasized on the educational intervention as a way to increase perceived severity.

In the current study, intrinsic and extrinsic rewards decreased considerably in the intervention group compared to the control group, 3 months after the intervention, which is consistent with the result of Baghhiani-Moghaddam et al. (29) and McClendon et al. (1). A reason for the reduction happened in internal and external rewards among the farmers may be the reality that the educational intervention had been able to increase the perceived benefits of farmers regarding SCPBs. Therefore, it is recommended for future studies to take into account the benefits of SCPBs and the disadvantages of risky behaviors.

The findings indicated that the mean score of the response costs of SCPBs among the farmers in the intervention group decreased significantly after the

intervention, which is in agreement with the studies conducted by Baghiani-Moghaddam et al. (29), Dehdari et al. (31) McClendon et al (1), and Milne et al.(33). Perceived response costs among farmers can be considered as barriers to conducting protective behaviors. So, conducting a training program and guiding people to remove barriers can increase protective behaviors. The study by Sadeghi et al. (32), also, showed that removing barriers could increase healthy behaviors.

Self-efficacy was a strong predictive factor for SCPBs, in the present study. Several studies have emphasized the predicting role of self-efficacy in promoting healthy behaviors among different populations (34-36). Therefore, it is necessary to pay particular attention to self-efficacy in educational interventions. In this study, consistent with previous studies (29-31,36) it was found that 3 months after the educational intervention self-efficacy increased, significantly, in the intervention group compared to the control group. Dehdari et al. (31) reported that belief in high personal self-efficacy to do a behavior strongly decreases the perceived barriers for performing it. Therefore, it is recommended to emphasize reducing behavioral barriers in educational interventions to increase self-efficacy in conducting protective behaviors.

Regarding response efficacy, a statistically significant difference was found between the scores of the two groups before and 3 months after the educational intervention, which is consistent with previous studies (18,29,37). These findings show that belief in desirable outcomes of a healthy behavior could lead to a better performance.

The present study indicated a statistically significant difference in protection motivation scores between the two groups before and 3 months after the intervention, which is consistent with the findings of Baghiani-Moghaddam et al. (29) and Dehdari et al. (31). Protection motivation is influenced by other structures of PMT; hence, it is predictable that with an increase in the mean scores of the theory structures, the protection motivation also to be increased. In this study, the educational intervention resulted in a considerable increase in SCPBs in the intervention group compared to the control group 3 months after the intervention. In the intervention group, use of sunscreen 17.5%, use of long-sleeved shirts 50.8%, wide-brimmed hats 56.6%, and stay in shade 17.5% increased. In a study conducted by Craciun et al. (38) on women regarding using sunscreen, it was shown that educational intervention had a significant effect on applying sunscreen among women. Moreover, in the study performed by Maseudi et al. (39) and Ghahremani et al. (30), it was revealed that educational intervention, based on PMT, had a considerable effect on increasing the protective behaviors.

Accordingly, it can be said that PMT may be considered as an appropriate framework in educational intervention designed to promote SCPBs.

Limitations

One of the limitations is that the data were collected by a self-report tool. The study was performed on male farmers only, so it is not possible to compare the results among both males and females. It is recommended to conduct similar researches on women farmers and other occupational groups.

Conclusion

The findings indicated that after the intervention, a significant increase was observed in the variables of PMT and SCPBs in the intervention group compared to the control counterparts. This is the first study to demonstrate that a PMT-based intervention can enhance SCPBs among rural farmers. In the primary assessments (29), the main cognitive predictor for SCPBs was found to be perceived susceptibility. It was concluded that designing an educational program with a focus on promoting perceived susceptibility increased the level of performing SCPBs among the rural farmers.

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