RESEARCH ARTICLE

Predictors of Sun-Protective Practices among Iranian Female College Students: Application of Protection Motivation Theory

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Abstract

Purpose: Given the importance of sun protection in the prevention of skin cancer, this study was designed to determine predictors of sun-protective practices among a sample of Iranian female college students based on protection motivation theory (PMT) variables. Materials and Methods: In this cross-sectional study, a total of 201 female college students in Iran University of Medical Sciences were selected. Demographic and PMT variables were assessed with a 67-item questionnaire. Multiple linear regression was used to identify demographic and PMT variables that were associated with sun-protective practices and intention. Results: one percent of participants always wore a hat with a brim, 3.5% gloves and 15.9% sunglasses while outdoors. Only 10.9% regularly had their skin checked by a doctor. Perceived rewards, response efficacy, fear, self-efficacy and marital status were the five variables which could predict 39% variance of participants intention to perform sun-protective practices. Also, intention and response cost explained 31% of the variance of sun-protective practices. Conclusions: These predictive variables may be used to develop theory-based education interventions to prevent skin cancer among college students.

Keywords: Skin cancer - sun-protective practices - student - protection motivation theory - Iran

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Introduction

The incidence of both skin cancers, melanoma and non-melanoma, has been increasing over the past decades. Currently, between 2 to 3 million non-melanoma and 132,000 melanoma skin cancer occur globally each year. One in every three diagnosed cancer is skin type cancer (WHO, 2015). Similarity, skin cancer has been recognized as most prevalent type of malignancy in Iran, with incidence of 10.4 per 100,000 in 2005. The number of skin cancer increase from 2353 new cases in 2000 to 8484 cases in 2005 (Heidari & Najafi, 2013).

Exposure to ultraviolet (UV) radiation is the major preventable carcinogen cause of skin cancer (Branstrom et al., 2004). Limiting exposure to UV or applying using regular sunscreen, seeking shade, wearing sunglasses, wearing protective clothing avoiding artificial tanning devices and changing sunbathing habits may be reduce the risk of developing skin cancer risk by over 75% (Stern et al., 1986; WHO, 2015). Literature show that there are physical (e.g. cost), psychological (e.g. poor self-esteem), and environmental (e.g. lake of supportive policies, public education or well-coordinated implementation efforts) barriers to achieving sun protection (Dadlani & Orlow, 2008; Emmons & Colditz, 1999). However, additional information regarding theoretical constructs and factors that positively or negatively influence sun protection is required to develop tailored and effective interventions aimed at promoting regular sun safe exposure behaviors. Since Protection Motivation Theory (PMT) is a useful guide to explain various cancer-related preventive behaviors (e.g. skin cancer) (Conner and Norman, 2005; Baghianimoghadam et al., 2011; Dehdari et al., 2014), we applied the PMT to investigate predictors of female college student's behaviors to perform sun protection behaviors. PMT assumes that protection motivation (i.e. intention to follow a recommended behavior) results from two appraisal processes which are a positive function of perceptions of severity, vulnerability, response efficacy and self-efficacy, as well as a negative function of perceptions of the rewards associated with maladaptive responses and the response costs of the adaptive behavior. For protection motivation to be elicited, perceptions of severity and vulnerability should outweigh the rewards associated with maladaptive responses. In addition, perceptions of response efficacy and self-efficacy should

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Table 1. Correlation among PMT Variables in the Study Sample (N=201)

Constructs	1	2	3	4	5	6	7	8	9
1. Sun-protective behaviors	1.00								
2. Intention	0.56*	1.00							
3. Perceived vulnerability	0.15*	0.19*	1.00						
4. Perceived severity	0.18*	0.10	0.26*	1.00					
5. Perceived self- efficacy	0.27*	0.35*	0.18*	0.25*	1.00				
6. Response cost	-0.19*	-0.06	-0.13	-0.22*	-0.21*	1.00			
7. Response efficacy	0.31*	0.54*	0.36*	0.28*	0.47*	-0.01	1.00		
8. Perceived rewards	0.09	0.21*	-0.08	-0.06	-0.02	0.11	-0.009	1.00	
9. Fear	0.17*	0.28*	0.23*	0.39*	0.04	-0.36*	0.22*	0.01	1.00

*P<0.05

outweigh the response costs of the adaptive behavior (Conner & Norman, 2005). Despite the high prevalence of skin cancer in Iran (Noorbala & Kafaie, 2007; Marjani & Kabir, 2009), the rate of reported sun-protective practices among Iranian population still is poor (Mousavi et al., 2011; Ramezanpour et al., 2013). There is a need for recognize the factors influencing perform sun-protective behaviors among this population. As such, the present study was designed to determine the predictors of sun-protective practices among a sample of Iranian female college students based on PMT variables.

Materials and Methods

Design and sample

In this cross-sectional study, a total of 201 female college students were studying in the Iran University of Medical Sciences, Tehran, Iran were selected by simple sampling method. The native language of the participants was Persian. The study was conducted between November and March, 2015.

Procedure

All of the college students were informed about the study and a written consent was obtained. The demographic and PMT variables questionnaires were then completed by the participants in about 20 to 25 minutes.

Study instrument and measures

PMT variables were measured trough a designed and validated questionnaire by Morowatisharifabad et al. for assessing the PMT variables in terms of the sun-protective behaviors for prevention of skin cancer among Iranian farmers (Morowatisharifabad et al., 2015). In the 63-items tool, 8 items was used to measure the perceived vulnerability (e.g. "skin cancer may be observed only in people who have white skin"), 7 items for perceived severity (e.g. "skin cancer can be deadly"), 5 items for fear (e.g. " I'm afraid of thinking about skin cancer"), 9 items for response cost (e.g. "sunscreen is expensive"), 5 items for response efficacy (e.g. "using sunglasses will help in preventing skin cancer"), 4 items for perceived rewards (e.g. "I feel good when I am in the sun"), 10 items for self-efficacy (e.g. "I can use sunscreen consistently before I go outside "), 7 items for intention (e.g. "I intend to spend less time outdoors"), and 8 items for sun-protective practices (e.g. "do you wear hat with a brim when you are in the sun?"). The first six items were measured on a 5-point Likert scale ranging from 0="completely disagree" to 4="completely agree". Self-efficacy in terms of sun-protective practices were measured on a Likert-type scale, ranging from 0= "completely unconfident" to 4 = "completely confident". The intention (or protection motivation) items were measured a Likert scale ranging from 0= "not at all true" to 3 = "very much true". The sun-protective practices items were measured on a Likert scale ranging from 0= "never" to 3 = "always".

Table 2. Multiple Linear Regression (Stepwise Method) of Iranian Female College Students' Reported intention to Perform Sun-Protective Practices Regressed onto Protection Motivation Theory variables. Significant Predictors (p<0.05) Shown. N=201

Variable	R2	B	SE	Beta	P
Intention to perform sun-protective practices onto PMT constructs					
	0.39				
Constant (a)		-8.86	2.32	-	0.001
Fear		0.26	0.07	0.20	0.001
Response efficacy		0.60	0.11	0.36	0.001
Perceived rewards		0.32	0.09	0.20	0.001
Self-efficacy		0.13	0.06	0. 12	0.04
Marital status		2.20	0.60	0.21	0.001

(R2=0.39, F=22.04, p<0.001)

Table 3. Multiple Linear Egression (Stepwise Method) of Iranian Female College Students' Reported Sun-Protective Practices Regressed onto Protection Motivation Theory Variables. Significant predictors (p<0.05) shown. N = 201

Variable	R2	B	SE	Beta	P
Sun-protective behaviors onto PMT constructs					
	0.31				
Constant (a)		-4.44	2.79	-	0.01
intention		0.43	0.07	0.46	0.001
Response cost		0.14	0.07	0.15	0.001

(R2=0.31, F=12.47, p<0.001)

Statistical analysis

In this study, normality of the data was assessed and approved by Kolmogorov–Smirnov test. Pearson correlations were used to examine the relationship between sun-protective practices or intention and quantitative demographic variables (e.g. age). Moreover, Spearman correlation test was used to assess the relationship between sun-protective practices or intention and qualitative demographic variables (e.g. marital status).

Table 4. Frequency of Sun-Protective Practices among Iranian Female College Students

Behaviors	Never	Sometimes	Often	Always
Do you apply sunscreen with SPF of >15 before you go outside?	24 (11.9%)	55 (27.4%)	41 (20.4%)	81(40.3%)
Do you wear a hat with brim when you outside under the sun?	111 (55.2%)	66 (32.8%)	22 (10.9%)	2 (1%)
Do you wear gloves when you are outside?	143 (72.1%)	31 (15.4%)	20 (10%)	7 (3.5%)
Do you use sunglasses when you are outside under the sun?	42 (20.9%)	73 (36.3%)	54 (26.9%)	32 (15.9%)
Do you wear long-sleeve shirt and long pant and/ or skirt when you are outdoor?	10 (5%)	37 (18.4%)	71 (35.3%)	83 (41.3%)
Do you have outdoor activities during early hours of the morning and/ or afternoon?	15 (7.5%)	67 (33.3%)	76 (37.8%)	43 (21.4%)
Do you immediately see a doctor when you find something unusual on your skin changes?	31 (15.4%)	84 (41.8%)	39 (19.4%)	47 (23.4%)
Do you have your skin checked by a doctor on a regular basis?	62 (30.8%)	79 (39.3%)	38 (18.9%)	22 (10.9%)

Multiple linear regression (stepwise method) was used to identify demographic and PMT variables that were associated with sun-protective practices and intention. The data were analyzed using SPSS Statistics (version 17.0, SPSS, Inc.,Chicago, IL, USA). P<.05 was considered statistically significant.

Results

The mean age of the students was 24.49 years (SD= 4.24). 78.6% of participants were married and 20.9% single. 52.8% of students were undergraduate, 34.4% postgraduate and 10.9% were medical students. 63.2% had history of severe sunburn. There are significant correlation between participant's age (p=0.004, r=0.20) or marital status (p=0.001, r=0.36) and their intention to perform sun-protective practices. Also, significantly correlation was observed between marital status and sun-protective practices (p=0.004, r=0.20). The correlation among PMT variables was shown in Table 1. As shown in the Table 1, significant correlations were observed between PMT variables and sun-protective practices, except for perceived rewards. Considering that significant correlations were recognized between PMT variables and intention to sun-protective practices, except for perceived severity and response cost. Multiple linear regression using stepwise method revealed that of the PMT variables, perceived rewards, response efficacy, fear, self-efficacy and marital status were the five variables which could predict %39 variance of participant's intention to perform sun-protective practices (see Table 2). Also, intention and response cost explained 31% of the variance of sun-protective practices (see Table 3). Those participants who had more intention and fewer response cost were also more likely to protect themselves against the sun. In Table 4, the frequency of sun-protective practices among participants is shown.

Discussion

In this study, response cost and intention act as two significant predictors to use sun-protective behaviors among Iranian female college students. Participants who perceived less response cost and higher intention for protection used more of the safe sun exposure behaviors than those students with more of response cost and less of intention. This conclusion is consistent with the findings of similar studies (Cody and lee, 1990; Bränström et al., 2010). The results suggest that understanding of the participants as what the barriers are in regards to the application of the sun protective behavior, is necessary to develop an intervention that aims toward reduction in number of skin cancer incidents.

In the present study, self-efficacy belief was found to be no predictor of the behavior. This finding is not consistent with similar studies done on similar subjects. For example, Vries et al. observed that adolescents whom put on protective clothing on a regular basis had more self-efficacy levels about skin cancer prevention (Vries et al., 2005). Mujumdar et al. reported that self-efficacy was a significant predictor of regular self skin examination and sun-protective behaviors (Azzarello et al., 2006; Mujumdar et al., 2009). Findings of the present study shows that there was a negative correlation between self-efficacy and response cost (see table 1). It might be expected that the greater of these barriers resulted in fewer perceived self-efficacy (Pender et al., 2002) and as such less usage of sun safe behaviors (Mujumdar et al., 2009; Bränström et al., 2010). The claim that researchers should focus more on the interventions that address suggested barriers to sun protection intention as a way of increasing self-efficacy beliefs among female university students may be accepted.

Another important finding is that five self-efficacy, perceived rewards, fear, response efficacy and marital status could predict 39% of the variance of intention to perform safe sun exposure behaviors among Iranian female college students. This finding revealed that the coping appraisal components of PMT were powerful predictors of intention to perform sun-safe behaviors than were the threat appraisal components among the participants. This finding is consistent with Cho et al. (Cho et al., 2010). Moreover, Grunfeld found that the threat appraisal components of PMT were shown to be stronger predictors for university students' intentions to perform sun-protective practices (Grunfeld, 2004). As such, applying the PMT was helpful in determining variables that played an important role toward student's intention to use sun-related behaviors.

Finding showed that participants had poor practices regarding performance of sun-protective behaviors. Only 1% of participants always wore a hat with a brim, 3.5% put on gloves and 15.9% used sunglasses while being outdoors. Only 10.9% of all those had their skin checked regularly by a doctor. These findings are consistent with a large number of research literature published on skin cancer prevention in Asia. For example, Andsoy et al. and Dalli et al. observed that Turkish nurses and high school students did not have enough knowledge about skin cancer and; therefore, were not adequately protecting themselves

from UV ray damages (Dalli et al., 2004; Andsoy et al., 2013). Al-Naggar also reported that Malaysian road traffic police officers had poor practice regarding application of sunscreen (Al-Naggar, 2013). Several studies showed greater practice in terms of skin cancer prevention than those observed in our study (Vries et al., 2005; Saridi et al., 2015). Therefore, there is a need to develop health education programs to train college students in the area of skin cancer and its preventive strategies.

Although the findings in the present study underscore the application of PMT variables in predicting performance of sun protective behaviors among a sample of female college students, it had some limitations. Data was collected among female college students whom were studying at the Iran University of Medical Sciences. Thus, the findings are not generalized to other groups of university students (e.g. male college students). The authors suggest that similar studies be developed focusing on other youth groups, such as male students, and other racial/ethnic groups in Iran.

In conclusion, female college students with more intention and less response cost were more likely to protect themselves against the sun. Practitioners should take into account these significant variables to developing theory-based education interventions regarding prevention of skin cancer for students.

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