Psychological Determinants of Sunscreen Use among Iranian Students: A Theory Based Cross-Sectional Study

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Abstract

Background
Skin cancer is the most common type of cancer, and its prevalence continues to increase. The aim of this study was to determine prevalence and psychological determinants of sunscreen use in order to prevent skin cancer among Iranian students based on the health belief model (HBM).

Materials and Methods
A cross-sectional study was conducted among 550 high school students in Abadan city, Southern Iran, during 2017, which were randomly selected to participate voluntarily, in the Southern of Iran. Data collection was carried out using self-made questionnaire and the collected data were analyzed using SPSS version 16.0 software.

Results
The mean age of participants was 16.40 ± 0.93 years, ranging from 15 to 19 years. Prevalence of using daily sunscreen was almost 15.5%. There was a significant relationship between using daily sunscreen with sex (female) and higher economic status (P<0.05). The Health Belief Model (HBM) variables predictor accounted for 27% of the variation in the outcome measure of use the sunscreen. Perceived barrier (Beta = -0.290 and P<0.001), Perceived benefits (Beta = 0.242 and P< 0.001) and cues to action (Beta = 0.155 and P= 0.006) were the more influential predictor on sunscreen use.

Conclusion
We found that girl students compare than boy students were more daily use of sunscreen. Furthermore, comprehensive sunscreen use promotion programs focus on psychological determinants such as perceived barrier, perceived benefits and cues to action may be usefulness of the results in order to promotion of sunscreen.

Key Words: Perceived Benefits, Skin Cancer, Students, Sunscreen, Health Belief Model.

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1- INTRODUCTION

Cancers are the second leading cause of death, accounting for 9% of deaths in the world and according to world health organization it is estimated that cancer-related deaths in the Middle East countries will increase as much as 10 to 15% in the next 10 years; meanwhile, skin cancer is the most common cancer (1). The prevalence of skin cancer in Iran is 15% which makes this type of cancer to be the most common cancer (2). The number overall instances of skin cancer in Iran is 10.13 per 100,000 person; the incidence of basal cell carcinoma has been 53.7, the incidence of Squamous cell carcinoma has been 79.1 and the incidence of malignant melanoma has been 39.0 per 100,1000 person (3). The financial aspect of cancers can significantly impact the resources of society (4). Although skin cancer is one of the most common cancers, also it is one of the most preventable cancers (5).

Epidemiologically, the main cause of skin cancer is continuous exposure to Ultraviolet radiation, whether from sun or from artificial sources (6). In addition, studies have indicated that sun exposure during childhood and adolescence has a significant role in the incidence of skin cancer (7) and, in 80% of the cases, sun exposure occurs before the age of 21 (8). In Khuzestan province, ultraviolet radiation is the main cause of (non-melanoma) skin cancer (9). Therefore, protective behaviors against sunlight are highly important and they are more effective when employed correctly and started at a younger age (10).

Sunscreen use considered as a healthy behavior and as all human behaviors are reflections of personal and environmental determinants (11). Assessment the causal network of the human behaviors is important for affecting the determinants that impact on behaviors (12). Also it's desirable by the behavioral scientists, psychological based assessment of these determinants are highly important for health planning programs and ultimately for behavior change (13). Health Belief Model (HBM) is one of the very famous and popular models for developing healthy behaviors; the present study explores the psychological determinants impacting on sunscreen use as the main strategy for the prevention of skin cancer among students (14). Health belief model emphasizes the way individual perceptions and beliefs, about health problem consequences and assessment of benefits and barriers of preventive behavior, lead to adopting the intended preventive behavior (15).

According to the health belief model the first individuals must feel fear against the problem (perceived susceptibility), then perceive the depth of the risk and the seriousness of its different physical and mental consequences (perceived severity), assessment of the perceived benefits of the preventive behavior (perceived benefit), lack of serious barriers (perceived barrier), perception of the ability to do the behavior (perceived self-efficacy) and resources for guiding the behavior (cues to action) (16). Several studies have reported Health Belief Model variables predictability to explain behavioral health such as sunscreen use (17-20). Considering what has been mentioned, the aim of the present study was to predict the psychological determinants of sunscreen use as the main preventive method against skin cancer in high school students in Abadan city, Southern of Iran based on health belief model.

2- MATERIALS AND METHODS

2-1. Method

This cross-sectional study was conducted among 550 high school students in Abadan city, Khuzestan province, Southern Iran, during summer 2017. The sample size was calculated at 99% significant level according to the results of a pilot study and based on the sample size

formula N = z.p.q/d2 was used, where z=1.96, p=prevalence (based on pilot study was 16.2 %, q= (1-P), and d=error margin (1%), and a sample of 544 was estimated, in this study 550 subject were selected for participants in this study. After removing the incomplete questionnaires, 529 questionnaires were analyzed (response rate 96.2%). The volunteers were given the self-report questionnaire. Prior to conducting the main project, a pilot study was carried out. Initially, the relevant questionnaires were administered to 30 students who were similar to study population in order to estimate the reliability of the questionnaire. Furthermore, experts panel were consulted on validity of the questionnaire. This study has been approved by the institutional review board at the Abadan school of medical sciences, Abadan, Iran (IR.ABADANUMS.REC.1395.114). All the participants were justified on the way the study was conducted, the confidentiality of the aim of the study and they all entered willingly. In addition, all the questionnaires were responded anonymously so that the participants were not identifiable. Being a high school student enrolled at the Abadan city, southern of Iran, during 2017, without history of skin cancer were the inclusion criteria and the lack of willingness to cooperate was the exclusion criterion.

2-2. The Questioner

A: Background

Background variables were: age (years), gender (female and male), parents' divorce (yes or no), parents education level (primary, secondary, diploma, academic) and economic status of family (very weak, weak, average, good, very good),

B: Sunscreen use

To assess sunscreen by one question "How often do you use sunscreen?" responses were categorized as: never, sometime, just in summer, and daily.

C: Health Belief Model variables

HBM scale was designed based on standard questionnaires (17, 18). English version of the questionnaire was translated into Persian by two mastered translators and was translated back to English after consulting with some professors and a third person who had full knowledge of both languages. In addition, content validity was confirmed by a group of experts (health education and promotion expert, healthcare services management expert, and medical doctor). Furthermore, estimated reliability was done by using alpha Cronbach coefficient for each constructs questionnaire.

Scale included twenty seven items under six constructs including (a) three items to measure the perceived susceptibility of the side effects of skin cancer (e.g. "Only those who had a history of skin cancer in family will be at risk of skin cancer"); (b) five items to measure the perceived severity of side effects of skin cancer (e.g. "Skin cancer will have a serious effect in my life"); (c) five items to measure perceived benefits of sunscreen use (e.g. "sunscreen use is effective for prevention of skin cancer"); (d) four items to measure evaluate the perceived barriers of sunscreen use (e.g. "sunscreen use is too expensive for me"); (e) eight items to measure cues to action about sunscreen use (e.g. "If you use a sunscreen, what were your sources of information? health worker, TV, etc."); (f) four items to measure perceived self-efficacy about sunscreen use (e.g. "I believe that I can buy sunscreen"). In order to facilitate participants' responding to the items, each item was measured on an ordinal 5-point Likert-type scaling (1= strongly disagree, 5= strongly agree). In cues to action scale, yes or no were used as response options. The scores range of perceived susceptibility was 3-15, perceived severity was 5-25, perceived barrier was 4 – 20, perceived benefit was 5- 25, perceived

self-efficacy was 4 – 20, and cause to action was 0-8. Furthermore, higher score represented a better perceived susceptibility, perceived severity, perceived benefit, perceived self-efficacy, and cause to action and lower score represented a better perceived barrier towards sunscreen use. Estimated reliability using Cronbach's alpha coefficient for the Health Belief Model constructs questionnaire were: perceived susceptibility (α=0.74); perceived severity (α=0.77); perceived benefit (α=0.75); perceived barrier (α=0.78), perceived self-efficacy (α=0.77), and causes to action (α=0.76).

2-3. Data analyses

Data were analyzed using SPSS version 16.0 running Chi-square, t-test, Pearson correlation, linear regression statistical tests at a 95% significant level. Bivariate correlations were computed to ascertain the magnitude and direction of the associations between the Health Belief Model variables. Linear regression analysis was performed to explain the variation in the sunscreen use on the basis of health belief model variables. Chi-square and t-test was performed to assessment the relationship between background variables and daily use of sunscreen. Cronbach's Coefficient Alpha was used to estimate the internal consistency of the various measures.

3- RESULTS

The aim of this study was to determine determinants related to sunscreen use among high school students based on Health Belief Model. The results of the present study indicated that perceived barrier, perceived benefits and cues to action were the more influential predictor on sunscreen use. The mean age of participants was 16.40 (standard deviation [SD]: 0.93) years, ranging from 15 to 19 years. Almost 51.2% (271/550) were female and 47.3% (250/550) were male, and 1.5% was no response of this item (8/550). Nearly 9.1% (48/550), 12.3% (65/550), 40.6% (215/550), and 35.5% (188/550) of participants reported that their fathers had elementary, secondary, diploma, and academic education, respectively. In addition, 15.1% (80/550), 14.9% (79/550), 41.2% (218/550), and 27.2% (144/550) of participant's reported that their mothers had elementary, secondary, high school, and academic education, respectively. Furthermore, 47.3% (250/550), 29.1% (154/550), 7.2% (38/550), and 15.5% (82/550) of participants reported never, sometime, just in summer, and daily use of sunscreen, respectively. Furthermore, 2.6% (14/550) of participants reported their parents were divorced. The relationships between sunscreen use and background variables are shown in **Table.1**. There was a significant relationship between using daily sunscreen with gender (female student) and higher economic status (P<0.05).

Table-1: The relationship between background variables and daily use of sunscreen among 529 students

Variables	Sub-group	No, Number (%) Mean (SD)	Yes, Number (%) Mean (SD)	P-value
Age		16.42 (0.94)	16.23 (0.93)	0.092
Gender	Male	243 (97.6%)	6 (2.4%)	< 0.001
	Female	193 (71.7%)	76 (28.3%)	
Father's education	Primary	39 (83%)	8 (17%)	0.790
	Secondary	56 (87.5%)	8 (12.5%)	
	High School	184 (85.6%)	31 (14.4%)	
	Academic	156 (83%)	32 (17%)	

Mother's education	Primary	62 (79.5%)	16 (20.5%)		0.295
	Secondary	71 (89.9%)	8 (10.5%)		
	High School	182 (83.5%)	36 (15.5%)		
	Academic	124 (86.1%)	20 (13.9%)		
Economic status	Weak	29 (96.7%)	1 (3.3%)		0.003
	Average	156 (90.2%)	17 (9.8%)		
	Good	213 (81.6%)	48 (18.4%)		
	Very Good	37 (74%)	13 (26%)		
Parents' divorce	Yes	11 (78.6%)	3 (21.4%)		0.360
	No	424 (85%)	75 (15%)		

Table.2 shows the mean, standard deviation and Bivariate correlations between the Health Belief Model variables. Significance levels at the 0.01 were the criteria for the analysis. The bivariate assessment of variables revealed that there were signs of multicollinearity among Health Belief Model variables. The findings indicate that for the sample, cause to action was significantly related to perceived susceptibility (r = 0.168), perceived severity (r = 0.159), perceived benefit (r = 0.269), and perceived self-efficacy (r = 0.333), while it was inversely and significantly related to the perceived barrier (r = -0.163). Perceived self-efficacy was significantly related to perceived susceptibility (r = 0.137), perceived severity (r = 0.307), and perceived benefit (r = 0.574), while it was inversely and significantly related to the perceived barrier (r = -0.381). Perceived benefit was significantly related to perceived severity (r = 0.206), while it was inversely and significantly related to the perceived barrier (r = -0.461), and not related to perceived susceptibility (r = 0.012). Perceived barrier was inversely significantly related to perceived susceptibility (r = -0.137), and not related to perceived severity (r = -0.079). Perceived severity was significantly related to perceived severity (r = 0.146).

Table-2: The Predictor variables of sunscreen based on bivariate correlation analysis

Variables	Mean (SD)	Scores Range	X1	X2	X3	X4	X5
X1. Perceived Susceptibility	8.79 (1.74)	3 – 15	1				
X2. Perceived Severity	17.99 (3.21)	5 – 25	0.146**	1			
X3. Perceived Barrier	12.09 (2.46)	4 – 20	-0.137**	-0.079	1		
X4. Perceived Benefit	17.90 (3.65)	5 – 25	0.012	0.206**	-0.461**	1	
X5. Perceived Self-efficacy	14.59 (3.26)	4 – 20	0.137**	0.307**	-0.381**	0.574**	1
X6. Cause to Action	3.32 (2.42)	0 - 8	0.168**	0.159*	-0.163**	0.269**	0.333**

** Correlation is significant at the 0.01 level (2-Tailed).

A linear regression analysis was performed to explain the variation in the outcome measure of use the sunscreen, using the health belief model variables. As can be seen in **Table.3**, our result indicated the Health Belief Model variables predictor accounted for 27% of the variation in the outcome measure of use the sunscreen. Among the health belief model constructs: perceived barrier (Beta=-0.290 and P< 0.001), perceived benefits (Beta=0.242 and P< 0.001), and cues to action (Beta=0.155 and P= 0.006) were the more influential predictor on sunscreen use.

Table-3: The Predictors of the sunscreen based on linear regression analysis

Variables		Unstandardized Coefficients		Standardized Coefficients	t-value	P-value
		B	Std. Error	Beta		
1	(Constant)	1.946	0.640		3.040	0.003
	Susceptibility	-0.035	0.035	-0.057	-0.990	0.323
	Severity	0.011	0.020	0.031	0.539	0.590
	Barriers	-0.132	0.030	-0.282	-4.354	<0.01
	Benefits	0.057	0.022	0.188	2.566	0.011
	Self-efficacy	0.031	0.024	0.090	1.284	0.200
	Cause to Action	0.064	0.026	0.144	2.481	0.014
2	(Constant)	2.030	0.620		3.273	0.001
	Susceptibility	-0.033	0.035	-0.054	-.947	0.344
	Barriers	-0.129	0.030	0-.277	-4.329	< 0.001
	Benefits	0.058	0.022	0.191	2.620	0.009
	Self-efficacy	0.034	0.023	0.099	1.451	0.148
	Cause to Action	0.065	0.026	0.145	2.493	0.013
3	(Constant)	1.881	0.600		3.136	0.002
	Barriers	-0.137	0.029	-0.292	-4.741	< 0.001
	Benefits	0.059	0.022	0.196	2.689	0.008
	Self-efficacy	0.029	0.023	0.086	1.290	0.198
	Cause to Action	0.061	0.026	0.136	2.377	0.018
4	(Constant)	2.022	0.591		3.422	0.001
	Barriers	-0.135	0.029	-0.290	-4.697	< 0.001
	Benefits	0.073	0.019	0.242	3.792	< 0.001
	Cues to Action	0.069	0.025	0.155	2.779	0.006

4- DISCUSSION

According to the results, 15.5% of the participants reported using daily sunscreen. Peters et al. carried out a research on Brazilian adolescents and reported that 56% of the subjects were using sunscreen every day (21). Neale et al., in their study reported that 45.4% of the participants used sunscreen on at least 5 days per week (22). In addition, Montague et al. reported that 31% of American adolescents used sunscreen (23). These findings indicated the necessity of the development and implementation of programs in order to increase sunscreen use among Iranian students. Skiveren et al. in their study stated that the health belief model can be used to identify and describe sun protective behavior determinants (18). The results of the present study indicated that barrier, benefit and cause to action were the most influential predictors of sunscreen use. In this regards Grubbs and Tabano in their cross sectional study based on health belief model among health care providers indicated that perceived susceptibility was a strong predicting determinant for sunscreen use among the participants (24). Furthermore, Butera et al., in their study aimed at exploring perceptions about risk of skin cancer and sunscreen use among 13-18 year-old adolescent female club soccer athletes reported a significant correlation between susceptibility and sunscreen use (25). Also, de Vries et al., carried out a research entitled the role of risk perception in explaining parental sunscreen use (26). Dunn stated that sun tanning can cause cancer, and carried out a research on 824 undergraduate students in USA and reported participants who had intentions to decrease sun tanning having a higher self-efficacy in avoiding tanning (27). In addition, Buller et al., in their study in South America reported participants as receiving most of their information on ways to prevent skin cancer from health workers, family members, friends and the media and participants who reported the

health workers as their source of information had better performance in preventing skin cancer compared to others (28). Our findings can be used to develop a sun protection program. Based on our findings, intervention programs should focus on the increase of benefit and cause to action toward use of sunscreen among students. Furthermore, focus on reduce barrier toward use of sunscreen among students. Our findings also indicated a significant relationship between using daily sunscreen with gender (female student) and higher economic status. This result is similar to the results reported by other studies; for example, Cercato et al., in their study on Spanish beachgoers indicated that there was a significant association between sex and sunscreen use (29). In addition, a similar study indicated that women seem to not only be generally more prone to intentional sunbathe but are also more likely to adopt sun protection practices (30). These findings suggested that male students compared to female students, are more in need of getting the information about the important role of sunscreen us in preventing skin cancer. Our study had several limitations. First, the study was a cross-sectional among sample of high school students in the southern of Iran, thus, results cannot be generalized to other populations of school students. Second, data collection was based on self-reporting, which is usually prone to recall bias. We suggest that future researches be carried out based on design theory and using other behavior change theories to investigate comprehensive determinants affecting skin cancer prevention behaviors.

5- CONCLUSION

Our findings showed that using daily sunscreen among students was low. We found that female students compare than male students are more daily use of sunscreen. Furthermore, comprehensive sunscreen use promotion programs focus on psychological determinants such as barrier, benefits and cues to action may be usefulness of the results in order to promotion of sunscreen.

6- CONFLICT OF INTEREST: None.

7- ACKNOWLEDGEMENT

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