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Cognitive Determinants Predicting Pediculosis Preventive Behaviors: Application of Health Belief Model

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Abstract

Background: Pediculosis is still recognized as a worldwide infestation and is a major public health concern. The aim of this study was to determine the cognitive determinants Predicting Pediculosis Preventive Behaviors (PPB) based on the Health Belief Model (HBM).

Methods: This descriptive cross-sectional study was conducted among 193 female high school students in the west of Iran, during 2019. The participants were selected by random sampling method. They filled out a self-administered questionnaire including the Background variables, PPB questionnaire, and HBM determinants. Data were analyzed by SPSS-22 software using Pearson correlation test and linear regression analysis.

Results: The mean age of the students was 12.72 years [SD: 0.60], ranging from 12 to 14 years. The mean score of PPB was 7.72 [SD: 2.23], ranging from 0 to 10. HBM determinants accounted for 20% of the variation in PPB. The best predictors of PPB were perceived susceptibility (Beta: 0.303, P<0.001), perceived barriers (Beta: -0.217, P=0.004) and perceived self-efficacy (Beta: 0.158, P=0.040), respectively.

Conclusion: It seems that the development and implementation of health promotion programs to increase susceptibility toward the risk of pediculosis, improve self-efficacy toward performing PPB, and reduce the barriers in adopting PPB among the students. These results may be useful in preventing pediculosis.

Key Words: Pediculosis, Preventive Behaviors, Students.

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1- INTRODUCTION

Pediculosis is a public health concern as 25 million people worldwide are contaminated with head lice annually (2, 1). The lice attach to the scalp through the hair shaft and feed from blood and go through all stages of life including eggs, nymphs, and adult lice on the host body (3). Lice are transmitted through direct head-to-head contact or indirectly through the shoulder, clothing, towels, scarves, hats, etc. (4-6). Pediculosis can cause insomnia, irritability, depression, education failure, anxiety, secondary bacterial infection, and lymphadenopathy (7-9). The prevalence of pediculosis is higher in developing countries and especially in crowded places with low economic and social status and poor health conditions (10-12). Pediculosis can spread rapidly and, if left uncontrolled, can become epidemic. It is widely accepted that the school environment can easily spread the infestation, because it provides an opportunity for children to communicate continuously (13). About 6-12 million people in the United States are contaminated with head lice, annually (5, 6 and 8). Recent studies indicated the high prevalence of pediculosis among students; for example, the prevalence of Pediculosis in Portugal, Brazil and Nigeria were reported 42.1%, 35% and 26.4%, respectively (14-16). The prevalence of lice infestation in different parts of Iran is estimated between 6 and 30% (10, 14). In western Iran, the prevalence of Pediculosis were, respectively, reported 8% and 19.7% in Kermanshah and Sanandaj (9, 15).

Promoting public health, raising awareness, improving economic and social status, as well as timely diagnosis and treatment of infested cases have an important role in controlling pediculosis (9). The use of educational approaches is one of the appropriate strategies for planning to eliminate or modify undesirable health behaviors and create health-promoting behaviors in adolescents (17). Moreover, health education and promotion experts believe that choosing an appropriate theoretical framework in the development and design of intervention programs leads to the greater efficiency and effectiveness of educational programs (18). To achieve useful results, the education should be principled and based on defined models; and among these, the health belief model (HBM) is one of the models of behavior analysis that has been used in many studies and emphasizes how individual perceptions and beliefs about fear of health problems and assessing the benefits and barriers of preventative behaviors can lead to such behaviors (19). HBM is designed to predict and explain human behavior in specific contexts, such as pediculosis prevention behaviors (PPB) (10, 13, 16). For example, Khakshoor-Gharehsoo and Peyman carried out research on female students in Mashhad to determine the effect of education on the preventive behaviors of pediculosis based on HBM (13). According to the HBM, behaviors are predicted by six constructs: (a) Perceived susceptibility (refers to subjective assessment of the risk of developing a health problem), (b) Perceived severity (refers to a person's feelings on the seriousness of contacting an illness or disease), (c) Perceived benefits (refer to an individual's assessment of the value or efficacy of engaging in a health-promoting behavior to decrease the risk of a health problem), (d), Perceived barriers (refer to an individual's assessment of the obstacles to behavior change), (e), Cue to action (stimulus needed to trigger the decision-making process to accept a recommended health action), and (f) Self-efficacy (individual's perception of his or her competence to successfully perform a behavior) (20). The aim of this study was to investigate the cognitive determinants Predicting pediculosis preventive behaviors using HBM in a sample of high

school students in Eslamabad-e Gharb city, Kermanshah Province, the west of Iran.

2- METHODS

2-1. Participants and procedure

This cross-sectional study was conducted among 193 female high school students in Eslamabad-e Gharb city, Kermanshah Province, in the west of Iran. The required sample size was calculated using the following formula:

$$n = \frac{\sigma^2 * z^2_{1-\frac{\alpha}{2}}}{d^2}$$

The sample size was calculated at 95% significant level according to the results of a pilot study and a sample of 193 was estimated.

For data collection, the following stages were done. First, all of the girls' junior high schools in the Eslamabad-e Gharb were listed; next, three schools were randomly selected. Then, among seventh-grade students, the volunteers enrolled in the study. Only the seventh-grade students were eligible to participate in this study. Finally, the volunteers were given the self-report questionnaire. From among the population of 193, 185 (95.8%) signed the consent form and voluntarily agreed to participate in this study, which has been approved by the Institutional Review Board at the Kermanshah University of Medical Sciences (IR.KUMS.REC.1398.821).

2-2. Measures

The questionnaire included three sections that comprised 42 items: 8 items for background variables, 5 items about PPB in the past month and 29 items for HBM determinants.

2-2.1. Background variables

The background variables assessed in this study included: age, family size, fathers' age, mothers' age, fathers' job, mothers' job, fathers' education and mothers' education.

2-2.2. PPB questionnaire

The PPB questionnaire was designed based on a standard questionnaire (21) and included five items. The behaviors included the following items: combing hair every day; Taking a bath two times per week; cleaning the brush and comb daily; cutting hair; and ironing clothes regularly. A 3-point Likert scale, ranging from 0 (never), to 1 (sometimes), and 2 (always) was considered to answer the PPB questions. The reliability coefficient for the PPB questionnaire in the current study was 0.80.

2-2.3. HBM determinants

The items assessing HBM determinants were designed based on standard questionnaires (13, 16, 19) and included 29 items under six determinants including (a) perceived susceptibility, (b) perceived severity, (c) perceived benefits, (d) perceived barriers, (e) perceived self-efficacy, and (f) cues to action. Five items were designed to measure perceived susceptibility about pediculosis (e.g. "There is a high probability of pediculosis in my place of residence or study."). Five items were designed to measure the perceived severity of pediculosis side effects (e.g., "pediculosis keeps me from learning my lessons."). Four items were designed to assess the perceived benefits of performing PPB (e.g., "Combing hair several times in a day is effective in preventing a pediculosis."). Four items were designed to evaluate the perceived barriers to perform PPB (e.g., "It is difficult for me to use of the comb several times daily."). There were four items that measured the self-efficacy towards the perform PPB (e.g., "I have the ability to plan to comb my hair regularly and frequently every day."). Seven items were designed to evaluate the cues to act for performing PPB (e.g., "My teachers

encourage me to perform PPB"). In order to facilitate the participants' responses to the items, perceived susceptibility, perceived severity, perceived benefits, perceived barriers and perceived self-efficacy items were standardized to a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Responses included yes/no categories for cues to action items. Estimated reliabilities of the subscales of HBM determinant questionnaire were as follows: perceived susceptibility (α=0.82); perceived severity (α=0.78); perceived benefits (α=0.74); perceived barriers (α=0.85); perceived self-efficacy (α=0.76); and cues to action (α=0.65). The face validities of the HBM determinants and PPB questionnaires were evaluated qualitatively. Face-to-face individual interviews were held up with twelve experts, the comments were taken, and the items were modified. Also at this stage, the questionnaire was given to ten high school female students in Eslamabad-e Gharb city. Furthermore, the content validity of the questionnaires was measured by both quantitative and qualitative methods. For this purpose, 12 experts in the field of health education and promotion, public health, health policy, and medical entomology were interviewed face to face, and the level of difficulty, relevancy, and ambiguity of the scales was examined. The Content Validity Index (CVI) and Content Validity Ratio (CVR) were examined based on the experts' comments. Based on the Lawshe table the minimum value for acceptable CVI and CVR items are considered 0.79 and 0.62, respectively (22). As for the qualitative face validity of the questionnaires, the opinion of the expert plan was applied in the questionnaires. Furthermore, all items were confirmed to have an acceptable CVI and CVR.

2-4. Statistical Analysis

Data were analyzed by SPSS-22 software using Pearson correlation test and linear regression analysis. Pearson correlation was used to estimate the correlations between the HBM variables and PPB. Linear regression analysis was performed to explain the variation in the PPB on the basis of HBM determinants. A Linear regression analysis was conducted to determine the variables strongly predicting PPB. Cronbach's Coefficient Alpha and Split-half were used to estimate the internal consistency of the measures.

3- RESULTS

The mean age of the students was 12.72 years [SD: 0.60], ranging from 12 to 14 years. Furthermore, the mean age of the students' fathers was 44.82 years [SD: 0.5.90], ranging from 32 to 64 years, and the mean age of the students' mothers was 38.69 years [SD: 5.14], ranging from 28 to 55 years. More details of the demographic characteristics of the students are shown in **Table 1**.

The mean score of PPB among the students was 7.72 [SD: 2.23], ranging from 0 to 10. This finding shows that the students, in average, achieved 77.2% of the maximum achievable score for PPB.

Table 2 shows the bivariate associations among the HBM variables and PPB. The results showed that PPB was significantly associated with HBM variables at either 0.05 or 0.01 levels. For example, PPB was associated with the perceived severity (r= 0.168), perceived susceptibility (r= 0.343), perceived benefits (r= 0.155), perceived self-efficacy (r=0.320), and cues to action (r= 0.171). In addition, PPB is inversely and significantly related to perceived barriers (r= -0.311).

As can be seen in **Table 3**, HBM determinants accounted for 20% of the variation in PPB. The best predictors for PPB were perceived susceptibility, perceived barriers and perceived self-efficacy, respectively.

Table-1: Demographic characteristics of the students

Variable	Number	Percent
Family Size		
3-4 number	91	49.2
4-6 number	83	44.9
6-8 number	11	5.9
Fathers' Job		
Employed	34	18.4
Worker	124	67
Farmer	27	14.6
Mothers' Job		
Employed	8	4.3
Housewife	177	95.7
Fathers' Education		
Primary (1-5 grade)	43	23.2
Secondary (5-8 grade)	52	28.1
High school (9-12 grade)	69	37.3
Academic (13-16 grade)	21	11.4
Mothers' Education		
Primary (1-5 grade)	79	42.7
Secondary (5-8 grade)	36	19.4
High school (9-12 grade)	51	27.6
Academic (13-16 grade)	19	10.3

Our results indicated that among the background variables, the mother's education level was the best predictor for PPB performance among the students (**Table 4**).

4- DISCUSSION

The mean score of PPB among the students was 7.72 [SD: 2.23], ranging from 0 to 10. This finding shows that the students achieved 77.2% of the maximum achievable score for PPB. This result is similar to the results reported by other studies. For example, Daneshvar et al., in their study among elementary school female students in Eyvan (in the west of Iran) reported that the mean score of pediculosis prevention behaviors in students has been optimal (8). In addition, Moshki et al. (10), in their study among 179 female fifth grade students of Gonabad city (in northeast of Iran), and Ghajari et al. (19), in their study among 170 elementary school students in Khorramshahr city (in south of Iran), have reported similar findings.The findings of the present study revealed that among the background variables, the mothers' education level was the best predictor of the adoption of PPB among students. Several studies have reported the strong predictability of mothers' education level in explaining the students' health behaviors, including the adoption of PPB (2, 15). In this regard, Öncü et al. carried out a study in the primary schools of Turkey, and indicated the important role of the mothers' education level in adopting the pediculosis prevention behaviors (2). Tarkhasi et al. (15) also mentioned mothers' education level as one of the effective factors in reducing pediculosis

among students. The results of the similar studies confirm these findings and show the importance of maternal education for the care of children against the prevention and rapid treatment of pediculosis.

Table-2: Correlations between different determinants of HBM and PPB

		Mean (SD)	Score Range	Perceived Severity	Perceived Susceptibility	Perceived Benefits	Perceived Barriers	Perceived Self-efficacy	Cues to Action
Perceived Severity	Correlation	17.30 (3.56)	5-25	1					
	Sig. (2-tailed)								
Perceived Susceptibility	Correlation	18.37 (3.64)	5-25	0.347**	1				
	Sig. (2-tailed)			< 0.001					
Perceived Benefits	Correlation	14.14 (3.18)	4-20	0.337**	0.175*	1			
	Sig. (2-tailed)			< 0.001	0.017				
Perceived Barriers	Correlation	6.03 (2.68)	4-20	-0.245**	-0.052	-.227**	1		
	Sig. (2-tailed)			0.001	0.478	0.002			
Perceived Self-efficacy	Correlation	16.20 (2.87)	4-20	0.326**	0.182*	0.336**	-0.491**	1	
	Sig. (2-tailed)			< 0.001	0.013	< 0.001	< 0.001		
Cues to Action	Pearson	3.76 (1.63)	0-7	0.038	0.156*	0.078	-0.144	0.074	1
	Sig. (2-tailed)			0.603	0.034	0.294	0.051	0.317	
PPB	Correlation	7.72 (2.31)	0-10	0.168*	0.343**	0.155*	-0.311**	0.320**	0.171*
	Sig. (2-tailed)			0.022	< 0.001	0.035	< 0.001	< 0.001	0.020

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

*. Correlation is significant at the 0.05 level (2-tailed).

Our results indicated that among the HBM determinants, the best predictors for PPB were perceived susceptibility, perceived barriers and perceived self-efficacy, respectively. Adopting pediculosis-preventive behaviors is influenced by the ability to perform a behavior and its benefits, and then the fear of contacting the problem. Raising students' awareness of the severity of the disease and its complications along with creating susceptibility to pediculosis can be effective in adopting preventive behaviors. This result is similar to the findings reported by other studies (10, 19, 23). For example, In line with our study, Moshki et al. reported that there was a significant correlation between perceived barriers and pediculosis preventive behaviors (10). Thus, it is necessary that educational programs pay adequate attention to self-efficacy, barriers and susceptibility.

Our study had a few limitations. First, data collection was based on self-reporting, which is usually prone to recall bias. Second, the internal consistency of the questionnaire was relatively low ($\alpha = 0.65$) for assessing cues to action.

5- CONCLUSION

Our findings can support the effective use of HBM in the development and implementation of PPB promotion programs. Further, it is strongly recommended that educational programs pay adequate attention to self-efficacy, barriers, and susceptibility. Thus, HBM-based assessments of behavior may provide insights for designing interventions to promote pediculosis

prevention behaviors among students. Perceived susceptibility, perceived barriers, and perceived self-efficacy to perform preventive behaviors should play prominent roles in educational interventions.

6- AUTHOR CONTRIBUTORS

The manuscript has been read and approved by all authors and they had significant cooperation with different sections of the work.

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8- CONFLICT OF INTEREST: None.

Table-3: Predictors of the PPB based on HBM determinants

Model		Unstandardized Coefficients		Standardized Coefficients	t	P
		B	Std. Error	Beta		
1	(Constant)	3.282	1.446		2.269	0.024
	Perceived Severity	-0.031	0.047	-0.050	-0.663	0.508
	Perceived Susceptibility	0.186	0.044	0.304	4.256	< 0.001
	Perceived Benefits	0.006	0.051	0.008	0.112	0.911
	Perceived Barriers	-0.175	0.064	-0.211	-2.737	0.007
	Perceived Self-efficacy	0.131	0.062	0.168	2.108	0.036
	Cues to Action	0.112	0.092	0.082	1.222	0.223
2	(Constant)	3.315	1.411	-	2.350	0.020
	Perceived Severity	-0.030	0.046	-0.048	-0.656	0.513
	Perceived Susceptibility	0.187	0.044	0.305	4.277	< 0.001
	Perceived Barriers	-0.175	0.064	-0.211	-2.753	0.007
	Perceived Self-efficacy	0.132	0.061	0.170	2.182	0.030
	Cues to Action	0.113	0.091	0.083	1.231	0.220
3	(Constant)	3.043	1.346	-	2.260	0.025
	Perceived Susceptibility	0.177	0.041	0.290	4.300	< 0.001
	Perceived Barriers	-0.170	0.063	-0.205	-2.696	0.008
	Perceived Self-efficacy	0.125	0.059	0.160	2.097	0.037
	Cues to Action	0.115	0.091	0.085	1.266	0.207
4	(Constant)	3.424	1.315	-	2.604	0.010
	Perceived Susceptibility	0.185	0.041	0.303	4.537	< 0.001
	Perceived Barriers	-0.180	0.063	-0.217	-2.882	0.004
	Perceived Self-efficacy	0.123	0.059	0.158	2.065	0.040

Table-4: Predictors of the PPB based on background variables

Model		Un-standardized Coefficients		Standardized Coefficients	t	P
		B	Std. Error	Beta		
1	(Constant)	12.260	4.442	-	2.760	0.006
	Age	-0.427	0.276	-0.115	-1.547	0.124
	Family Size Number	-0.033	0.182	-0.015	-0.182	0.856
	Fathers' Age	0.002	0.037	0.005	0.052	0.959
	Mothers' Age	-0.008	0.043	-0.019	-0.195	0.846
	Fathers' Job	0.160	0.310	0.041	0.518	0.605
	Mothers' Job	0.002	0.825	< 0.001	0.002	0.998
	Fathers' Education	0.075	0.201	0.032	0.372	0.711
	Mother's' Education	0.387	0.173	0.183	2.239	0.026
2	(Constant)	12.263	4.166	-	2.944	0.004
	Age	-0.427	0.275	-0.115	-1.551	0.123
	Family Size Number	-0.033	0.180	-0.015	-0.184	0.854
	Fathers' Age	0.002	0.036	0.005	0.052	0.959
	Mother's' Age	-0.008	0.043	-0.019	-0.195	0.845
	Fathers' Job	0.160	0.309	0.041	0.520	0.604
	Father s' Education	0.075	0.200	0.032	0.373	0.710
	Mothers' Education	0.387	0.172	0.183	2.257	0.025
3	(Constant)	12.314	4.033	-	3.053	0.003
	Age	-0.428	0.273	-0.116	-1.570	0.118
	Family Size Number	-0.032	0.178	-0.015	-0.179	0.858
	Mothers' Age	-0.007	0.035	-0.016	-0.202	0.840
	Fathers' Job	0.160	0.308	0.041	0.521	0.603
	Fathers' Education	0.074	0.199	0.032	0.371	0.711
	Mothers' Education	0.388	0.171	0.184	2.265	0.025
4	(Constant)	12.221	3.989	-	3.064	0.003
	Age	-0.427	0.272	-0.115	-1.570	0.118
	Mothers' Age	-0.009	0.033	-0.021	-0.279	0.781
	Fathers' Job	0.156	0.306	0.040	0.510	0.611
	Fathers' Education	0.080	0.195	0.035	0.409	0.683
	Mothers' Education	0.389	0.171	0.184	2.282	0.024
5	(Constant)	11.759	3.619	-	3.249	0.001
	Age	-0.421	0.270	-0.114	-1.558	0.121
	Fathers' Job	0.157	0.305	0.040	0.513	0.609
	Fathers' Education	0.091	0.191	0.039	0.474	0.636
	Mothers' Education	0.396	0.169	0.187	2.347	0.020

Model		Un-standardized Coefficients		Standardized Coefficients	t	P
		B	Std. Error	Beta		
6	(Constant)	12.100	3.539	-	3.419	0.001
	Age	-0.429	0.269	-0.116	-1.592	0.113
	Fathers' Job	0.114	0.291	0.029	0.391	0.697
	Mothers' Education	0.421	0.159	0.199	2.643	0.009
7	(Constant)	12.337	3.479	-	3.546	< 0.001
	Age	-0.427	0.269	-0.116	-1.590	0.114
	Mothers' Education	0.405	0.153	0.192	2.639	0.009
8	(Constant)	6.833	0.353		19.376	< 0.001
	Mothers' Education	0.437	0.153	0.207	2.858	0.005

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