

Predictive and Preventive Factors Related to of Head Lice Infestations among Teenage Girls Student: Application of Health Belief Model

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Abstract

Background: Despite of improving public health, head lice infestations has remained as an important health issue among all society in worldwide. Head lice infestations are common in areas with high population density and associated with low socioeconomic status and health literacy. This study aimed to evaluate the preventive behaviors related to pediculosis based on the Health Belief Model (HBM) in teenage girl students.

Methods & Material: This cross-sectional survey was performed on 200 teenage girl students that randomly selected from 4 schools in different geographical areas in Torbat Heydariyeh city-Iran. A structured questionnaire was designed to collect the data on socio-demographic characteristics, health belief model constructs and pediculosis-related behaviors. This data was described and analyzed by two-sample t-test, Pearson's correlation coefficient and regression analysis using SPSS 22.

Result: The overall percentage of head lice infestations was 4.1% and 9.5% of participations had experience of head lice infestations in the 3 past months. Itching reported in 30% of infected students ($p < 0.001$). Head lice infestations strongly predicted with itching on a scalp ($OR = 73.2$, 95% CI 8.23, 652.2), and the main protective factor for Head lice infestations was adopt of preventive behavior ($OR = 0.68$, 95% CI 0.47, 0.97), also the preventive behavior (according to HBM model) were explained by Perceived barriers, self-efficiency and predisposing factors (5.7%, 5.6% and 7.8%) respectively.

Conclusion: It seems that should provide necessary trainings with an emphasis on recognizing symptoms of disease and promoting preventive behavior by reinforcing predisposing factors, perceived barriers and self-efficacy in students.

1. Introduction

Head lice infestation, due to *Pediculus Humanus Capitis*, is one of the types of human blood-sucking insects that threatens to human health. Despite of improving public health, it remains as an important health issue among all society in worldwide, however chiefly it more prevalence in low and middle-income countries [1-4]. it annually infects between 6-12 million people [5]. The highest prevalence of Pediculosis was reported in Central and South American (33%) and the lowest was in Europe (5%) [5]. There is a greater chance for spread this parasite in crowded and unsanitary places, and the schoolchildren and teenagers are the most sensitive group to infect this external parasite [5-7]. Also the females being more affected than males (19% V.s 7%) [5,8-11].

Although the high prevalence of contamination in schools, it is the most suitable place to provide necessary health education for prevent and control of disease, so that the studies shown the great impact of health education on students' knowledge, attitude and health performance towards head lice [12-14]. The first step in the training planning process is to choose a health education model; the right model can start the training program in the right direction and extend it [15]. One of the proposed educational models in health education is the health belief model [16]. This model has focuses on constructs in preventive behaviors that motivating people to act, then the perception of persons can be motivates them to act and behavior. Therefore to increase the preventive functions, people must first feel the danger of the health problem (perceived sensitivity), then understand

the depth of this danger and the seriousness of its various complications (perceived severity). Also the positive signs that received from their surroundings or internal environment (guidelines for action), so they will be believed that the disease prevention program is useful and applicable (perceived benefits) and the factors that prevent them from taking action are also

less expensive than the benefits (perceived obstacles) to finally act occurred to prevent of disease(Figure 1). The aims of this study was determined the factors related to the promotion of preventive behaviors against Pediculosis in primary school girl students in Torbat Heydarieh city.

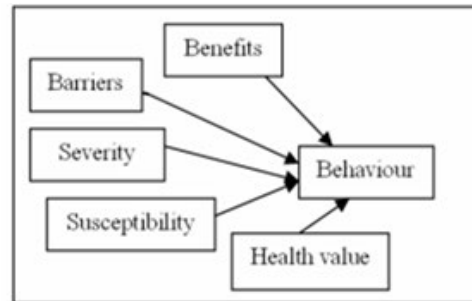


Figure 1: The Health Belief Model

2. Methods and Materials

2.1 Study Setting & Design

This cross-sectional study was performed in Torbat Heydaryeh city, Khorasan Razavi province, Iran, from August 3 to 14, 2021. The protocol of study was approved by ethics committee of Torbat Heydaryeh University of Medical Sciences (IR). Informed Consent Form was obtained from the parents of all participants.

2.2 Study Population

Study population was including 200 random Teenage girl students of primary schools that selected by multistage cluster-stratified method. So based on sampling framework was selected 4 schools of different geographical areas of city, 50 people from each school of fourth (66 people), fifth (68 people) and sixth (66 people) grades. Inclusion criteria , were include age 9 to 14 years old, female gender, and exclusion criteria were including absent of school in data collection day or lack of consent of parents of students to participate in this study. Before examining students, the research objectives were explained to parents of participants and they were assured that the information would remain confidential. Also written informed consent and socio-demographic data were obtained of them.

3. Data Collection

Data were collected based on a researcher-made questionnaire regarding the evaluation of behavior students towards Pediculosis. The validity of the questionnaire was measured by 5 specialists in health education, infectious disease and health care service management. Reliability of questionnaire was assessed by pilot study among 20 students. This questionnaire was including socio-demographic questions and 24 questions about awareness and 34 questions of constructs of the Health Belief Model (HBM). Each true answer to 10 knowledge questions

was given a one score (false answer zero score). The 7 attitude questions were assessed by three-level likert scale (agree 3 points, I have no opinion 2 score and disagree 1 score), also each “yes” answer to behavioral questions (7 questions) was scored one. Perceived sensitivity was measured with five questions, perceived intensity with six questions, perceived benefits with 5 questions, self-efficacy with five questions, perceived barriers with 6 questions and perceived benefits with 7 questions with a three-choice likert scale (agree 3 score, I have no opinion 2 points and I disagree 1 point).

3.1 Statistical Issues

This data was described and analyzed by two-sample t-test, Fisher Exact test and regression analysis using SPSS 22.

3.2 Main Measurements

Prevalent and protective factors related to pediculosis as a primary outcome; and secondary outcome was predicted factors for pediculosis among Teenage Girls student.

4. Result

In this study 197 teenage girl’s student between 9 to 13 years old were evaluated. The average of family size was 4.5 ± 0.9 (2 to 9) in participated. The prevalence of head lice infestations was % 4.1 in participations; also 9.5% of them had reported experience of head lice infestations in the 3 past months. The demographic characteristics of participated according to status of head lice infestations was described in table1. Head lice infestations more observed in students with family size ≥ 5 (8.7% vs. 3.4%), although this finding was not statically significant ($p=0.23$). Education and occupation of parents were not related to status of head lice infestations in teenage girl’s student ($p>0.05$). 10.4% of all students reported itching, that 30% of them had the head lice infestations ($p<0.001$).

Variable	group	N%	Head lice infestations n%		Sig*
			Yes, 8 (4.1)	No, 189 (95.9)	
Family size N=197	2-5	174 (88.3)	6 (3.4)	168 (96.6)	P= 0.231
	≥5	23 (11.7)	2 (8.7)	21 (91.3)	
Occupation of fathers N=190	Workless	9 (4.7)	0	9 (100)	P= 0.745
	Officer	30 (15.8)	2 (6.7)	28 (93.3)	
	Others	151 (79.5)	6 (4.0)	145 (96.0)	
Occupation of mothers N=195	Home wife	162 (83.1)	7 (4.3)	155 (95.7)	P=0.226
	Officer	10 (5.1)	0	10 (100)	
	Others	23 (11.8)	1 (4.3)	22 (95.7)	
Education of mothers N=189	Primary school	57 (30.6)	3 (5.3)	54 (94.7)	P= 0.702
	high school/ college	129 (69.4)	5 (3.9)	124 (96.1)	
Education of mothers N=189	Primary school	70 (37.0)	5 (7.1)	65 (92.9)	P=0.149
	high school/ college	119 (63.0)	3 (2.5)	116 (97.5)	
Hair cooler N=195	black	117 (60.0)	6 (5.1)	111 (94.9)	P=0.552
	brown	57 (29.2)	1 (1.8)	56 (98.2)	
	blond	21 (10.8)	1 (4.8)	20 (95.2)	
Itching N=192	YES	20 (10.4)	6 (30)	14 (70)	P<0.001
	No	172 (89.6)	1 (0.6)	11 (99.4)	
head lice infestations in the 3-past month	Yes	18 (9.5)	3 (16.7)	15 (83.3)	P=0.01
	No	144 (75.8)	3 (2.1)	141 (97.9)	
	I don't know	28 (14.7)	2 (7.1)	26 (92.9)	

*Fisher Exact test.

Table1: Characteristics of participated according to status of head lice infestations.

Pearson's correlation coefficient showed, preventive behavior were significantly correlated with perceived barriers (P=0.003; r = 0.23), self-efficacy (P = 0.002; r = 0.23), and predisposing factors (P<0.001; r = 0.28). According to the unadjusted regression model to predict preventive behavior using the HBM constructs, perceived barriers predicted 5.7% (R2 = 0.057), self-efficacy predicted 5.6% (R2 = 0.056) and predisposing factors predicted 7.8% (R2 = 0.078) of preventive behavior. In the next stage of regression analysis, all HBM constructs entered to model, and indicated that its variables predicted 21% (R2 = 0.21) of preventive behavior. Investigation of the relationship between

HBM constructs with head lice infection in teenage students, result showed: the mean score of preventive behavior was more in students who hadn't any head lice infestations than students with head lice infestations, this finding was statically significant (p=0.02). However the mean score of knowledge, perceived barriers and predisposing factors were grater in students with head lice infestations (p=0.32). Also infected students had lower mean score of health self-efficacy in compared to students without any head lice infestations (p=0.60). The mean score of perceived barriers higher in student with Head lice infestations in compared whit other students (p=0.06) (table2).

Variable	SCORE	Head lice infestations mean (CI 0.95)		Sig*
	mean ± SD	Have	Haven't	
Knowledge	17.50±3.71	19 (15.48, 22.51)	17.54 (17, 18.08)	P= 0.32
Preventive Behavior	16.73 ±1.59	15.42 (13.37, 17.48)	16.79 (16.55, 17.03)	P=0.02
Self-efficacy	15.48±1.60	15.12 (13.4, 16.82)	15.50 (15.26, 15.74)	P=0.60
Perceived sensitivity	12.39±2.27	12.66 (10.71, 14.62)	12.38 (12.04, 12.73)	P=0.82
Perceived intensity	10.77±2.24	10.37 (8.09, 12.65)	10.79 (10.46, 11.12)	P= 0.35
Perceived benefits	15.84±2.84	15.66 (11.81, 19.51)	15.58 (15.41, 16.28)	P= 0.71
Perceived barriers	9±2.48	10.12 (.5, 11.49)	8.98 (8.60, 9.37)	P=0.06
predisposing factors	12.49± 1.85	13.37 (11.48, 15.26)	12.45 (12.17, 12.2)	P= 0.31

*Mann-Whitney test.

Table 2: The Relationship between Knowledge, Behavior and Structures of Health Belief Model with Head Lice Infection in Teenage Girl Student.

All associated factor with head lice infection in teenage girl student entered to un-adjusted regression model, result shows: health Behavior (OR=0.68, P=0.038) was the main protective factors to head lice infestations among Teenage Girls student.

However with control on effect of other factors by adjusted regression model itching was the main predictive factor for head lice infestations among Teenage Girls student (OR= 55.83, P<0.001) (Table 3).

Variable		Un Adjusted OR CI 0.95	Sig	Adjusted OR CI 0.95	Sig
Education of mothers	Primary school	1	-		
	high school & college	0.33 (0.07, 1.45)	0.144		
head lice infestations in the 3 past month	Yes	1	-		
	No	0.10 (0.02, 0.57)	0.009		
	I don't know	0.38 (0.05, 2.56)	0.324		
Itching	No	1		1	-
	Yes	73.2 (8.23, 652.2)	<0.001	55.83 (6.01, 518.67)	<0.001*
Preventive Behavior		0.68 (0.47, 0.97)	0.038	0.82 (0.52, 1.28)	0.399
Perceived barriers		1.17 (0.91, 1.49)	0.212		

Table 3: Predictive Factors Related to Head Lice Infestations among Teenage Girls Student.

5. Discussion

In this study the prevalence of head lice infestations was % 4.1 among urban Teenage Girls student and 86% of them hadn't any experience of head lice infestations in the 3 past months, this prevalence was lower than previous estimates. The previous studies showed the estimate of pediculosis prevalence from 1.6% to 67%, depends on cultural behavior, society, and various climate conditions in Iran [17-20]. Also the overall prevalence of head lice infestation was estimated 7.4% (6.6–8.2) among Iranian Girls student in meta-analysis conducted by Moosazadeh, 2015 [21]. Education and occupation of parents were not related to status of head lice infestations in teenage girl's student. Similar to the study of Hazrati et al. Ghazanfari et al, no significant relationship had between the prevalence rate of head lice infestation and educational level and occupation of parents [22,23]. Parents with high levels of education may also be at risk similar to other parents because of being busy or having inadequate knowledge. Unlike this study Öncü et al and Tarkhasi et al. indicated the important role of the Education and occupation of parents in adopting the pediculosis prevention behaviors [24,25]. In current study, the preventive behavior more common in students who hadn't any experience of Head lice infestations, and it was the main protective factor of head lice infestations in teenage girl's student. Therefore the lower prevalence of head lice infestations may be related to adopting preventive behavior by them, these findings were consistent with other studies [26,27]. The same in Najjari quasi-experimental study, that the prevalence of pediculosis was significantly reduced following the educational interventions to changes in behavior (of 8.4% to 3%) [14]. Finding shows, itching was the main predicting symptoms of head lice infestations, the same in kasirri study, that itching was reported in 37.2% of participants and it statistically related to Pediculosis capitis [28]. in Kitvatanachai study, also Itching scalp 93.0% was related to pediculosis [3]. Overall itching is inevitable and occurs when the individual with lice, infecting to antigenic components in the louse saliva [29]. So itching of the scalp is the main and often sole symptom for rapid diagnosis of head lice infestation, and help to prevent the spread of louse and reduce Head lice

infestations spread [30]. But in ghazanfari study self-efficacy was determined as the only predictor of preventive behaviors of head lice infestation [23].

The findings of the current study highlighted perceived barriers; self-efficiency and predisposing factors were predicted of 21% of preventive behavior in these students. these findings was consisted to other studies [31,32]. Such as Moshki study that perceived barriers and self-efficacy correlated to preventive behavior [26]. Perceived barriers identified as an individual's subjective understanding of the material and psychological costs of the recommended health behaviors related to pediculosis, that were higher in students who had experience of head lice infestation. and the study by Panahi et al. and Nejaei et al. [33-35]. As the main explanation construct, self-efficacy has gained much support as an intermediary in behavioral change in head lice studies [23,36]. on the other side self-efficacy had main role in forming of head lice preventive behaviors [26]. In addition, people with self-efficacy have tend to demonstrate appropriate behaviors, so self-efficacy of preventive behavior is one of the most commonly evaluated mediators, that role and impact as a mediator of behavioral change has gained considerable support. The limitations of this study include self-report and lack of accurate completion of questionnaires by students due to their young age. On the other hand this study was conducted in girl's school students suggested to more generalization in country, be done among male students

6. Conclusion

It seems that should provide necessary trainings with an emphasis on recognizing symptoms of disease and promoting preventive behavior of head lice infestation by reinforcing predisposing factors, perceived barriers and self-efficacy in students

Declarations

Ethics approval and consent to participate: This study has been approved by the ethics committee of Torbat Heydariyeh University of Medical Sciences, and informed consent form was written and obtained from all parents of participated.

Consent for publication: Not applicable

Availability of data and materials: Availability of data and materials

Competing interests: There are no financial conflicts of interest to disclose for any authors.

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- Data extraction **M.J., F.A., H.A.**
- Funding acquisition; **H.A.**
- Investigation; **H.A., F.A., H.H. M.A.**
- Methodology; **F.A.**
- Project administration; **H.A.** and **M.J.**
- Resources; **H.A.**
- Software; **F.A.**
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- Roles/Writing original draft; **F.A., H.A.**
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