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# The Effect of Educational Program on the Prevention of Pediculosis in Primary School Fifth Grade Students: An application of the Health Belief Model

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***ABSTRACT***

**Background:** Pediculosis is one of the most common problems in the world, which despite the improvement of the health status, still has a global distribution. Since this disease is usually transmitted through direct (head-to-head) and indirect (using personal belongings of others) contact, conditions of prevalence in populated areas such as schools can cause students to experience physical and psychological problems. The aim of this study was to determine the effect of education based on health belief model on pediculosis prevention in the fifth grade female students in Bafq city in the academic year of 2016 - 2017.

**Methods:** This study was a randomized controlled trial. The study population included 110 fifth grade female students who were selected by multi-stage sampling method and were randomly divided into two groups of test (55) and control group, (55). First, to determine the prevalence of pediculosis, students were checked to find out if they had Lice and Livestock in their hair and then the required data was collected through a questionnaire based on the Health Belief Model whose validity and reliability had already been confirmed. After their analysis and need assessment, a training program was designed according to the design model and delivered as a lecture, question and answer, and group discussion for students of the experimental group and pamphlets were also distributed among them. Then six weeks after the intervention, the initial questionnaire was completed again by student groups. Data was analyzed using independent t-test, Chi-square, Chi-square, ANOVA and Pearson correlation.

**Results:** There was a positive and significant correlation between head lice preventive behaviors in students and self-efficacy and perceived benefits constructs. Knowledge and constructs of the health belief model predicted 28.7% of behavioral variance that predicted only predictive power of self-efficacy was statistically significant and it was found that the perceived benefits construct indirectly affects the behavior. After the intervention, the mean score of all constructs of the health belief model, knowledge and behavior in the experimental group significantly increased; however there was no significant increase in the control group.

**Conclusion:** Considering that both constructs of self-efficacy and perceived benefits were behavior predictors and the educational program led to improve the attitude and behavior of students, health-based and belief-based programs can be implemented based on these two constructs to improve students' performance in lice preventive behaviors.

**Keywords:** Female Students, Health Belief Model, Pediculosis, Prevention





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## Introduction

One of the health threats to the community is insect infestation, especially foreign parasites, which despite the improvement of the level of health and progress of medical sciences is still considered as a health problem.[1] Pediculosis is one of these problems; despite the improvement of health conditions, it still has global distribution. Head lice infection is not only a problem in poor societies, but also in industrialized and advanced countries as a health problem.[2]

Although population growth and poor health are among factors that exacerbate the disease, the possibility exists for this problem in all socioeconomic classes.[3] Children are more likely than adults and women are more likely than men to have head lice due to hair mass.[4] Head lice infection can be seen in the age group of 6 - 11 years old and primary school children are the most vulnerable group.[5] In addition, similar studies and researches have shown that the prevalence of pediculosis, especially in fifth grade primary school female students, is higher than that of the rest.[6] Since the disease is usually transmitted through direct (head to head) and indirect (using personal devices belongings to others), the conditions prevail in populated areas such as schools.[7] The standard defined by the National Center for Combating with head lice infection of the United States, defines the incidence of over 5% head lice as an epidemic.[1] However, the prevalence of head lice infestation in primary school children in developed countries is estimated to be between 2% and 10%.[8] Nevertheless, in some studies, the prevalence of head lice in Mexico was 13.6, Jordan 26.6, Thailand 23.32, and Nigeria 26.4.[9-12] In another study in Turkey, the infection rate for lice is estimated 10.9.[13] In Iran, this pollution is also appearing and increasing due to some reasons such as an increase in population, migrating from villagers to cities, marginalization, and the establishment of satellite settlements with minimum health and welfare facilities as a health problem along with other contagious diseases in some regions.[8] The prevalence of pediculosis in different parts of the country has been reported from 6% to 30%.[14] In the study of Afshari et al. (2013), 1.25% of students in Robat Karim were infected with head lice.[15] The prevalence of infection in girl schools in the rural areas of Qom province, which was investigated by Noroozi et al. (2013) was estimated at 13.3%.[16] Furthermore, studies in Gonabad had a relatively high prevalence of pediculosis infection (up to 10.28%); especially in girls of fifth grade elementary school.[17, 18] A severe head skin itching due to the effect of the propulsion element in the lice saliva is considered to be the most important complication of lice. Excessive scratching of the scalp also causes skin scratches in contamination with secondary infections, especially yellow scars. In severe cases, infection with the lice causes swelling and painful lymph nodes in the back of the ear and head. Lice infestation often affects children to be restless.[19]

The health belief model is one of the oldest models in which behavioral science theories are used to solve health problems and show the relationship between behavior and beliefs.[20] The health belief model is often used to interpret the responses of people at risk of illness; however, does not have experience in symptoms of the disease, and those who are well aware of risks and complications of the disease, do not make suitable action for its reduction. This model is particularly useful for designing programs for disease prevention and behavior change in the short term as well as studies on students.[21-24]

Various dimensions of this model are perceived sensitivity (the belief that a person may have a disease or a disadvantage as a result of a particular behavior), perceived severity (belief in the extent of the loss of an illness or injury condition as a result of a particular behavior), perceived barriers (the belief in the probable cost of pursuing a new behavior), perceived benefits (belief in the benefits of proposed methods for reducing the risk or severity of a disease or a disadvantage caused by a particular behavior), a guide for action (an



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accelerating force that causes a person's need for action), self-efficacy (one's confidence in his ability to follow a behavior).[25]

Given that lice infection can be found in the age group of 6 - 11 years old, i.e. primary and secondary school children, and the importance of schools health as a populous place in transmission of this infection and the physical, social, economic and cultural consequences of infection with head lice and the effective role of education in prevention, control and reduction of this infection, this study was conducted on the effect of educational program based on health belief model on pediculosis prevention in female students of fifth grade elementary school in Bafq city.

## Methods

This study was a randomized controlled trial that was performed on female students of the fifth grade elementary school of Bafq. To determine the sample size according to similar study[26] and S = 0.4, based on the sample size formula, taking into account the coefficient 95% confidence and 90% test power, the most sample size was obtained by the method below 53. Considering the probability of loss, 55 individuals were considered for each case and control group.

The samples were selected using multi-stage sampling. Firstly, a list of primary schools was prepared from the health unit of health departments. According to the sample size, out of 12 girl primary schools, randomly, four schools, each with one fifth grade class were chosen. Since two schools were in the lower part of the city and two other schools in the upper area of the city, to match both groups of experimental and control, a school from the lower part of the city and another school from the upper region of the city were selected.

In the first stage, to determine the prevalence of infection, the students were examined for the presence of head scab and lice. Then, the information was collected through a researcher-made questionnaire. The questionnaire consisted of four sections: demographic questions (8 questions), knowledge questions (9 questions) with a score range of 0 - 18, questions about health belief model constructs, including perceived sensitivity, perceived severity, perceived barriers, perceived benefits and self-efficacy each with 5 questions with a score of 0 - 20 and a guide for action was also measured in frequency and percentage, and questions of behavior (5 questions) with a score range of 10 - 0. In questions of awareness, responses were designed as yes, no, and I do not know and they got 2 points for each correct answer, the wrong answer had zero and I do not know had 1 score. The response of model constructs based on the Likert scale of 5 options, was designed from “I totally agree” to “I totally disagree” with the scores from 0 - 4. In the case of behavior questions, the responses was “always” (2 scores), “sometimes” (1 scores), “never” (0 scores). The validity and reliability of the questionnaire used by Moshki et al. (2013) in the study of "The Preventive Behaviors of Pediculosis Infection in Gonabad Students Using the Health Belief Model"[6] has been proved. Alpha Cronbach total of tool was 0.77, and Cronbach alpha was 0.86 for awareness construct, perceived sensitivity 0.82, perceived severity 0.78, perceived barriers 0.85, perceived benefits 0.74, self-efficacy 0.76, and behavior 0.78, respectively. This research was carried out after obtaining necessary permissions from the university and education authorities and students. Then, considering the classroom program of the samples required coordination was made with the management and teachers of each school. After justifying the students about the study, the goals were expressed and the confidentiality of the secret information, the work began. In the first stage, an examination was carried out by the investigator to determine the prevalence of the infection, with direct observation, hair and scalp, including observation of the precision of hair, especially in the back of ears and hair. The criterion for detection of infection was observation of mature lice, neonatal or egg stages that 12 infected individuals were detected and excluded from the study. In the second stage, the questionnaire was divided into two groups of experimental and



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control. Then, according to the goals, available resources and the results obtained from the completion of questionnaires in the pre-test phase, educational needs assessment and teaching materials and methods and the number of sessions required for training were identified.

After analyzing the pre-test and the results of the linear regression test, it was found that self-efficacy and perceived benefits directly and indirectly affect the behavior and should be considered in the intervention. Therefore, the curriculum based on the health belief model was designed with emphasis on these two structures. In the first stage of education, general information on head lice infestation (lice characteristics, location, symptoms and side effects, transmission routes and ways to prevent and fight) was provided for students of experimental group. In order to increase perceived benefits, first, the questionnaire was asked about benefits of student behavior and then explained in detail for them. The lecture first emphasized the importance of preventative behaviors (including regular combing, bathing, brushing and brushing, using personal items both at home and at the barber shop, etc.) to increase students' motivation . After that, using the group discussion method, barriers to behavior were identified and solutions such as planning, step-by-step, assistance from others, etc. were presented. Next, ways to strengthen self-efficacy, including breaking behavior complex to smaller stages, repetition of behavior, encouragement and praise for the performance of duty and etc. and increasing self-esteem were explained to students. In the final stage, tips and methods of doing preventive behaviors were presented for the students and they were collectively committed to do the precautionary behaviors. In all sessions, a question and answer method was used to ensure learning of the materials. For training each of structures a 45 - 60 minute session was considered and training sessions were held in the student's classroom.

Educational intervention was conducted only for students in the experimental group. Teaching aids only included in pamphlets were given to students of the experimental group. After 6 weeks as an intervention period, the primary questionnaire was distributed among the students of both groups. In similar studies, the duration of the intervention was 1 to 3 months.[27-29]

After collecting data, data was analyzed by SPSS software. In descriptive statistics, the distribution of absolute and relative abundance and percentage was used. T-test, Chi-square, One-way ANOVA and Pearson correlation were also used for the analysis.

Initially, the purpose of the study was told to the students and they were satisfied to participate in this study and their parents were involved in the intervention. Participation was voluntarily in this study. After completing the study, the control group was also presented at a meeting and the pamphlet was distributed among them.

## Results

According to the demographic data, the average birth rate in the experimental group 1.76 (0.881) was and in the control group 1.89 (1.117), the mean of household size in the experimental group 4.80 (0.931) was and in the control group 4.62 (0.850) was. The mean frequency of combing in the experimental group 3.07 (1.501) was and in the control group 3.07 (0.959) was. Education of 43.6% of the fathers and 47.3% of the mothers was diploma. 74.5% of the fathers were workers and 90.9% of mothers were housewives. The maximum number of baths per week in both groups was also twice. There was no significant difference between two groups in terms of demographic information (Table 1).

In assessing the average percentage of the maximum score of theoretical constructs, it was found that perceived sensitivity was the highest percentage 80.9% and the perceived benefits were the lowest percentage 28.75%.

Based on the Pearson correlation test, head lice preventive behaviors with perceived benefits and self-efficacy showed a positive and significant correlation. The beliefs of the health belief model included awareness, perceived sensitivity, perceived



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severity, perceived barriers, perceived benefits, and self-efficacy predicted 28.7 percent of the variance of challenging behaviors, among which self-efficacy was the strongest predictor (Table 2).

According to guideline structure results for action, 55.5% of the students believed that the doctor could have the most assistance in preventing pediculosis, and 56.4% of the students adopted doctor's advice on the prevention of head lice.

The results of the study showed that there was no significant difference between the mean score of knowledge, behavior, and constructs of the health belief model except perceived severity, before the intervention, in two groups of experimental and control. However, but after the intervention, the mean score of knowledge, perceived susceptibility, perceived severity, perceived barriers, perceived benefits, self-efficacy and behavior in two groups showed a significant difference (Table 3).

The behavioral structure also increased in the experimental group after the intervention, and the highest increase was related to the behavior of using personal belongings in hairdressers and then bathing. In contrast, there was no increase in the control group (Table 4).

**Table 1.** Comparison of absolute frequency distribution of demographic variables in students of experimental and control groups

| Variable | | Test | | Control | | P-value |
|---|---|---|---|---|---|---|
| | | Number | (%) | Number | (%) | ( Chi-square test) |
| **Father's job** | Employee | 3 | (5.5) | 10 | (18.2) | 0.091 |
| | Worker | 41 | (74.5) | 31 | (56.4) | |
| | Marketer | 0 | (0) | 3 | (5.5) | |
| | Teacher | 2 | (3.6) | 1 | (1.8) | |
| | Un-Employed | 0 | (0) | 1 | (1.8) | |
| | Others | 9 | (16.8) | 9 | (16.4) | |
| | Total | 55 | (100) | 55 | (100) | |
| **Mother' job** | Employee | 2 | (3.6) | 5 | (9.1) | 0.483 |
| | Worker | 0 | (0) | 1 | (1.8) | |
| | Marketer | 1.8 | | 1 | (1.8) | |
| | Teacher | 2 | (3.6) | 4 | (7.3) | |
| | Un-Employed | 50 | (90.9) | 43 | (78.2) | |
| | Others | 0 | (0) | 1 | (1.8) | |
| | Total | 55 | (100) | 55 | (100) | |
| **Father's education** | Elementary | 8 | (14.5) | 10 | (18.2) | 0.648 |
| | Secondary | 12 | (21.8) | 16 | (29.1) | |
| | High School | 24 | (43.6) | 18 | (32.7) | |
| | University | 11 | (20) | 11 | (11) | |
| | Total | 55 | (100) | 55 | (100) | |
| **Mother's education** | Illiterate | 0 | (0) | 3 | (5.5) | 0.198 |
| | Elementary | 8 | (14.5) | 9 | (16.4) | |
| | Secondary | 10 | (18.2) | 4 | (7.3) | |
| | High School | 26 | (47.3) | 25 | (45.5) | |
| | University | 11 | (20) | 14 | (25.5) | |
| | Total | 55 | (100) | 55 | (100) | |



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**Table 2.** Regression analysis indicators of the concepts of health belief model based on model assumptions

| Independent Variables | Standardized ß | P-value | $R^2$ | Dependent Variable |
|---|---|---|---|---|
| Awareness | 0.036 | 0.695 | 0.287 | Behavior |
| Perceived sensitivity | -0.142 | 0.167 | | |
| Perceived severity | 0.073 | 0.473 | | |
| Efficacy | 0.621 | 0.00 | | |
| Perceived benefits | -0.118 | 0.270 | | |
| Perceived barriers | 0.071 | 0.415 | | |

**Table 3.** The mean, standard deviation and percentage of score obtained from the studied variables in two groups of experimental and control before and after the intervention

| Variable | | Before | After | Percentage of score obtained before intervention | Percentage of score obtained after intervention | P-value (Paired t test) |
|---|---|---|---|---|---|---|
| Awareness | Test | 2.31 (13.49) | 1.48 (16.91) | 74.94 | 93.94 | 0.00 |
| | Control | 2.60 (13.45) | 2.02 (13.15) | 74.72 | 73.05 | 0.480 |
| Perceived sensibility | Test | 3.93 (16.18) | 1.83 (18.76) | 80.9 | 93.8 | 0.00 |
| | Control | 3.38 (15.11) | 3.58 (15.22) | 75.55 | 76.1 | 0.863 |
| Perceived severity | Test | 4.19 (14.53) | 1.21 (19.53) | 72.65 | 97.65 | 0.00 |
| | Control | 4.32 (13.18) | 3.81 (12.78) | 65.9 | 63.9 | 0.637 |
| Perceived barriers | Test | 3.65 (5.75) | 2.19 (1.80) | 28.75 | 9 | 0.00 |
| | Control | 3.30 (5.20) | 4.43 (4.95) | 26 | 24.75 | 0.710 |
| Perceived benefits | Test | 5.51 (14.05) | 2.69 (18.58) | 70.25 | 92.9 | 0.00 |
| | Control | 4.19 (15.24) | 4.50 (12.38) | 76.2 | 61.9 | 0.001 |
| Self-efficiency | Test | 3.53 (14.67) | 1.67 (18.67) | 73.35 | 93.35 | 0.00 |
| | Control | 3.20 (15.62) | 2.43 (14.53) | 78.1 | 72.65 | 0.037 |
| Behavior | Test | 1.84 (7.71) | 1.60 (8.58) | 77.1 | 85.5 | 0.00 |
| | Control | 1.89 (7.11) | 1.39 (6.73) | 71.1 | 67.3 | 0.242 |

**Table 4.** Comparison of the percentage of preventive behaviours in two groups before and after the intervention

| Variable | | Test | | Control | |
|---|---|---|---|---|---|
| | | Before | After | Before | After |
| Neat combing | Always | 76.36 | 89.1 | 70.90 | 74.55 |
| | Sometimes | 23.64 | 10.90 | 29.1 | 25.45 |
| | Never | 0 | 0 | 0 | 0 |
| Tidy barefoot | Always | 61.81 | 87.28 | 56.36 | 58.62 |
| | Sometimes | 38.19 | 12.72 | 43.63 | 41.38 |
| | Never | 0 | 0 | 0 | 0 |
| Brush and shoulder cleaning | Always | 69.09 | 81.82 | 52.72 | 27.27 |
| | Sometimes | 27.27 | 18.18 | 41.83 | 63.63 |
| | Never | 3.64 | 0 | 5.45 | 9.1 |
| Use of personal items in the hairdressing salon | Always | 34.54 | 61 | 27.27 | 10.90 |
| | Sometimes | 25.46 | 27.27 | 29.1 | 43.65 |
| | Never | 40 | 12.72 | 43.63 | 45.45 |
| Use of personal belongings at home | Always | 74.54 | 80 | 61.83 | 32.72 |
| | Sometimes | 23.65 | 20 | 34.54 | 63.65 |
| | Never | 1.81 | 0 | 3.63 | 3.63 |



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## Discussion

In this study, 110 female students of fifth grade elementary school students were studied in two groups of experimental and control groups. The purpose of this study was to determine the effect of education based on health belief model in the prevention of pediculosis in primary school students of Bafq city.

The prevalence of head infections to lice and rush in female students of fifth grade was 10.9%, which is consistent with the results of the study of Riabi and Atarodi (2012) in Khorasan Razavi and Matlabi et al. (1989) in Gonabad. [17, 18] According to the standard defined by the International Association for the Scientific Cooperation of the international cooperation, the prevalence of head lice in primary schools in the city of Bafq is in a state of lice epidemic that the need to educate families, students and teachers about prevention ways and control of this infection is highly felt.

There was a positive and significant correlation between head lice preventive behaviors and self-efficacy and perceived benefits. Based on these findings, it can be concluded that by increasing self-efficacy and perceived benefits preventive behaviors will be promoted in students. Morowati Sharifabad et al. (2014) and Namdar et al. (2012) achieved the same results in their study. [30, 31]

Based on the results of regression analysis, knowledge and constructs of the health belief model predicted 28.7% of the variance of behavior, among which self-efficacy significantly predicted head lice preventive behaviors. In the study of Morowati Sharifabad et al. (2014) health belief model constructs predicted 10.7% of behavioral variance, which was the only predictive power of self-efficacy construct in terms of statistical significance. [30] However, in the study of Moshki et al. (2014) perceived barrier and combing were recognized as the strongest structures that are not consistent with this study. [6]

Self-efficacy is a connecting factor between awareness and behavior and the belief in one's ability to behave knowing the causes of doing that behavior for the individual and what he is supposed to do is not enough; however, he must be able to know whether he is capable of doing that particular behavior or not. In other words, self-efficacy is an introduction to doing a behavior. [32]

The findings of this study showed that education based on Health Belief Model on pediculosis prevention increased the knowledge score, constructs of health belief model and the behavior of the test group compared to the control group. According to the analysis of pre-test stage questionnaires, an educational program with emphasis on two self-efficacy and perceived benefits for behavior change was designed and implemented for students in the experimental group. The analysis of the questionnaires after educational intervention showed that the mean of perceived benefits score in the experimental group was changed from 14.05 (5.52) to 18.58 (2.69), which had a significant increase compared to the control group. The findings are congruent to the study of Sharifirad et al. (2007) [33] on nutrition training in people with type 2 diabetes, Sadeghi et al. (2016), Volk and Koopman (2001) in the field of AIDS prevention. [29, 34] Some studies results suggest that the person's perception from the benefits paves the way for preventive behaviors. [32]

In this study, the average self-efficacy score increased from 14.67 (3.53) to 18.67 (1.67). Self-efficacy is one of the components introduced by Bandura in 1988 and added to the model. Self-efficacy is one's judgment of the assurance of his ability to perform a special act that depends on the individual's sense of control over his or her environment and behavior. [35] Individuals with more self-efficacy have higher goals and are more committed and therefore have more desirable behavior. Several studies also show the effect of education based on the Health Belief Model to increase the average score of self-efficacy. [33, 36]

The mean of behavioral scores in the experimental group was increased from 7.71 (1.84) to 8.58 (1.60), and contrary to the results before the intervention, there was no significant difference between two groups. After the intervention, there



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was a significant difference between two groups. Furthermore, in the experimental group, the comparison of the mean scores obtained before and after the intervention showed a significant difference, but in the control group, this difference was not significant. The most significant increase was related to two behaviors of the use of personal belongings in the hairdressing salon and regular shower. The results of the study by Jadgal et al. (2014) and Olayemi et al. (2009) illustrate the effect of educational intervention on the erection since it is preventative.[27, 37]

In order to increase the score of perceived benefits and self-efficacy in students, it is first necessary that they become familiar with the importance of illness, its symptoms and its complications, prevention methods, etc. In this study, there was a significant difference between two groups in the mean of other grades of structures, especially perceived severity before and after the intervention.

Another concept in this guide is the practice. Before and after the intervention, both experimental and control groups, the doctor received the highest percentage. Considering the importance of this group in implementing health programs, it is also necessary to pay attention to the development of health programs to change the behavior of the group as well as to familiarize students with the role of health staff and school educators. In Sarani's (2011) study,[38] the most commonly used guides for practice were percentage of physician, interns, family, radio, and books. In the study of Moshki et al. (2006)[6] the physician also had the most importance in advising on preventive behaviors that the results of both studies were in line with the findings of this study.

The limitations of this study were the low age of fifth grade students and the probability of error in completing the questionnaires. Another limitation is related to the guiding structure for action. Since this structure has two qualitative questions, it was not included in the regression test and it has only been dealt with descriptively.

## Conclusion

The results of this study showed that two constructs of self-efficacy and perceived benefits are predictive of behavior and education based on the health belief model has made pupils' knowledge, attitude and performance more effective for lice head prevention. Therefore, by implementing programs based on the health belief model and emphasis on the structures that have the greatest impact on the behavior better performance of students regarding the observance of lice preventative behaviors can be seen.

## Conflicts of interest

The authors do not have any conflict in the interests.

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## Authors' Contribution

Conceptualization, A.A.D.T. and Z.R.; Methodology, M.A.Sh. and Z.R.; Investigation, A.A.D.T. and Z.R.; Writing – Original Draft, T.H.; Writing – Review & Editing, Z.R. and T.H.; Supervision, A.A.D.T., Z.R. and M.A.Sh.

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