The Effectiveness of Education Based on BASNEF Model on Promoting Preventive Behavior of Cutaneous Leishmaniasis in Students

*Abedin Saghafipour[1], Jalil Nejati[2], Ehssan Mozaffari[3], Fatemeh Rezaei[4], Zabihollah Gharlipour[1], Mahdi Mirheydari[5]

[1]Department of Public Health, Faculty of Health, Qom University of Medical Sciences, Qom, Iran. [2]Health Promotion Research Center, Zahedan University of Medical Sciences, Zahedan, Iran. [3]Department of Medical Entomology and Vector control, School of Public Health, Tehran University of Medical Sciences. Tehran, Iran. [4]Department of Social Medicine, Medicine School Jahrom University of Medical Sciences, Jahrom, Iran. [5]Department of Communicable Diseases, Health Center of Qom Province, Qom University of Medical Sciences, Qom, Iran.

Abstract

Background: Cutaneous leishmaniasis (CL) is considered as one of the issues and problems of public health in most tropical parts of Iran. The CL is a very important disease, because of its dermal lesions on patient's bodies. This study was conducted to determine the effectiveness of education based on BASNEF model on promoting preventive behavior of CL among students.

Materials and Methods
This study was a quasi-experimental study which was performed on 192 middle school students that resident in endemic areas of Qom province- Iran based on BASNEF model. Students were divided into several groups then they were selected as experimental and control groups using cluster sampling method; Data collection was done by researchers made Questionnaire before and two months after intervention. After two months of students training, the data were collected again and analyzed via Chi- square, t- independent, and generalized linear model (GLM) statistics.

Results: The findings showed that 46.95% and 46.1% of students were males in experimental and control groups, respectively. The mean age in experimental and control groups were 13.8±1 and 13.9±9 years old, respectively. There was no significant difference in term of demographic data in experimental group in comparison of control group (P>0.05). Mean scores of knowledge, attitude, enabling factors, behavioral intentions and behavior as components of BASNEF Model increase significantly two months after the educational intervention among experimental group comparing to control group (P<0.05). Mean scores in subjective norms among students has increased, but there was no significant relationship between subjective norms in experimental group in comparison of control group (P >0.05).

Conclusion: According to the finding, educational intervention based on BAZNEF model can elevate knowledge, attitude, enabling factors, behavioral intentions and behavior of students for prevention and control of CL.

Key Words: BAZNEF model, Cutaneous leishmaniasis, Education, Iran, Students.

Corresponding Author:

Abedin Saghafipour, Department of Public Health, Faculty of Health, Qom University of Medical Sciences, Qom, Iran.

Email: abed.saghafi@yahoo.com

1- INTRODUCTION

Leishmaniasis is one of zoonotic diseases that it is classified into three clinical forms: Cutaneous leishmaniasis (CL), Visceral Leishmaniasis (VL), and Mucocutaneous Leishmaniasis (MCL). Cutaneous leishmaniasis is caused by different species of the *Leishmania* genus in different foci of the disease. The *Leishmania* is the amastigote in the vertebrate body and the promastigote in the female's sand flies, as the vectors of leishmaniasis. There are two forms of CL; Zoonotic Cutaneous Leishmaniasis (ZCL), and Anthroponetic Cutaneous Leishmaniasis (ACL). This causative agent of ZCL; *Leishmania* major is transmitted from zoonotic reservoirs (mainly zoonotic rodents) to human by infected female sand flies biting (1).

More than 700 species of sand flies have been detected in the World. Out of them 52 species those belongings to Phlebotomus and Sergentomyia genus have been recorded in Iran (2). Phlebotomus papatasi and P. salehi are proven and secondary vectors of ZCL in Iran, respectively (1). Zoonotic rodent are mainly as the reservoirs of ZCL in Iran and until four species of them including Rhombomys opimus in Central and North-eastern, Meriones hurrianae in South-eastern, Tatera indica in Central, West and South and finally Meriones libycus in Central areas of Iran have known as the main reservoirs of the disease (3).

Serological and molecular techniques are used to detection of disease. In serological method, examinations are performed on suspected humans. Smears were prepared from skin lesions. All prepared smears were stained with Giemsa 10% stain solution and examined for the presence of amastigote forms of Leishmania microscopically (4). The clinical symptoms of disease are lesions that it can remain on human body (hands, legs and so on) for one year (1). It is estimated that the annual incidence of the disease in the World are 2 million new cases. 350 million people in 98 countries are at risk for disease and 12 million of populations in the World are infected to different types of leishmaniasis (5). The endemic foci of ZCL are located in Afghanistan, Pakistan, Iran, Iraq, Jordan, Palestine, Saudi Arabia, Syria, Yemen Libya, Egypt and Morocco (1). In Iran, about 20,000 cases of ZCL from 17 provinces have been reported annually to Management Center of the Ministry of Health whereas the actual number of its morbidity is 4-5 times that figure. The statistics also show that the prevalence of disease has been increasing in Iran. In recent years; new foci of the disease have been identified in the country.

Annual average incidence rate of ZCL is 20-40 per100, 000 cases (6). At now, this disease is one of the most important health problems and endemic disease in Qom province, Iran and a lot of cases are reported in this region annually. Reported cases of ZCL were 382,406 and 83 that incidence rate were 38.2, 40.6 and 8.3 per 100,000 in 2014-2016, respectively (7). There are many various strategies for controlling of ZCL in the world. Vector and reservoir control methods (such as indoor residual spraying to control of vectors and use of rodent control strategies against reservoir rodents), personal protection; reduction contact between people and vectors (Use of Insecticide-treated bed nets and insect repellency products to repellent sand flies vectors) in order to prevention of disease can be mentioned. Besides that, case founding and health education are useful preventive actions in this disease (1).

Due to lack of success in production of vaccines and drugs for preventing most of the parasitic diseases such as CL and high prevalence of them, health education issue is one of the most important elements of control program of World Health Organization (8). For effective education,

present situation of the health problems should be studied perfectly, so, it is necessary that programs be based on health education scientific models and theories. According to comprehensive framework, they are devises that can able high risk group people to protect personal health, their physical and social health, health live style and individual habits more than previous. One of the useful models for this health surveillance is BAZNEF model. It includes beliefs, attitudes, subjective norms and enabling factors that was presented by Hubley (9). BAZNEF model as a combination of behavioral and Proceed Models was applied to study and planning for behavior changes and determination of effective factor associated with them (10).

The difference is that, unlike behavioral model, each belief in this model will not be led to behavior, but there are enabling factors such as money, having skills, access to primary health care services between Beliefs and behavior (10). The components of this model are included Beliefs, Subjective norms, Attitudes and Enabling factors that BASNEF which is made up of the first letters of these above words (11). Heshmati et al., in a study in order to determination the relationship between health volunteer's behavior and family's preventive behaviors based on BASNEF model in Yazd city, have found that providing effective education, attitudes and enabling factors for health volunteers would have additional effect on family's preventive behaviors and ultimately on leishmaniasis control programmes (10).

Effect of educational programs on leishmaniasis control was evaluated by Pardo et al., they have showed that families with better economic condition and high family income use of preventive issues such as bed nets and insecticides more than other people. Besides that, it was revealed thereby the incidence of disease are low among them, also, it was found providing financial resources for shopping bed nets can reduce inequities in health situation in endemic foci of deferent societies (12). In many previous studies it was observed that the education has been positive effects on knowledge and practices of participants in studies (13-17). Qom Province is one of the endemic foci of ZCL in Iran and the prevalence of the disease is high in this region (18), besides that, there is no scientific researches on preventive behaviors about ZCL based on BASNEF model in Qom province, therefore this present study was conducted to determine the effectiveness of education based on BASNEF model on promoting preventive behavior of cutaneous leishmaniasis among students.

2- MATERIALS AND METHODS

2-1. Study design and population

This quasi-experimental study has been conducted on 7-9th grade students (girls and boys) of two schools, who were resident in Markazi district; an endemic focus of ZCL in Qom province; Central of Iran during April to June, 2016.

2-2. Methods

In this research we used cluster sampling method; at first, using stratified sampling method, two schools (girls and boys) were selected as clusters from two municipal zones. Then, using simple random sampling method, a specific number of students proportionate to the total number of students at each cluster were selected.

While determining the sample size based on the below formula, the sample size was calculated by using the sample size formula as 192 students (92: 46 males and 46 females, 48: 24 males and 24 females and 52: 26 males and 26 females students; males and females equally in 7-9th, respectively).

2-3. Measuring tools: Validity and Reliability

Data collection instrument was a researcher-made questionnaire that was developed on the basis of BASNEF model and study goals. Validity of the questionnaire was approved by experts' viewpoints by 10 people of faculty members of Qom University of Medical Sciences and reliability of the questionnaire was approved on the basis of Cronbach's alpha that its Cronbach's alpha-coefficient was 0.81, 0.90, 0.80, 0.87 and 0.91 for knowledge, beliefs, practices, enabling factors and subjective norms, respectively.

The questionnaire was including demographic characteristics (10 questions), knowledge of preventive and control strategies and clinical symptoms of leishmaniasis (10 questions), Students' attitudes about how a person can be infected with leishmaniasis (10 questions), subjective norms (7 questions), behavioral intention (7 questions), enabling factors (7 questions) and practice (6 questions). Knowledge questions were developed as four answer choices that score one were used for correct response and zero score were used for incorrect response and a total score of 100 was justified.

Attitude questions were developed on the basis of six point Likert scale (strongly agree, agree, somewhat agree, somewhat disagree, disagree, strongly disagree), so scores was between zero to five so that highest score and lowest score was related to the most desirable attitude and most undesirable attitude respectively and a total score of 100 was justified. Subjective Norms questions were developed as three answer choices (yes, somewhat, no), that two, one and zero score were used for yes, somewhat and no response, respectively and the total score was calculated based on the percentage of each option question. Behavioral Intention, enabling factors and practice questions were developed as three answer choices (yes, somewhat, no), that two, one and zero score were used for yes,

somewhat and no response, respectively and a total score of 100 was justified. In Attitude questions section some of people's attitude were surveyed. For instance, "Cutaneous leishmaniasis is a sign of God's wrath "and" it's not important what I do if this is my fate that I must become ill so I will involve with illness". In Subjective Norms questions section, perspectives of students' parents, family members, friends, teachers, classmates, health care workers and relatives about preventive and control methods of cutaneous leishmaniasis were asked. For example, "It's not important for my family members that I be involved with leishmaniasis scar or not". In enabling factors section, access to books, booklets, educational classes, health care and the time required for access to medicine in the form of questions such as " do you must spend a lot of time for access to the nearest health care services?" have been mentioned.

In behavioral intention questions section, some subjects and Phrases about installing nets on doors and windows, not playing in dilapidated buildings and animal fertilizers sites, the care and treatment of CL such as "if I were observes CL lesions on my body I will refer to health care services center as soon as possible" were evaluated. Also, in practice section, some sentences such as "I do not spill garbage in the streets and along the rivers because it will cause the forming of breeding places for sand flies as a vector of disease" were expressed.

The questionnaires were completed by students in two experimental and control groups, in before and two months after educational intervention. The reports, documents, data and recorded information in health centers, interview and currents guidelines (National guidelines for Cutaneous Leishmaniasis, Center for Diseases Management, Zoonoses Control Department) were used for providing the

educational content. Six one-hour training sessions was conducted for students in experimental group, educational activities was included speech, focus group (group discussions), brainstorming, Question and Answer sessions, distribution of booklets, pamphlets and educational posters. The educational activities were performed by educated experts who were worked in department of prevention and control of diseases, Provincial Health Center of Qom, Iran.

2.4-Ethical consideration

At first, coordination and permission letter from Qom office of Education and Training was taken. It should be mentioned that before the start of the study, the aim of the study was demonstrated and the target group were ensured about the confidentiality of their data.

2-5. Inclusion criteria

The inclusion criteria were determined of being 7-9th grade Iranian students who were resident in Markazi district of Qom province and being satisfied to participate in this study.

2-5. Exclusion criteria

The exclusion criteria were included; being non-Iranian, not living permanently in the study area, just partial completing of the questionnaire and unwillingness for participation in current study.

2-6. Data Analyses

Histogram plots were used to check for normality of data, if the data was normally distributed, the curve will be a bell–shaped curve and ANOVA can be used for analysis. In addition, Shapiro-Wilk and Kolmogorov- Simonov tests showed that the distribution was normal (P = 0.01). Matching variables was done between the two studies groups using Chi-square test (**Table.1**).

After data encoding and entering in to SPSS 16.0 software, for data analyzing paired t-test were used. Also, according to normality of data in under studied components were used parametric tests such as paired t-test, independent t-test. Also, to evaluate effect of the educational intervention on components BASNEF model in relationship to cutaneous leishmaniasis generalized linear models (GLM) repeated measures analysis were used at a significance level of 5% on software SPSS version 16. P> 0.05 was considered significant level.

Table 1.The base line compression of two studies groups based on matched variables

Variables	Chi-square test	
	t-test	P-value
Age	0.766	0.44
Gender	2.06	0.93
Family members	0.73	0.46
History of previous infection	0.88	0.70
History of previous infection among family members	0.78	0.57

3-RESULTS

Out of students participating in the study, 46.95% and 46.1% were males in experimental and control groups, respectively. The mean age in experimental and control groups were

13.8±1 and 13.9±9 years old, respectively. Chi-square test showed that there were no significant differences among the demographic variables such as gender, history of previous infection, history of previous infection among family members

and Parent's educational level and Knowledge, Attitudes and Behavior of participants in experimental group in comparison of control group (P>0.05). The mean of family members were 5.4± 1.4 and 5.26±1.3 in experimental and control groups, respectively. In terms of educational grade of studied students, 92(47.92%), 48(25%), 52 (27.08%) of the students were 7th, 8th and 9th educational level, respectively. These students in all three educational grades have divided in two experimental and control groups equally in term of gender. Most of the student's parents in two groups had initial educational level.

Only 5.2% of their fathers were formal worker and had diploma. The majority of participates in the present study did not have history of previous infection (95.8% in experimental versus 96.9% control groups). Also, the majority of student's family members taking part in this research did not involve with history of previous infection (82.3% and 85.3% in experimental and control groups), respectively (**Table.2**). The mean scores of the structures of the BASNEF model in both groups had no significant differences before the training session (**Table.2**), but as it is shown in **Table.3**, in the intervention group the situation changes and significant differences are observed in the mean scores of the structures of the BASNEF model after the training (P<0.05). In 96 students who were in the experimental group, the mean score in knowledge was elevated to 73.16 + 10.80, attitudes 74.551±8.1, subjective norms 68.80+ 10.20, enabling factors 68.80+ 15.60, behavior intention 79.73+ 13.60 and behavior 69 % + 16.40 after 2 months.

There was a significant difference in the mean score of the structures of the majority of BASNEF model (attitudes, Behavior intention and enabling factors) between the control and intervention groups after the training process. It means the mean score (score from 100) of student's attitude about prevention of the disease, their behavior intention to use of strategies for leishmaniasis prevention and control and enabling factors were elevated from 52.90 to 74.55, 57.50 to 79.73 and 49.36 to 68.80 after intervention, respectively. But mean scores in subjective norms among students has increased, but there was no significant relationship between subjective norms in experimental group in comparison of control group (**Table.3**).

Table-2: The comparison of demographic data of the participants in experimental and control groups

Variables		Experimental group No. (%)	Control group No. (%)	P-value*
Gender	Male	45 (46.9)	44 (46.3)	> 0.05
	Female	51 (53.1)	52 (53.7)	
History of previous infection	Yes	4 (4.2)	3 (3.1)	>0.05
	No	92 (95.8)	93 (96.9)	
History of previous infection among family members	Yes	17 (17.7)	14 (14.7)	>0.05
	No	79 (82.3)	82 (85.3)	
Parent's education	Illiterate	53 (27.1)	25 (26.2)	>0.05
	Primary school	104 (54.2)	107 (56)	
	Secondary school	23 (12)	38 (19.9)	
	High school/Diploma	13 (6.7)	15 (15.7)	
	Academic	0 (0)	5 (2.6)	

*Chi-square test.

Table-3: The comparison of scores mean of components of BAZNEF model before and after the intervention case and control group (*t*-test)

Variables	Group	Before intervention Mean ±SD (score from 100)	2 Months after intervention Mean ±SD (score from 100)	P-value	
				Intervention effect	Effect of period intervention
Knowledge	Experimental	46.83±13.35	73.16±10.80	0.031	0.0001
	Control	44.11±14.08	34±14.97		
Attitudes	Experimental	52.90±8.57	74.55±9.90	<0.0001	0.0001
	Control	65.44±8.60	64.08±9.16		
Subjective norms	Experimental	57.50±5.50	68.80±10.20	0.95	0.0001
	Control	69.47±8.30	58.10±7.37		
Enabling factors	Experimental	49.36±16.10	68.80±15.60	<0.0001	0.0001
	Control	38.80±15	33.90±14.50		
Behavior intention	Experimental	57.50±8.10	79.73±13.60	<0.0001	0.0001
	Control	60.70±9.60	60.90±8.30		
Behavior	Experimental	52.80±19.70	69±16.40	<0.0001	0.0001
	Control	55±21.10	41.9±18.40		

4- DISCUSSION

Zoonotic cutaneous leishmaniasis is a parasitic disease that transmitted from rodent's reservoir to human's host with bite of some species of infected female sand flies (2). One of the most important preventive and control methods for preventing of is personal protection. It cause reduction contact between people who residents in endemic areas and vectors of disease (1). For instance, use of Insecticide-treated bed nets and insect repellency products to repellent sand flies vectors are effective in control of disease (1). Students as the good educators to teach prevention strategies for control of disease and they are enable to transmit the concepts to other people specially their families (19). The main object of the present study was determination the effectiveness of educational intervention based on BASNEF model to promote CL preventive behaviors among students. In all components of BASNEF model, get a higher score indicate a more favorable situation in terms of implementation of CL preventive behaviors (10). This study was revealed that the mean score of most components of BASNEF model such as knowledge, attitude, enabling factors, behavioral intention and practice were significantly increased after educational interventions compared to before them in the experimental group. Also, the score of subjective norms despite not being statistically significant it was increased. But it was not observed the statistically significant in mean score of participants into control group. The present study has demonstrated that knowledge of students in both experimental and control groups was lower than standard level before educational intervention, which it indicates the need for these groups to education. Findings of the current study support erstwhile studies (20, 21) evaluating knowledge of students about preventive behaviors in CL control programs. It is important subject; because having correct

and necessary information is the first and most fundamental steps to surveillance on any health problem. This study has also shown that a significant increase was happened in knowledge of experimental group after educational intervention, whereas it was not observed a significant deference in control group, that is indicates educational intervention had been effective on increasing of student's knowledge about CL. This finding is concurrent with the results of other studies on promotion of knowledge after educational intervention (22). In several studies (20, 21), researchers have proven that students that are resident in endemic foci in Iran did not have enough knowledge about CL. Besides that, there are wrong attitude on transmission of disease among them. For instance, "Cutaneous leishmaniasis is a sign of God's wrath "and" it's not important what I do if this is my fate that I must become ill so I will involve with illness. It seems some factors such as social and cultural beliefs are also effective on preventive behaviors.

According to our results, like knowledge, there was a significant difference in the student's attitude in experimental group; whereas a significant difference was not observed in control group. Based on the results of other studies (23), increasing people's knowledge and attitude can be one of the promoting factors in mean score of attitude of participants in experimental group. The result of this study about promotion of attitude after educational intervention is in agreement with Heshmati et al. findings (2011) (10). In a similar study, Khani Jeihooni et al. (2012) observed that mean scores of health workers and households was increased statistically after educational intervention (education regarding CL based on BAZNEF model by health volunteers) in experimental group (24). Vahedian et al (2014) have observed that educational intervention could promote mean score in

participant's attitudes in these studies (25). But Yaaghobi et al. (1999) were able to achieve this result (26). and The differences in the impact of education on people's attitudes in various studies could be due to the fact that publicly attitude and practice more than knowledge could be under impact of social and environmental factors, so education alone cannot be able to modification their attitude. Thereby, we can mention increased knowledge alone cannot lead to a better attitude. In the other hand, to find out the attitude change was happened or not, it is better people talk about their beliefs. In addition, in fact, the process of presenting comments by participants and observing reactions of other people is one of the strongest strategies for evaluating the change in attitude (27).

In this study, problem-based learning method was used to change student's attitude. With implementation of this training method, not only educational materials did not deliver to learners one way, but also learners themselves participate in the process of discussion and their opinions were expressed. After that, they tried to change their wrong attitude, and were responsible. In a similar study, Nicklas et al. showed that materials and activities used were acceptable channels for increasing awareness, positive attitudes, and knowledge about fruits/vegetables in participants. It's probable that this change of attitude has been due to the use of focus groups for target population and program development. If only it was used educational intervention, attitude would not change more (28).

Totally, it seems that various factors including lack of personal protection facilities, wrong attitudes, and relative's recommendation were mentioned as effective preventive factors in disease control. Another finding of this research indicates that subjective norms as a one of

components of BAZNEF model in experimental group, although was not statistically significant, but the mean score of this component after educational intervention have been increased. Whereas, there was no a significant deference in control group statistically. This finding demonstrated that education alone does little role to change the patterns and subject norms. This finding is in agreement with most of the previous studies (29), but Kohzadi observed that there was no significant relationship between experimental and control groups statistically before and after educational intervention in terms of mean score of subjective norms (30).

Of course it should be noticed that subjective norms (the famous and effective people on the behavior of other people in the community) are important factors to do some behaviors or not in every society. One group of these effective people is students that we can use of them for promoting their family's knowledge, attitude and ultimately health behaviors. In this regard the more extensive educational and training plans are necessary. So, according to multiple factors effecting the disease control and prevention, it seems a social approach should be set in educational programs. Educational courses should be designed so that in addition to students, his family and relative such as father, mother, brother, sister and friends will also be included. It was previously approved by Stewart- Knox (2003) that inappropriate subjective norms can cause breastfeeding of babies more likely to be difficult (31). Also, in this study, the results showed that mean scores of enabling factors have increased significantly after 2 months in experimental group, whereas a significant deference was not observed in control group. This could indicate a positive role of educational intervention to create enough skills among students to control

and prevent of CL. In present study, it was determined that providing of enabling factors to students can be effective to encourage them for regarding preventive behaviors of disease in experimental group. In several studies (10, 13, 22, 32, 33) researchers have proven that educational intervention can lead to promotion of enabling factors. This present study revealed that there was a significant relationship in mean score of student's behavior intention before and after intervention in experimental group. One of the important factors for forming health behavior is concurrency of behavioral intention and enabling factors.

A person may have the intention to perform the desired behavior, but because of the impact of factors such as lack of skills, money, time and other enabling factors, the behavior is not done. The results of this study indicated that intendance to use of insecticide-treated nets (ITN) and Insect Repellent Pens as two personal protection devices was not at a desirable level among students, while the use of ITN is one of the more effective activities for preventing and control of CL. In this present study, investigation on the enabling factors showed that very few of the students was aware of the address of ITN store. In addition to this, the majority of people did not have enough budgets for providing preventive equipment.

Also it was previously proven that headship of families who had better economic condition use of preventive equipment (ITN and insecticides) more than others. Besides that, it was revealed funding for the purchase of ITN can reduce injustice in the health state of societies where the disease has endemic focus (12). Also, in a similar study, Downs and Hausenblas have reported that there was a significant relationship between behavioral intention and behavior (34). It is important to mention that, in this present study, a significant deference was

observed in mean score of experimental group's practice after educational intervention and after that, the mean score of student's practice was increased. Consequently, bearing in mind all these factors based on BAZNEF model can improve knowledge, attitude and behavior of students.

4-1. Limitations of the study

Despite of this fact that students are most accessible group to teach and learn, however, getting permission from the Education office for entering to schools in order to preformation the educational intervention was one of the limitations of this the study.

5- CONCLUSION

According to the finding, educational intervention based on BAZNEF model can elevate knowledge, attitude, enabling factors, behavioral intentions and behavior of students for prevention and control of CL. If the objectives and educational programs on knowledge and modification of wrong attitudes and these programs focus on enabling factors, access to preventive behaviors in order to CL control, can will be easy.

6- CONFLICT OF INTEREST: None.

7-ACKNOWLEDGMENT

8- REFERENCES

1. Iranian Ministry of Health & Medical Education: Center for Disease Control, Zoonoses Control Division a guide to control cutaneous Leishmaniasis. 2007. Available at: http://www.semums.ac.ir/images/download/1511/317.pdf. Accessed Feb 2, 2013. (Persian)

2. Vahabi A, Rassi Y, Oshaghi MA, Sayyadi M, Rafizadeh S. Detection of Leishmania major DNA within wild caught Phlebotomus papatasi and species composition of sand flies in endemic focus of cutaneous leishmaniasis, in western Iran. J Parasit Dis 2016; 40(1): 69–74. doi: 10.1007/s12639-014-0448-0. PMCID: PMC4815861.

3. Rezaei F, Saghafipour A, Rassi Y, Abai MR. Effect of rodents' management plan on controlling cutaneous leishmaniasis in endemic centers of Qom province in 2012. Hormozgan Med J 2015; 19 (3): 219-225.

4. Mohebali, M. Visceral leishmaniasis in Iran: Review of the Epidemiological and Clinical Features. Iran J Parasitol 2013; 8(3): 348–358. PMCID: PMC3887234.

5. Ardahali S, Rezaei H, Nadim A. Leishmania and Leishmaniasis. 2nd ed. Tehran: Tehran Uneversity Publication Center; 1994.

6. Islamic Republic of Iran Ministry of Health and Medical Education. Principles of disease prevention and surveillance. Tehran: Center for disease control; 2008.pp.249-55.

7. Islamic Republic of Iran Ministry of Health and Medical Education. Instruction of leishmaniasis Control. Tehran: Center of disease control; 2013.

8. World Health Organization. Control of the leishmaniasis. Report of a meeting of the WHO Expert Committee on the Control of Leishmaniases, Geneva 2010.

9. Hubley J. Understanding behaviour: the key to successful health education. Trop Doct 1988; 18(3): 134-8.

10. Heshmati H, Rahaei Z, Hazavehei SMM, Hasanzadeh A. Related factors to educational behaviors of health volunteers about cutaneous leishmaniasis on the Basis of BASNEF model in Yazd. Ardabil journal of health 2011; 1(3):48-56.

11. Ajzen I, Fishbein M. Attitude-behavior relations: A theoretical analysis and review of empirical research. Psychological Bulletin 1977; 84(5): 888-918.

12. Pardo RH, Carvajal A, Ferro C, Davies CR. Effect of knowledge and economic status on sand fly control activities by householders at risk of cutaneous leishmaniasis in the subandean region of Huila department, Colombia. Biomedica 2006; 26(1): 167-79.

13. Doroudgar A, Tashakkor Z. Effect of education on teachers' knowledge towards leshmaniasis in Kashan. KAUMS Journal (FEYZ) 2003; 7 (3):57-63.

14. Yarmohammadi S, Eftekhar ardebili H, Mahmoodi M, Jazayeri S A, Chamari M. The effect of an educational program based on the BASNEF model on the nutritional behavior of guidance school female pupils. SJSPH. 2015; 13 (2):55-68.

15. Hosseini Z, Gharlipour Z, Mohebi S, Sharifirad Gh, Mohammadbeigi A, Kazazloo Z. Associated Factors of Milk Consumption among Students: Using Health Belief Model (HBM). Int J Pediatr 2017; 5(2): 4439-48. DOI: 10.22038/ijp.2016.7901.

16. Sadr Hashemi F, Soltani R, Hassanzadeh A, Eslami AA. Relationship between Breakfast Consumption and Self-Efficacy, outcome Expectations, Evaluation and Knowledge in Elementary

Students. Int.J.Pediatr.2017; 5(1):4163-74. DOI:10.22038/ijp.2016.7678.

17. Ghajari H, Ghaderi N, Valizadeh R, Shakerinejad Gh, Haghighizadeh MH. Knowledge, Attitude and Nutritional Behavior of Female High School Students about Consumption of Calcium-Rich Foods in Khorramshahr City, South West of Iran. Int J Pediatr 2016; 4(11): 3837-46.DOI:10.22038/ijp.2016.7795

18. Saghafipour A, Vatandoost H, Zahraei-Ramazani AR, Yaghoobi-Ershadi MR, Rassi Y, Shirzadi MR, et al. Spatial distribution of phlebotomine Sand Fly Species (Diptera: Psychodidae) in Qom Province, central Iran. Journal of Medical Entomology 2017; 54 (1):35-43.

19. Motamedi N, Hejazi SH, Hazavehei SMM, Zamani AR, Saberi S, Rahimi E. Effect of education based on Health Belief Model on promoting preventive behavior of coetaneous leishmaniasis. J Mil Med 2010; 11(4): 231-6.

20. Mazloumi SS, Servat FL. Knowledge, attitude and practice regarding to Leishmaniasis: a descriptive study in bafroye region. Tolooe Behdasht 2004; 3(1): 32-8.

21. Amirian H, Safavi M. Effect of education about leishmaniasis transmission and prevention in knowledge and practice of female high school student in Yazd in 2002. Journal of Public Health 2002; 2(4): 20-5.

22. Hazavehei SMM, Sharifirad GhR, Kargar M. The comparison of educational intervention effect using BASNEF and classic models on improving assertion skill level. Journal Research in Health sciences 2008; 8(1):7-11.

23. Mangesho PE, Shayo E, Makunde WH, Keto GB, Mandara CI, Kamugisha ML, et al. Community knowledge, attitudes and practices towards tuberculosis and its treatment in Mpwapwa district, central Tanzania. Tanzan Health Res Bull 2007; 9(1): 38-43.

24. Khani Jeihooni A, Hatami M, Kashfi S, Heshmati H. The Effectiveness of Education Based on BASNEF Model Program in Promotion of Preventive Behavior of Leishmaniasis among Health Workers and Families under Health Centers Coverage. JFUMS 2012; 2(1):26-33.

25. Vahedian M , Sadeghi R , Farhadlu R , Nazeri A, Dehghan A, Barati MH. Effect of Educational Booklet and Lecture on Nutritional Behavior, Knowledge and Attitude on Third-Grade Male Guidance School Students. Journal of Community Health Research 2014; 3(1): 1-12.

26. Yaaghobi A, Egtesadi SH, Porabdolahi P. The assessment of nutrition educational effect on Knowledge and attitude and practice of high school girls Paper presented at: Congress on nutrition. The 5rd abstract papers congress on nutrition in Iran; Tabriz, Iran; 1999.

27. Farzianpour F, Seddighi Gilani MA, Zeinalou AA. Assessment of medical education quality in Tehran university of Medical Science and Health Services. Journal of Medical Education 2005; 7(1): 42-6.

28. Nicklas TA, Johnson CC, Farris R, Rice R, Lyon L, Shi R. Development of a school – based nutrition intervention for high school students: Gimme 5. Am J Health Promot 1997; 11(5):315-22.

29. Duggleby WD, Degner L, Williams A, Wright K, Cooper D, Popkin D. et al. Living with hope: initial evaluation of a psychosocial hope intervention for older palliative home care patients: J Pain Symptom Manage 2007; 33(7):247-57.

30. Kohzadi K. The assessment of Educational effect through BASNEF model on knowledge, attitude and practice in first grade gaudiness school students in Bane about teeth and mouth health. Unpublished MSc Thesis. Tehran: Iran University of Medical Science; 2005.

31. Stewart- Knox B, Gardiner K, Wright M. What is the problem with breast feeding? A qualitative analysis of infant feeding perceptions. J Hun Nut Diet 2003; 16(4): 265-73.

32. Sharifirad GR, Golshiri P, Shahnazi H, Barati M. The impact of educational program based on BASNEF model on breastfeeding behavior of pregnant mothers in Arak. Arak Medical University Journal 2010; 13(1):63-70.

33. Laveist TA, Keith VM, Gutierrez ML. Black/white differences in prenatal care utilization: an assessment of predisposing and enabling factors. Health Serv Res 1995; 30(1): 43-58.

34. Downs DS, Hausenblas HA. Exercising for two: examining pregnant women's second trimester exercise intention and behavior using the framework of the theory of planned behavior. Woman's Health Issues 2003; 13(6): 222-8.