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Effect of Health Workers' Training Programs on Preventive Behavior of *Leishmaniasis* Based on BASNEF Model

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ABSTRACT

Background: We aimed to assess the impact of health workers' training program on preventive behaviors of *leishmaniasis* based on BASNEF (Belief, Attitude, Subjective Norm, and Enabling Factors) model in the families under the coverage of health centers.

Methods: The study was done in rural health centers of Marvdasht City, Fars Province, Iran in 2011. Health workers completed a specific questionnaire. Moreover, out of the families under the health center's coverage, 20 families from each health center were selected in order to complete the questionnaire. Then, 4 training sessions for the health workers and 2 training sessions for influential individuals were held. Weekly meetings were also conducted with the health workers' representatives in order to prepare the enabling factors and solve the problems. Three months after the health workers' training, the data were collected again and analyzed using the SPSS statistical software (version 16).

Results: The mean scores obtained for knowledge, attitude, behavioral intention, enabling factors, and health workers' behavior significantly increased after the educational intervention in the experimental (intervention) group ($P=0.001$). Influential individuals also revealed significant changes after the educational intervention ($P=0.001$). The mean scores obtained for those factors of the attendant families under coverage also increased significantly in the experimental group ($P=0.001$).

Conclusion: Educational programs based on the BASNEF model might change the health workers' behavior and, eventually, their training behavior leads to preventive actions in families under coverage.

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Introduction

Leishmaniasis is endemic in 88 countries throughout the world. Moreover, 350 million people around the world are at risk of getting infected by it. It is estimated that 14 million people are already infected. Moreover, 2 million individuals get infected every year and 1.5 million get the cutaneous *leishmaniasis*. According to W.H.O., this disease is accompanied by the incidence of 6 major parasitic diseases in tropical areas¹. On the contrary to other infectious diseases, the frequency of *leishmaniasis* is increasing². This increase is mainly due to the migration of the population, infection accompanied by the global warming, and changes in human ecology^{1,3}.

Since the disease has a rather long wound course, makes improper scars, and increase the probability of secondary infections, it has caused high treatment expenses resulting from the increases in the length of the treatment course and the complications of utilizing the existing medicines^{4,5}. When the disease is not cured, its duration will be between 5 months to 2 years, and consequently the probability of the disease

transmission will be increased⁶. In the Eastern Mediterranean area, *leishmaniasis* exists in Afghanistan, Iran, Iraq, Saudi Arabia, Pakistan, Syria, Jordan, and Sudan⁷. Iran has a high prevalence of *leishmaniasis*; in a way that it is ranked among the first seven countries of the world, and 3000 infected individuals are reported in the country every year^{1,8}. However, the real prevalence of the disease is 4 to 5 times more than the available statistics⁹. Regarding *leishmaniasis*, Fars Health Center reported Marvdasht City as one of the most infected cities¹⁰.

Due to the high prevalence of parasitic diseases, such as cutaneous *leishmaniasis*, as well as the lack of appropriate vaccines and medicines, W.H.O. has considered health education on preventing such diseases in priority¹¹. Moreover, the studies on controlling the disease vector emphasize the importance of health education alongside the society's cooperation^{12,13}.

Today, the focus of comprehensive health care program should be on self-care and education rather than treatment and reliance. In addition, effort should be made in order to enhance the individual's capabilities for improvement, ability, independence, and non-reliance¹⁴.

Giving health instructions to people may help those making effective decisions on their health; get self-confidence and essential skills to put decisions in to practice¹⁵. The value of health instruction programs depends on their effectiveness. On the other hand, such effectiveness is dependent on suitable application of theories and models used in health education program¹⁶. Any of these models have advantage compare to the others, since the components of the beliefs, attitudes, subjective norms and enabling factors (BASNEF) model not only address the individual ability regarding to the behavioral action but also concentrate on the potential of interpersonal and inability of the person toward the behavior¹⁷.

Behavioral attitude is a product of one's belief; in fact, it is the positive or negative evaluation of behavior. Subjective norms are one's belief relative to influential persons and this is on social pressures and reflections. Enabling factors are skills and sources that allow person's aim or intention to change the behavior¹⁸. On the other hand, we have got limited resources and, as a result, it is not possible to teach all the individuals of an area at the same time. Therefore, health workers can play a major role in developing a direct relationship with people in order to perform training programs. Thus, they should be trained in order to be able to conduct the training programs.

Considering the high prevalence of the disease, its great importance, and the major role the health workers play in educating and guiding people, the present study aimed to assess the effectiveness of the health workers' training programs.

Methods

In this prospective, quasi-experimental study, two health centers, located in the most prevalent endemic areas of *leishmaniasis* in Marvdasht City, Fars Province, Iran in 2011, were selected and randomly divided into a control and experimental group. The population under study consisted of the health workers of these health centers as well as their families infected with *leishmaniasis* and the families under the coverage of these health centers which contained no *leishmaniasis*-infected individuals. Therefore, all the health workers who had the inclusion criteria (N=20) were evaluated in the present study (10 in the control and 10 in the experimental group). In addition, out of the families under the coverage of the health centers, 20 families were randomly selected and, overall, 160 families were studied (80 families in the control and 80 in the experimental group).

The data collection instruments included two questionnaires which – in line with the objectives of the study – had been designed based on the BASNEF model and their reliability as well as validity had been confirmed already¹⁹. The health workers' questionnaire included demographic information (8 items), knowledge (24 items), attitude (12 items), subjective norms (8 items), and behavior or performance (11 items). Besides, the questionnaire provided for the families included demographic information (8 items), knowledge (24 items), attitude (2 items), subjective norms (11 items), behavioral intention (7 items), enabling factors (8 items), and behavior or performance (8 items). The data were gathered in two stages;

before and three months after the educational intervention. The health workers completed their questionnaires in the health centers in the presence of the researcher. Moreover, the researcher referred to the houses of the families under the study and guided the heads of the families in order to complete the questionnaires. Regarding the illiterate subjects, the researcher conducted an interview in order to complete their questionnaires.

Before the educational intervention, 4 methods were utilized in order to evaluate the status of the groups under study: 1) questionnaire, 2) checking the reports, documents, statistics, and backgrounds gathered in the health centers, 3) interview, and 4) observation. The collected data were utilized in order to design and prepare the content of the training program. Therefore, the educational intervention was conducted in two stages as follows:

(A) Training the health workers: Four training sessions were held for the health workers including one for getting familiar with *leishmaniasis* and its vector, one for getting familiar with the methods of preventing and struggling with the disease, one for getting familiar with interpersonal communication skills, and one for group work sessions in order to enhance the health workers' capability in group works and increase their communication skills. Then, the health workers were required to train the population under their coverage for three months. Of course, after 1.5 months, a training session was held in order to assess the health workers' activities, solve their problems, and answer their questions regarding the training activities. All the sessions were designed based on the BASNEF model and aimed to provide the health workers with opportunities to cooperate in both planning and designing the training program. Moreover, they got familiar with the importance of the components of the BASNEF model (beliefs, attitudes, subjective norms, and enabling factors) and were required to utilize these factors in their activities.

(B) Training the subjects considered influential on the health workers (doctor, health staff, family, trustworthy individuals of the area): these individuals were trained about the importance of *leishmaniasis*, methods of preventing the disease, and the major role the health workers play in training the people and controlling the disease. In addition, these influential individuals were required to encourage the health workers in their training activities.

Not only the health workers trained the families, but they also trained the individuals who were considered influential on people, such as local clergymen and trustworthy individuals, teachers, etc, and required them to encourage people in doing preventive actions toward the disease. Besides, the health workers provided the enabling factors, which the families need, in order to facilitate the preventive actions.

After three months, data were gathered again through the questionnaires, were reviewed, and statistically analyzed. In doing so, the SPSS statistical software (version 16) and the statistical tests of Chi-square, matched *t*-test, independent *t*-test, Mann-Whitney, and regression were utilized. Significance level was considered as 0.05.

Concerning the ethics, at the beginning of the study, it was explained to the health workers that taking part in the study was voluntary. Also, the control group was trained at the end of the study, as well.

Results

Since the present study was conducted on two target groups (the health workers and the families), the results related to the health workers are presented first for those related to the families.

A) The health workers: The results obtained from the matched *t*-test revealed no significant difference between the health workers of the control and the experimental groups, regarding the family size ($P=0.902$), age ($P=0.153$), and occupation ($P=0.319$).

Regarding the level of education, the results of the Chi-square test showed no significant difference between the health workers of the control and experimental groups ($P=0.172$). The results of the independent *t*-test revealed no significant difference between the two groups' mean scores obtained for knowledge, attitude, behavioral intention, enabling factors, and behavior. However, the difference revealed to be significant three months after the educational interventions. The results of the matched *t*-test depicted a significant increase in the experimental group's mean scores obtained for those factors three months after the educational intervention, while such a significant increase was not observed in the control group (Table 1).

Table 1: Comparison of the health workers' mean scores obtained for knowledge, attitude, behavioral intention, enabling factors, and behavior in both the control and experimental group before and three months after the educational intervention (N=100)

Variables	Pre-intervention		Post-intervention		Paired <i>t</i> -test
	Mean	SD	Mean	SD	
Knowledge					
Experimental	40.02	10.45	79.85	9.12	$P<0.001$
Control	41.25	7.95	42.11	7.94	$P=0.120$
<i>t</i> -test	$P=0.400$		$P<0.001$		
Attitude					
Experimental	80.17	7.75	88.90	9.67	$P<0.001$
Control	81.12	8.04	82.16	7	$P=0.606$
<i>t</i> -test	$P=0.514$		$P<0.001$		
Behavioral intention					
Experimental	44.62	10.30	77.03	5.39	$P<0.095$
Control	40.55	10.37	40.20	10.40	
<i>t</i> -test	$P<0.099$		$P<0.001$		
Enabling factors					
Experimental	49.72	21.31	88.21	10.70	$P<0.001$
Control	54.16	23.24	52.50	19.54	$P=0.493$
<i>t</i> -test	$P=0.277$		$P<0.001$		
Behavior					
Experimental	35.30	27.46	71.31	20.08	$P<0.001$
Control	38.18	26.10	37.12	25.57	$P=0.772$
<i>t</i> -test	$P=0.557$		$P<0.001$		

The results of the Mann-Whitney test showed that the effect of family, friends, neighbors, and trustworthy individuals of the area, local health workers, health staff, and doctors on the health workers was not significantly different between the control and the experimental group. In addition, the regression test compared the status before and three months after the educational intervention and revealed that all the influential

individuals on the health workers had significantly changed the experimental group behavior, while no significant difference was observed in the control group ($P<0.510$).

B) The families: The results of the chi-square revealed no significant difference between the two groups under study, regarding the families' level of education ($P=0.529$).

The results of the independent *t*-test showed that before the educational intervention, no significant difference was observed between the two groups' mean scores obtained for knowledge, attitude, behavioral intention, enabling factors, and behavior, while this difference revealed to be significant three months after the educational intervention.

Three months after the educational intervention, the results of the matched *t*-test showed a significant increase in the experimental group's mean scores obtained for abovementioned factors, while such increase was not observed in the control group (Table 2).

Table 2: Comparison of the families' mean scores obtained for knowledge, attitude, behavioral intention, enabling factors, and behavior in both the control and the experimental groups before and three months after the educational intervention (N=100)

Variables	Pre-intervention		Post-intervention		Paired <i>t</i> -test
	Mean	SD	Mean	SD	
Knowledge					
Experimental	40	11.21	48.20	11.32	$P<0.001$
Control	42.06	9.47	43.11	8.97	
<i>t</i> -test	$P=0.278$		$P=0.008$		
Attitude					
Experimental	68.19	15.11	74.51	12.06	$P=0.000$
Control	66.91	13.51	67.65	14.19	
<i>t</i> -test	$P=0.276$		$P=0.006$		
Behavioral intention					
Experimental	31.97	18.66	39.97	11.64	$P<0.001$
Control	78.21	14.49	79.29	14.26	
<i>t</i> -test	$P=0.276$		$P=0.035$		
Enabling factors					
Experimental	31.97	18.66	39.97	11.64	$P<0.001$
Control	36.66	21.17	34.32	16.79	
<i>t</i> -test	$P=0.201$		$P=0.037$		
Behavior					
Experimental	50.83	15.92	64.43	13.20	$P<0.001$
Control	55.20	17.26	56.99	14.17	
<i>t</i> -test	$P=0.152$		$P<0.004$		

The results of the Mann-Whitney test showed that the effect of spouse, father, mother, children, neighbors, and friends, trustworthy individuals of the area, local health workers, local clergymen, health workers, and health staff on the families was not significantly different between the control and experimental groups, while this difference revealed to be significant three months after the educational intervention.

Discussion

The health workers and the families under their coverage in both the control and the experimental groups were matched regarding the demographic characteristics. Moreover, the mean scores obtained for knowledge, attitude, behavioral intention,

enabling factors, and behavior were not significantly different between the two groups before the educational intervention, which shows the influence of the confounding variables on the results of the present study.

The low level of knowledge in both the control and experimental groups reveals that these groups are highly in need of education. In fact, these people play a major role in training people as well as controlling the disease; and knowledge is their primary need in order to fulfill their duties. Three months after the educational intervention, the experimental group's mean score obtained for knowledge significantly increased compared to the control group which shows the effectiveness of the educational intervention on increasing the knowledge of both the health workers and the families. These findings are in line with the results of the studies conducted on the effectiveness of health volunteers' education about prevention of cutaneous *leishmaniasis*²⁰ and mothers' knowledge about prevention of *leishmaniasis*²¹. They are also in line with other studies performed based on the BASNEF model such as the effect of education on assertiveness skills²², eye care in diabetic patients²³, and self-monitoring of blood pressure²⁴ after the educational intervention.

The mean scores obtained for attitude by the health workers of the experimental group significantly increased three months after the educational intervention about the activities and training, which confirms the effectiveness of the intervention – according to the BASNEF model – on the health workers' attitudes toward family training. These findings are in line with the studies conducted on mothers' knowledge about prevention of *leishmaniasis*²¹, and effects of education on self-monitoring of blood pressure in hypertensive patients²⁵.

They are also in line with other studies performed based on the BASNEF model such as application of BASNEF educational model for nutritional education among elderly patients with type 2 diabetes²⁶, prediction of domestic violence against women²⁷, and training health coordinating volunteers about *leishmaniasis*¹⁹.

Although the results of the regression test revealed that all the influential individuals of the experimental group had significant changes, the results of the study showed that some of these people (friends, neighbors, and local trustworthy individuals) were not significantly different from the control group after the educational intervention. This might have occurred due to their not being present in the training sessions, their small social effect on the health workers, the difficulty of changing the subjective norms as well as these people's difficult role in making such changes. These findings are, to some extent, in line with the results obtained by Behzadi on changing the subjective norms which showed that training based on the BASNEF model is effective on the entire model's components²⁸. Besides, a significant increase was observed in issues such as the health workers' and the families' behavior in addition to the subjective norms, which might be due to the increase of knowledge, improvement of attitude, and the effect of the subjective norms.

Regarding the increase in the health workers' behavioral intention after the educational intervention, the results of the present study are in line with other studies conducted based on the BASNEF model such as the effect of education about eye care in diabetic patients²³, control blood sugar in diabetic

patients type II²⁹, physical and social barriers to hygiene and child growth in remote Australian Aboriginal communities³⁰, improving the assertiveness skills²², and the health coordinating volunteers' education about *leishmaniasis*¹⁹.

The health workers' mean score obtained for the enabling factors was not desirable before the educational intervention. However, after the educational intervention, the mean significantly increased in the experimental group, which confirms the effectiveness of the educational intervention. Moreover, providing the enabling factors for the health workers' training activities can be considered as one of the factors which led to their success in training the subjects in the present study.

The present study showed that the health workers' training behavior was not desirable before the educational intervention. Nevertheless, one of the most important duties of the health workers is to train and care for families.

Our findings are in line with the study conducted on the effect of nutritional non presence method on education of mothers by health volunteers on anthropometric changes in infants³¹. Regarding the increase in the health workers' mean score obtained for behavior after the educational intervention, the results are similar to other studies conducted based on the BASNEF model such as: the effect of training on eye care in diabetic patients²³, case study in malaria prevention³², and application of BASNEF educational model for nutritional education among elderly patients with type 2 diabetes²⁶.

Our findings proved that the training program, based on the BASNEF model, include all the necessary aspects in order to change and maintain the training behavior in the health workers. Since the BASNEF model includes the structures of attitude, subjective norms, and enabling factors, it leads to the effectiveness of the training and, simultaneously, changes the health workers' training behavior which, eventually, results in significant changes in knowledge, attitude, subjective norms, behavioral intention, and behavior in the families under their coverage.

Conclusion

Conducting training programs based on the BASNEF model has been highly effective on the health workers. Moreover, it has facilitated the health workers' accomplishment of their duties.

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Conflict of interest statement

Authors have no conflict of interests.

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