Shiraz E-Med J. 2016 October; 17(10):e39957. doi: 10.17795/semj39957.

Published online 2016 October 9. **Research Article**

The Effect of Educational Intervention on Preventive Behaviors towards Cutaneous Leishmaniasis at Kharameh City in 2014

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Received 2016 June 15; **Revised** 2016 September 04; **Accepted** 2016 September 26.

Abstract

Background: Regarding the high prevalence of Cutaneous Leishmaniasis and the limited studies on educating households through the educational models for Cutaneous Leishmaniasis, the present study was done with the aim of investigating the effects of educational intervention on preventive behaviors towards Cutaneous Leishmaniasis at Kharameh city in 2014.
Methods: This was an interventional study in which the statistical population were the households covered by the urban health centers of Kharameh city. 110 households were selected as the experimental group and 110 ones were selected as the control group. The educational intervention based on enabling factors, reinforcing factors and predisposing factors were implemented. Before the intervention and two months after that, the required data was collected through a questionnaire whose validity and reliability had been approved. Descriptive indicators as well as independent T-test, paired T-test and chi-square test were used. The data was then analyzed using the SPSS software, version 16. The significance level was considered 0.05 in all tests.
Results: The mean scores of knowledge, attitude, enabling factors and reinforcing factors regarding behavior increased significantly in the experimental group after the intervention but no significant difference was seen in the control group ($P \leq 0.0001$).
Conclusions: The education based on enabling factors, reinforcing factors and predisposing factors had a significant effect on the households' behavior as well as the Cutaneous Leishmaniasis control.

Keywords: Cutaneous Leishmaniasis, Educational Intervention, Enabling Factors, Reinforcing Factors, Predisposing Factors

1. Background

Leishmaniasis is one of the main skin diseases transferred to human beings through bites of sand flies (1, 2). The disease is of great importance due to its spread, abundance, dispersion and distribution all over the world (3, 4). Leishmaniasis is widespread in 88 countries. 350 million people are at risk and 14 million are infected with it (5, 6). On the other hand, 2 million people get infected every year, of which 1.5 million cases are infected with Cutaneous Leishmaniasis (7, 8). Unlike other infectious diseases, the abundance of this disease is increasing (4, 9) mainly as a result of emigration, displacement, population growth, HIV infection, global warming and the changes in human ecology (10, 11). In the Eastern Mediterranean region, the disease is seen in Afghanistan, Iran, Iraq, Saudi Arabia, Pakistan, Syria and Jordan (12). Iran is amongst the countries with a high prevalence of Leishmaniasis (7, 13). It is endemic in most regions of Iran and it might be considered as the most important widespread parasitic disease after Malaria (7, 14). Every year, about 30,000 people get infected with Leishmaniasis (7), but according to available research results, the actual statistics are 4 to 5 times as much (15). New centers of the disease are appearing all over Iran and more people are getting involved in Leishmaniasis (8). In Iran, Cutaneous Leishmaniasis is found in two types of areas: dry (urban Leishmaniasis) and wet (rural Leishmaniasis) (16, 17), with the rural type being considered as a major health problem (18). Fars province is one of the most important centers of Leishmaniasis in Iran (19, 20) and recently, Cutaneous Leishmaniasis has been reported from new centers such as Kharameh city (the city is located in Fars Province, 75 kilometers east of Shiraz. It has a population of 61,580 people and a total area of 1590 square kilometers (20, 21). The lack of vaccines and appropriate drugs for

many parasitic diseases including Cutaneous Leishmaniasis and the high prevalence of these diseases have made the request of health education a main program of the World Health Organization for the prevention of this disease (22, 23). Moreover, several studies conducted on Leishmaniasis vector control have emphasized the importance of health education and community involvement (24, 25). From the current knowledge of the people, it is possible to prevent this disease through identifying the potential risk factors (26). The efficacy of the effects of educational programs based on the BASNEF model on the promotion of training performance of health volunteers in relation to the prevention of Leishmaniasis has been emphasized in various studies (7, 14). Similar studies are done based on the BASNEF model and demonstrate that the volunteers' educational behavior related to education regarding Leishmaniasis is not desirable (7). Another descriptive study showed a direct significant relationship between the knowledge and attitudes of volunteers and the awareness of families (14). An additional study showed a direct significant relationship effect of health education based on the Protection Motivation Theory on Malaria Preventive Behaviors in Rural Households of Kerman, Iran (27).

The theory used in this study is the PRECEDE-PROCEED theoretical model developed by Green and Kreuter in 2005 (28, 29). The PRECEDE-PROCEED model is the most prominent and pre-eminent model for providing experimental intervention to change high-risk behaviors. It is one of the models that will have important applications in health promotion. In the current intervention that was done in Kharameh city, the third stage of the model was used: enabling factors, reinforcing factors and predisposing factors. The predisposing factors is knowledge, attitude perception and value, which could cover a person with poor a knowledge and attitude regarding the disease Leishmaniasis. By identifying the enabling factors and by reinforcing the factors, it can help people control this disease. Housewives are having more responsibility indoors and play a key role in patient education, thus the use of this group is for an intervention.

Given that Kharameh city is one of the main centers of Leishmaniasis in the Fars province and each year the number of people suffering from this disease increases, this study was done with the aim of investigating the effects of educational intervention on enabling, reinforcing and predisposing factors of preventive behaviors towards Leishmaniasis in the households covered by urban health centers of Kharameh city.

2. Objectives

This study is so by careful investigations, the gaps causing the increase of the disease would be identified and proper steps would be taken to reduce it.

3. Methods

3.1. Study Design

This is an interventional study of the experimental type with a pretest-post-test design and a control group that was done in 2014.

3.2. Study Population and Sample Size

Kharameh city has 13 centers of Leishmaniasis amongst which 3 centers are active and include two urban centers as well as a rural one. Since the project focused on urban centers, the rural centers were excluded and two urban centers were selected as the intended group, one of which was the Gaffer neighborhood in the experimental group and the other one was Darvazeh Korbali neighborhood in the control group. According to the following sample size formula, 110 patients were selected for the experimental group and 110 patients were selected for the control group.

Inclusion criteria: Women who were referred to health centers and have been given a diagnostic procedure, a member of leishmaniasis and want to participate in the study.

3.3. Exclusion Criteria

Women who are absent in more than one session training and lack of consent to participate in the study.

$$n = \frac{2\sigma^2\left(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta}\right)^2}{d^2} \quad (1)$$

3.4. Data Instrument

The data collection instrument was a questionnaire designed by the researcher on the basis of predisposing, enabling and reinforcing factors that are in line with the objectives of the study. It had also been used in a similar study (8). To determine the content validity of the data collection, tools such as literature reviews, books and experts comments. The reliability of the questionnaire was confirmed by Cronbach's alpha coefficient. The Cronbach's alpha coefficients of the predisposing factors, reinforcing factors, enabling factors and behavior were 73%, 83%, 79% and 62%, respectively. The specialists had accepted its validity as well.

The questionnaire consisted of demographic data (10 questions including age, family size, education of the

spouse, the spouse's job, monthly income, source of information about Cutaneous Leishmaniasis, previous infection with the disease in the family and previous education in terms of Cutaneous Leishmaniasis) knowledge (26 questions), attitude (10 questions), reinforcing factors (11), enabling factors (14) and behavior or performance (8 questions). To collect the data, the researcher went to all houses in the area and completed the behavioral checklist. The households with the behavioral checklist scores of anything lower than 10 were included in the study.

3.5. Intervention and Data Collection

The data collection was carried out into two stages: before the intervention and 2 months after that based on the study conducted by Khani Jeihooni and collegues (8). The researcher and the housewives completed the behavioral checklists and the questionnaires, respectively. Then, the educational intervention was conducted in 4 sessions. It should be noted that all the sessions had been designed based on the PRECEDE model. The educational program for the experimental group included four 45-minute sessions (one session per week) that were held theoretically and practically through the use of direct and group educational practices such as lectures with questions and answers, a film regarding Cutaneous Leishmaniasis, slideshows and educational banners.

The first sessions dealt with predisposing factors, which include knowledge and attitude. Session one was about knowledge: the definition of Cutaneous Leishmaniasis and the cause and source of the disease, Cutaneous Leishmaniasis is transferred by sand flies. What is the difference between urban and rural Cutaneous Leishmaniases? Where do sand flies live? What are the sources of urban and rural Cutaneous Leishmaniases? What is the type and altitude of the sand flies' flight? What color are sand flies? Which months of the year are sand flies active? What times of the day are people more susceptible to sand fly bites? What are the symptoms of sand fly bites? Which season of the year is Cutaneous Leishmaniasis transferred more? Which parts of the body does Cutaneous Leishmaniasis affect? What type of disease is Cutaneous Leishmaniasis? How are humans infected with Cutaneous Leishmaniasis? What buildings develop Cutaneous Leishmaniasis more? A skin lesion that lasts longer than 14 days is suspected to be Cutaneous Leishmaniasis. Is Cutaneous Leishmaniasis more frequent in men or women? What age period does Cutaneous Leishmaniasis usually appear at? What month of the year are sand flies most active?

Attitude (session two): If a lesion suspicious with Cutaneous Leishmaniasis is diagnosed, shall I go to local healers or not? Sensitizing the beauty of the face and open parts of the body in cutaneous lesions. Sensitization on children who live in areas with endemic Cutaneous Leishmaniasis. Preventing the children from playing in contaminated environments. Getting sensitive to the use of mosquito nets or insect repellent pens.

Enabling factors (session three): Buying mosquito nets impregnated with poison is effective in preventing Cutaneous Leishmaniasis. Insect repellent pens are effective in preventing Cutaneous Leishmaniasis. Installing nets in front of the door and windows is effective in preventing Cutaneous Leishmaniasis. Using insecticides is effective in preventing Cutaneous Leishmaniasis. Unsanitary waste disposal and its relationship with Cutaneous Leishmaniasis. Unsanitary sewage disposal and its relationship with Cutaneous Leishmaniasis. Avoiding the release of water and sewage in the streets and public places and its relationship with Cutaneous Leishmaniasis. Separation of the whereabouts of animals from the human environment and observing the pets' hygiene. The use of plastic bags when taking out the garbage. Preventing the accumulation of any residuals and putrescible materials as well as animal manure inside and outside home. Preventing the use of home remedies and the lack of reference to local healers. Not using acid and burning the Cutaneous Leishmaniasis lesion. Going to a doctor when infected with pus in major *Leishmania*. Referral to hospitals and health centers for cry therapy.

Reinforcing factors (session four): These are the factors that cause to keep track of behavior and provide continuous reward for keeping behavior (e.g. family, peers, teachers, employers, health care providers, community leaders, decision-makers). In case of suspected Cutaneous Leishmaniasis lesions, who will guide you? Have you ever been given information regarding Cutaneous Leishmaniasis by the health personnel when referring to health centers, doctors and specialists?

3.6. Data Analysis

Data analysis was done using the statistical software SPSS, Version 16.0. Numerical variables were presented as mean (SD), whereas nominal and categorized variables were summarized by absolute frequencies and percentages .For comparing the baseline measurements between the two groups, chi-square test, paired-sample T-test and independent T test were used.

4. Results

220 households covered by urban health centers whose mean age and standard deviation was 14.23 ± 40.27 years participated in this study. Most households in the experimental group had an elementary education (33.6%)

and in the control group they were illiterate (25.5%). 93.6% of the participants in the experimental group and 90.9% in the control group were housewives. The age group of 30 - 40 years had the highest rate of Cutaneous Leishmaniasis in the households of both the experimental and the control groups. The main sources of information in the case group were health staff 45 cases (40.9%), friends and relatives 43 cases (39.09%), radio and television 18 cases (16.3%) and books, magazines and newspapers 4 case (3.6%), respectively. The main sources of information in the control group were the health staff 43 (39.09%), media 33 (33.6%), friends and relatives 26 (23.6%) and newspapers, books and magazines 4 (3.6%).

The baseline characteristics of the population under study are shown in Table 1 separately for the two groups. The chi-square test indicated that there was no statistically significant difference between the spouses' education and job in the experimental group and the control group ($P \geq 0.05$).

The independent t-tests showed that there was no statistically significant difference between the households in the experimental group and the control group in terms of family size ($P = 0.96$) and age ($P = 0.89$), this result is shown in Table 2.

T-test results showed that before the educational intervention, no significant difference was seen between the mean scores of knowledge ($P = 0.4$), attitude ($P = 0.4$), behavior ($P = 0.4$), reinforcing factors ($P = 0.4$) and enabling factors ($P = 0.4$) of the experimental and control groups, but the difference was significant 2 months after the intervention ($P \leq 0.05$).

The paired T-test showed that the mean scores of knowledge, attitude, behavior, enabling factors and reinforcing factors increased significantly in the experimental group ($P \leq 0.05$).

In the control group the mean scores of knowledge increased significantly ($P = 0.0001$), but attitude, behavior, enabling factors and reinforcing factors had no significant changes ($P \geq 0.05$). The results are shown in Table 3.

5. Discussion

Knowledge regarding attitude and practice of people that live in the Calaazar endemic area helped for the controlling and prevention of this disease, thus this study was explored to investigate the effect of educational intervention based on the Precede Model on promotion of preventive behaviors towards Cutaneous Leishmaniasis among housewives of the households covered by Cutaneous Leishmaniasis endemic area of Kharameh city in 2014. We showed the positive impact of educational intervention based on the Precede Model on preventive behaviors among housewives.

We showed that in the two groups (experimental and control), in terms of demographic characteristics and in scores of knowledge, attitudes, reinforcing factors, enabling factors and behavior before the educational intervention, there was no significant difference, and this suggests that the confounding factors had the least effect on the results of this study.

The mean scores of knowledge in the experimental group had a significant increase after the intervention and this reflects the effect of the intervention on the increase of knowledge in the experimental group. The result are similar to other studies conducted based on the proceed model such as: the effect of educating health workers in terms of Cutaneous Leishmaniasis (8) and the effect of educational programs on promoting educational practice of volunteer health workers regarding Cutaneous Leishmaniasis (30).

The mean score of attitude in relation to educational measures significantly increased 2 months after the educational intervention that indicate educational intervention. Based on the proceed model this is effective for promoting an attitude level. The findings of this study are consistent with other studies (31-33).

Although the test results showed that some reinforcing factors (subjective norms) in the experimental group had significant changes, some reinforcing factors (subjective norms) such as trusted people in the neighborhood, local therapists, local doctors and local clergymen) in the experimental group had no significant difference after the educational intervention. In the studies of Hazavehei et al. (34) some subjective norms had no significant changes after the intervention. In a study by Kohzadi it was revealed that education through the BASNEF model was effective on all components of the model except the abstract norms of the same reinforcing factors (35-38).

It seems that in the present study, a set of reasons cause the lack of significant changes in the people affecting households, some of which are the weak social impact of these people on households and the difficulty of changing the reinforcing factors and the role of these people. It is suggested that in the further studies some educational sessions be held for the people affecting the households in order to promote preventive behaviors regarding Cutaneous Leishmaniasis. The mean scores of enabling factors before the intervention are at the lowest level. After the intervention, the mean scores of enabling factors in the experimental group increased significantly. Therefore, it is suggested that in the population under study, along with the measures taken for the promotion of enabling factors, purposeful educational interventions be done focusing mostly on improving the enabling factors. This con-

Table 1. The Baseline Characteristics of the Population Under Study

Variables	Level	Case, No. (%)	Control, No. (%)	P Value
Education	Illiterate	16 (14.5)	29 (26)	0.7
	Elementary	39 (35)	17 (15.5)	
	Junior high school	24 (21.8)	25 (22.7)	
	High School Diploma	26 (23.6)	23 (20.9)	
	Associate Degree and Higher	5 (4.5)	16 (14.5)	
Job	Employee	2 (1.8)	5 (4.5)	0.6
	Housewife	1.3 (93.6)	100 (90.9)	
	Retired	2 (1.8)	1 (0.9)	
	Other	3 (2.7)	4 (3.6)	
Income	Less than 5,000,000 Rials	67 (60.9)	68 (61.8)	0.9
	5,000,000 to 7,500,000 Rials	32 (29.1)	32 (29.1)	
	7,500,000 to 10,000,000 Rials	9 (8.2)	9 (8.2)	
	More than 10,000,000 Rials	1 (0.9)	1 (0.9)	
Spouse's Education	Illiterate	32 (29.1)	35 (31.8)	0.3
	Elementary	28 (25.5)	21 (19.1)	
	Junior High School	23 (20.9)	33 (30)	
	High School Diploma	21 (19.1)	18 (16.4)	
	Associate Degree and Higher	6 (5.5)	3 (2.7)	
Spouse's Job	Employee	7 (6.4)	5 (4.5)	0.07
	Worker	5 (21.8)	43 (39.1)	
	Retired	24 (4.5)	2 (1.8)	
	Self Employed	25 (22.7)	23 (20.9)	
	Other	49 (44.5)	37 (33)	

Table 2. A Comparison Between the Demographic Variables of the Households Under Study in the Case and Control Groups

Variables	Group	Number	Age of Covered Households, Mean ± SD	T-Test	P Value
Age	Case	110	40.2 ± 14.2	-0.04	0.89
	Control	110	40.5 ± 14.6		
Household size	Case	110	3.8 ± 1.5	-0.04	0.96
	Control	110	3.8 ± 1.7		

forms to the findings of Hosseini et al. (30) Among the enabling factors before the intervention, the place of buying mosquito nets impregnated with poison was at the lowest level and the place of buying fine nets was at the highest level. After the educational intervention, the place of buying mosquito nets impregnated with poison was at the lowest level and providing the households with educational pamphlets was at the highest level. Furthermore, health warnings by the health centers to the households that had unsanitary sewage disposal as well as unsanitary trash and animal waste disposal was at the lowest level. The mean score of behavior in the experimental group significantly increased after the educational intervention and that demonstrated the effectiveness of the intervention based on the PRECED model on the promotion of behavior in the experimental group. Findings of this study were consistent with those of Hosseini et al. (30) and Khani Jeyhooni et al. (8).

Table 3. A Comparison Between the Mean of Knowledge, Attitude, Behavior, Reinforcing Factors and Enabling Factors Before and After the Educational Intervention in the Case and Control Groups

Intended Variables	Group	Before the Intervention, Mean ± SD	2 Months After the Intervention, Mean ± SD	Paired T-test Results
Knowledge	Case	75.4 ± 26.8	88.9 ± 28	0.0001
	Control	75.8 ± 27.2	81.8 ± 16.1	0.0001
Independent T-test		0.43	0.0001	
Attitude	Case	42.2 ± 15.2	50 ± 13.1	0.0001
	Control	42.7 ± 15.1	42.75 ± 15.1	0.6
Independent T-test		0.63	0.0001	
Behavior	Case	13.2 ± 5.9	35.25 ± 5.9	0.0001
	Control	13.2 ± 2.7	15.6 ± 2.7	0.07
Independent T-test		0.94	0.03	
Enabling Factors	Case	15.5 ± 10.9	19.5 ± 9.1	0.0001
	Control	15.7 ± 8.09	16.4 ± 6.3	0.06
Independent T-test		0.84	0.05	
Reinforcing Factors	Case	13.81 ± 9.2	16.9 ± 4.3	0.02
	Control	10.3 ± 9.5	10.7 ± 9.5	0.5
Independent T-test		0.0001	0.0001	

This study has some strengths and limitations: the strengths are the larger sample size and the investigation of the relationship between different variables and the limitations are as follows: science instruments used in this study were developed in Iran and t was not easy to compare the results of this study directly with those of other studies.

5.1. Conclusion

Findings of this study showed that the educational program based on predisposing, reinforcing and enabling factors had a significant impact on all required aspects of making changes as well as the sustainable educational behavior in the households under study. The PRECEDE model makes the education more influential due to having the following structures: attitude, reinforcing factors and enabling factors. Hence, it is suggested that future interventions have more emphasis on reinforcing and enabling factors so that the changes in behavior would get more influential.

Acknowledgments

This article was extracted from Goli Taravatmanesh M.Sc. The thesis was approved and financially supported by the research vice chancellor of Shiraz University of Medical Sciences (proposal No. 7595). They are also grateful for the professors and officials of the school of health, colleagues and the participating women for their kind cooperation in this study.

Footnote

Authors' Contribution: Goli Taravatmanesh designed and wrote this article. Goli Taravatmanesh analyzed the data. Mahin Nazari, Mohammad Hossein Kaveh, Abouzar Soltani, Haleh Ghaem revised and edited the manuscript. All authors read and approved the final manuscript.

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