Cutaneous leishmaniasis preventive behaviors and the related factors among parents: Application of BASNEF model

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Abstract

Background: Leishmaniasis is endemic in 98 countries, and 350 million people in the world are at risk of this disease. It is necessary to evaluate the influencing leishmaniasis preventive behaviors to manage this disease in endemic areas. The present study aimed to determine the factors associated with cutaneous leishmaniasis preventive behaviors in parents using the BASNEF model.

Methods: The research was an analytical cross - sectional study. The sample consisted of

154 parents selected via the available sampling method. The instrument for gathering data was a standard questionnaire based on the BASNEF model that was completed by parents. SPSS software version 16 was used for data analysis and the significance level was considered at 0.05.

Results: The knowledge of 32.4% of parents about cutaneous leishmaniasis preventive behaviors was lower than the average level. In the case of subjective norms, the most influential people for preventive behaviors were health liaisons (73.4%). The behavior of parents was directly correlated with subjective norms (r = 0.352, P <0.05) and intention (r = 0.384, P <0.01).

Conclusion: Cutaneous leishmaniasis can be controlled and managed in the family by creating a favorable attitude and using the power of the most influential people and providing enabling factors to perform leishmaniasis preventive behaviors by parents.

Key Words: Attitude, Behavior, Cutaneous Leishmaniasis (CL), Disease-carrying mosquitoes, Face Scars, Intention, Parents, Prevention, Subjective norms.

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1- INTRODUCTION

Cutaneous leishmaniasis is a skin infection and one of the most important health problems in the world, especially in tropical and subtropical countries. Its prevalence is increasing worldwide and is considered one of the most important forgotten diseases (1). The disease is endemic in more than 98 countries (2). 12 million people in the world are infected with the disease, 350 million people are at risk (3-7), and 1.5 million new cases of cutaneous leishmaniasis (5, 8) and 20-40 thousand deaths occur every year (9, 10).

Iran is among the first ten countries in the world based on the number of cases (11). According to the World Health Organization (WHO) report, in 2017, more than 95% of new cases of cutaneous leishmaniasis occurred in Afghanistan, Algeria, Brazil, Colombia, Iran, Iraq, and Syria (6, 12). Cutaneous leishmaniasis is one of the most important diseases in Iran, which is endemic in 18 provinces of the country (13).

Annually, more than 22,000 cases of cutaneous leishmaniasis are reported in Iran, 80% of which are rural cutaneous leishmaniasis (14). However, due to the fear of treatment and spontaneous recovery in patients, the actual number of infected cases is considered to be 4 to 5 times higher than the reported cases (15).

Khuzestan province is the southern and southwestern center of zoonotic or rural cutaneous leishmaniasis (16). Ramhormoz city is located in the east of Khuzestan province. The presence of a lot of waste and poor conditions, the unsanitary nature of a large part of the municipal sewage system, the existence of old buildings and tissues, and being bordered by cities with a high prevalence of leishmaniasis, have made the city a place for disease-carrying mosquitoes and has led to a significant increase in cases of leishmaniasis.

This disease can cause many problems for patients, including psychological problems due to the long period of wound healing, undesirable scars on the face, the possibility of secondary infections, high cost of treatment, long treatment period, and side effects of treatment with the existing drugs (17).

Since researchers have not been able to develop a vaccine for cutaneous leishmaniasis, the WHO has made health education a top priority in preventing the cutaneous leishmaniasis (18). Numerous studies have emphasized the importance of health education and community participation in the prevention of leishmaniasis (2, 19). Many researchers believe that implementing health education programs along with other disease control and prevention programs such as vaccine and drug production, improving the environment, the extermination of mice and spraying is necessary (7).

Young groups and students aged 10 to 15 years are more at risk for leishmaniasis in endemic areas (20). Amahmid et al. (2017) reported that facial lesions were more common in children than adults in Morocco (21).

The importance of the family to perform leishmaniasis preventive behaviors is one of the most important and effective strategies to prevent leishmaniasis in endemic areas. Parents can play a key role in the process of changing the behavior of their children (22). Parents are an accessible force that can be used to improve knowledge, attitude, and ultimately the health behaviors of families (2). Therefore, parents were selected as the target group. It is important to note that before any educational intervention, the factors affecting preventive behaviors should be identified and determined.

One of the most important actions in educational planning is choosing a model or theory. Selecting a model or theory

should be based on the circumstances, problem, and convergence with the aim of an educational program (23). Considering that the mentioned factors related to leishmaniasis preventive behaviors include knowledge, attitude, subjective norms, enabling factors, and intention to perform the behavior (22, 24, 25), the researchers concluded that the factors associated with adopting leishmaniasis preventive behaviors in parents can be determined using the BASNEF model (**Fig. 1**).
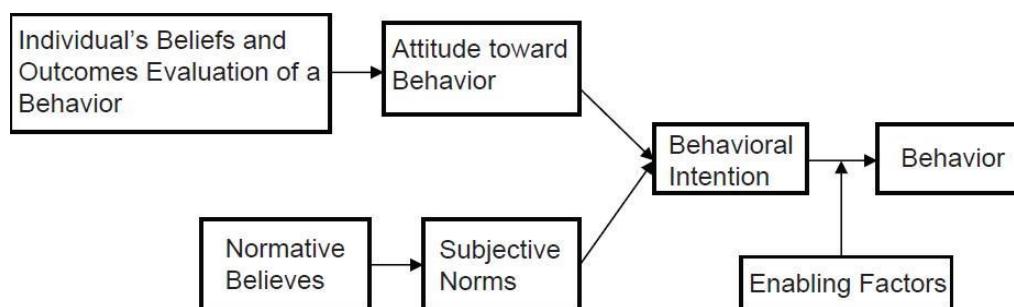

Fig. 1: Schematic of BASNEF model

2- MATERIALS AND METHODS

2-1. Study design and sampling

The research was an analytical cross - sectional study. The sample consisted of 154 parents selected through available sampling methods. Five rural centers, two rural-urban centers, and one urban center were studied in this research. 15, 20, and 39 people from each rural, rural-urban, and urban health center were enrolled in the study, respectively. Sample volume was calculated with a test power of 90% and 5% of the initial error. The inclusion criteria for parents were having a minimum of literacy (reading and writing) and satisfaction to participate in the study. Parents who completed the questionnaire incompletely were excluded from the study.

2-2. Data collection instruments

In this study, the BASNEF model questionnaire, which was designed and validated by Rahaei et al., was used for data collection. The reliability of this tool was reported (α = 0.73-0.82) using Cronbach's alpha (24). This questionnaire included the following sections:

1. Demographic characteristics included age, sex, level of education, place of residence, and history of infection.

2. Knowledge items included 24 two-choice questions. The correct option received a score of 1 and the incorrect option received a score of 0. To evaluate the knowledge of the study population, a score of 0-19 was considered as very poor, 20-39 as weak, 40-59 as moderate, 60-79 as good, and 80-100 as excellent.

3. The section related to BASNEF model structures, was as follows:

Twelve attitude items were designed based on the Likert six-choice scale (strongly agree, agree, partly agree, partly disagree, disagree, strongly disagree), scored between 0 and 5.

There were also 11 items of subjective norms, 7 items of behavioral intention, and 8 items of enabling factors designed as three-choice questions (yes, to some extent, no); a score of "two" was given for the answer yes, score "one" for the answer to some extent, and score "zero" for the answer no.

Finally, 8 two-choice questions (yes, no) were related to behavior, to which a score

of "one" was given for the answer yes, and a score of "zero" for the answer no.

For ease of comparison, all scores in different sections of the questionnaire were reported based on 100.

2-3. Data analysis

Descriptive analysis of data was performed using mean, standard deviation, and percentage. Independent t-tests and correlation tests were used to analyze the data. Data was analyzed using IBM SPSS Statistics software (Version 16) and the significance level was considered at 0.05.

3- RESULTS

The mean age of the samples was 31.39 years and 61% of them were female. In terms of education, 27.9% of the samples were at the elementary level. 11% of the study population previously had leishmaniasis (**Table 1**).

Table-1: Frequency distribution of demographic characteristics, location, and previous status of leishmaniasis

Variable		Number	%
Sex	Female	94	61
	Male	60	39
Age	≤35	103	66.9
	>35	51	33.1
Level of Education	Elementary	43	27.9
	Secondary	40	26
	High school diploma	42	27.3
	<Associate degree	29	18.8
Location	City	83	53.9
	Village	71	46.1
Previous status of leishmaniasis	Yes	17	11
	No	137	89

The mean and standard deviation of the BASNEF model structures are presented in **Table 2**.

The Knowledge of 5.8% of people was very poor (score 0-19), 26.6% poor (score 39-20), 48.1% moderate (score 40-59), 19.5% good (score 79-60), and 0% very good (100-180).

The attitude of 90.3% of people was moderate. The subjects had the best attitude about seeing a doctor in case of suspected leishmaniasis. Attitudes towards controlling children and avoiding polluted environments were in the next positions.

Most people did not have a high tendency to use preventive measures and 2.6% of people were against referring to local therapists.

The intention of 96.8% of people was excellent. In terms of behavioral intention, only 18.8% intended to use mosquito nets impregnated with poison. The intention to use the insect repellent pen (39.6%) was not in the desired range, but the intention to perform other preventive behaviors was acceptable.

Among the options of enabling factors, the lowest rate (11%) was allocated to the knowledge about the places of purchasing mosquito nets impregnated with poison, and the highest rate (51.9%) was allocated to the knowledge of the place of purchasing insecticide. Generally, the enabling factors were not at the desired

level. The yes answer did not even reach 50% in any factor. 56.5% of the subjects stated that they were not given education regarding leishmaniasis and its prevention and 52.6% of the subjects did not have pamphlets. Knowledge of the places of purchasing preventive devices was also undesirable. Also, in response to the question whether they have money to buy preventive devices, only 33.1% answered yes.

Table-2: Mean and standard deviation of the BASNEF model structures in household parents

Variable	Sex	Mean ± Standard deviation	P-value
Knowledge	Male	44.86±16.58	0.6
	Female	46.23±15.39	
Attitude	Male	56.30±16.94	0.3
	Female	54.20±11.15	
Subjective norms	Male	62.04±30.40	0.9
	Female	61.84±21.86	
Behavioral intention	Male	68.45±25.94	0.6
	Female	70.51±16.63	
Enabling factors	Male	42.08±23.71	0.8
	Female	42.68±23.55	
Behavior	Male	53.75±21.50	0.2
	Female	56.38±15.74	

* Independent t-test was used.

In the study of preventive behaviors of leishmaniasis, it was found that 24% of the families had mosquito nets and 30.5% of them used mosquito nets (69.5% of families who had mosquito nets did not use them). From among the 8 behaviors studied, only 4 behaviors were at optimal range and the rest of the behaviors were not performed even in 50% of families (**Table 3**).

Table-3: Frequency distribution of preventive behaviors of leishmaniasis among parents

preventive behaviors of leishmaniasis	Yes Number (%)	No Number (%)
Having mosquito nets	37 (24)	117 (76)
Using mosquito nets	47 (30.5)	107 (69.5)
Installing the net	43 (27.9)	111 (72.1)
Using an insect repellent pen	31 (20.1)	123 (79.9)
Proper disposal of waste	122 (79.2)	32 (20.8)
Using insecticides	130 (84.4)	24 (15.6)
Controlling children to play in contaminated places at sunset	136 (88.3)	18 (11.7)
See a doctor if concerned about any suspicious symptoms of leishmaniasis	132 (85.7)	22 (14.2)

In terms of subjective norms, the most important influential people in performing preventive measures are health liaisons (73.4%), mothers (64.3%), spouses (58.4%), fathers and local therapists (50.6% and 53.2%), respectively (**Table 4**).

Table-4: Frequency distribution of subjective norms

Variable	Yes	To some extent	NO
	Number (%)	Number (%)	Number (%)
Spouse	90 (58.4)	20 (13)	44 (28.6)
Father	78 (50.6)	39 (25.3)	37 (24)
Mother	99 (64.3)	28 (18.2)	26 (16.9)
Children	37 (24)	55 (35.7)	62 (40.3)
Neighbors	46 (29.9)	62 (40.30)	46 (29.9)
Friends	64 (41.6)	57 (37)	33 (21.4)
Trusted people	52 (33.8)	54 (35.1)	48 (31.2)
Local therapists	82 (53.2)	41 (26.6)	31 (20.1)
The clergy of the place	45 (29.2)	52 (33.8)	57 (37)
Health liaisons	112 (73.4)	23 (14.9)	18 (11.7)

The results of the study of the relationship between the structures of the BASNEF model showed a significant relationship between behavior and subjective norms (r = 0.352, P <0.05) and intention (r = 0.384, P <0.01) (**Table 5**).

Table-5: Relationship between BASNEF model structures

Variables	1	2	3	4	5	6
Knowledge	1					
Attitude	0.617*	1				
Subjective norms	0.320*	-0.166	1			
Behavioral intention	0.255**	0.018*	0.463	1		
Enabling factors	0.215	-0.143	0.365	0.440	1	
Behavior	0.081	0.139	0.352*	0.384**	0.262	1

* Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level

4- DISCUSSION

The knowledge of 32.4% of parents was lower than average. This result is consistent with the results of Ghofranipour et al. (26), Mazlumi and Servat (27), Amirian and Safavi (28). One of the main leading causes of leishmaniasis is the lack of information and knowledge about how to transmit leishmaniasis and its prevention, on the part of most people living in endemic areas. Various studies have shown that knowledge of people about leishmaniasis is not good (30, 29). This is a serious alarm because having the necessary and correct information is the first and most basic step for adopting any appropriate behavior (30).

The attitude of 90.3% of parents was moderate. If the knowledge of the population is increased by effective teaching methods, their attitude will also improve. The results of several studies have indicated that instead of correct information, people use the information of

family members, neighbors, and friends, in which there is a possibility of transmitting incomplete information and misconceptions to people (3, 31). The point of view and beliefs of people living in endemic areas need to be corrected or changed. Among these misconceptions is the presence of mosquitoes that transmit leishmaniasis only in areas and houses that have dogs and sheep, the suitability of softening creams and perfumes to prevent leishmaniasis, and the role of luck in developing leishmaniasis, etc. (32).

In the present study, the most influential people in terms of preventive measures were health liaisons and workers. Heshmati et al., similarly, reported that the most important people influencing health liaisons were health workers and doctors, respectively (31).

It should be noted that subjective norms (people influencing the individual) are among the most important factors for doing or not doing a behavior in any society. This important factor is not considered in many studies. Fortunately, health liaisons are an available force that can be trained to use their effective force positively and improve knowledge, attitude, and ultimately family health behaviors. Health workers can also be empowered to educate people.

Behavioral intention is another important factor that plays a role in behavior. In this study, the intention to use mosquito nets impregnated with poison and insect repellent pen was not at the desired level, while the use of mosquito nets impregnated with poison is the most effective measure to prevent leishmaniasis during the outbreak of the disease (32). According to the BASNEF model, by strengthening the enabling factors such as improving the knowledge and skills of parents and also empowering the groups affecting their behavior (spouses, health workers, and health liaisons), it is possible to promote behavioral intention and

ultimately improve leishmaniasis preventive behaviors in parents.

Sometimes a person may intend to perform the desired behavior, but due to the influence of enabling factors such as lack of skills, money, time, etc., does not perform that behavior (25). One of the obstacles to leishmaniasis preventive behaviors is that even if people are encouraged to do the behavior by training, some environmental restrictions such as the lack of preventive equipment such as proper mosquito nets, insect repellent pens, etc. can prevent the adoption of appropriate behavior (33).

The investigation of the enabling factors, in the present study, showed that the knowledge of where to buy mosquito nets impregnated with poison was very low. In addition, most people did not have enough money to pay for preventive equipment. It should be noted that the cost of housing in the old part of the city was relatively cheap; hence, most of the people who lived in the old areas of Ramhormoz were not in a good economic and social situation. The situation of the residents of these areas highlights the importance of enabling factors to take preventive measures against leishmaniasis. Pardo et al. reported that people with better economic status were more likely to use preventive equipment (mosquito nets and insecticides). In addition, it was found that providing financial assistance for the purchase of mosquito nets can reduce injustice in the health status of endemic communities (34).

The results of this study, thus, showed that behavior had a significant relationship with subjective norms and intention. Baghiani Moghaddam conducted a study on patients with diabetes and stated that there is a significant relationship between attitudes, subjective norms, and enabling factors with patients' behavior (35). Laveist et al. reported that enabling factors can be far more important than cultural and behavioral differences in performing a

behavior (36). Downs and Hausenblas also reported a strong relationship between behavioral intention and behavior (37).

4-1. Limitations of the study

The limitations of the present study were the use of self-reporting tools and lack of objective observation of preventive behaviors in parents. Therefore, it is suggested that further studies identify the determining factors of leishmaniasis preventive behaviors among parents, through qualitative assessments.

5- CONCLUSION

Considering the role of the parents in performing leishmaniasis preventive behaviors, identifying the factors related to their behavior in this respect is one of the best strategies for controlling and managing this disease. To improve leishmaniasis preventive behaviors in parents, educational programs and interventions should be designed in a way that reduces the barriers to behavior and strengthens the structures of attitude, subjective norms, along with the enabling factors. Therefore, the use of the BASNEF model as a framework for planning educational interventions to predict and improve leishmaniasis preventive behaviors in parents is recommended.

6- ETHICAL CONSIDERATIONS

Written consent was obtained from the samples, before starting the data collection. To comply with the principles of ethics in research, the objectives of the study were first stated for the samples, and they were also ensured that all information remains confidential. This study was approved by the code of ethics IR.SSU.SPH.REC.1394.48248 in Yazd University of Medical Sciences.

7- ACKNOWLEDGMENTS:

8- CONFLICT OF INTEREST:

None.

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