

## Evaluation of Quality of Life, Anxiety and Depression in Children with Cutaneous Leishmaniasis

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### Abstract

#### Background

Cutaneous leishmaniasis (CL) is a common parasitic infectious disease which is distributed worldwide. Despite low morbidity rate, the disorder negatively impacts on psychological well-being and social life of patients. We aimed to evaluate the frequency of psychiatric morbidity including depression and anxiety levels as well as quality of life (QOL) in children with CL.

#### Materials and Methods

In this cross-sectional study, 42 children with CL who referred to the Leishmaniasis clinic of Mashhad University of Medical Sciences, Mashhad, Iran, were enrolled by the convenience sampling method. Levels of depression and anxiety were assessed with the Child Depression Inventory (CDI), and the State-Trait Anxiety Inventory for Children (STAIC), respectively. QOL was evaluated by means of Children's Dermatology Life Quality Index (CDLQI). Questionnaires were filled by parents according to the children's answers.

#### Results

Forty-two patients including 29 girls (69.04%), and 13 boys (30.95%) with mean age of  $9.10 \pm 1.87$  years were studied. According to the CDI scores, 13 patients (30.95%) had depression disorder. Girls showed significantly more depression compared to boys ( $p = 0.021$ ). According to the STAIC scores, 9 patients (21.42%) had anxiety state, and 6 patients (14.28%) had anxiety trait. Non-acceptable QOL was detected in 24 patients (57.14%). Significant lower QOL was detected in patients with divorced parents ( $p = 0.038$ ), and those who had lesions on head and neck compared to other parts of the body ( $p = 0.023$ ).

#### Conclusion

Based on the results, CL in children leads to disturbed QOL and mental health including depression and anxiety among affected patients. Psychological survey of children with CL should be considered through interdisciplinary scrutiny that combines dermatological and psychiatric evaluations.

**Key Words:** Anxiety, Depression, Children, Cutaneous Leishmaniasis, Quality of life.

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## 1- INTRODUCTION

Leishmaniasis is a neglected tropical disease which is caused by different species of the intracellular protozoan, *Leishmania* (1-2). The parasite is transmitted to human body through the bite of infected sand flies. Leishmaniasis is endemic in 98 countries, mainly developing ones. About 1.5–2 million new cases of leishmaniasis occur each year, of which 75% are cutaneous leishmaniasis (CL) (1-3). Leishmaniasis is endemic in Iran and the neighboring Middle East countries (3). Clinically, almost all acute Old World CL in Iran are divided into two forms: anthroponotic cutaneous leishmaniasis (ACL) known as dry, urban or late ulcerative form and zoonotic cutaneous leishmaniasis (ZCL) known as wet, rural, or early ulcerative form. Appearance of an erythematous papule or nodule is the initial sign of infection which appears within one week to three months after bite. In a typical ZCL infection the primary lesion usually develops into an ulcer which heals spontaneously after several weeks or months resulting in a scar. In contrast, Ulceration is not a feature of ACL lesions due to hyperkeratosis in the domain of lesions (4, 5).

The lesions are most often in the face or other exposed parts of the body and can lead to substantial psychological and social suffering. The psychosocial impact of CL has been studied in a few quantitative papers. Studies conducted in Pakistan, Afghanistan, Syria, and Iran have demonstrated the serious social consequences of CL for young women. They may not be able to get married in the future (6, 7); or stay with their partner if they contract CL after marriage (8). Reduced quality of life (QOL) in CL patients with active lesions has been previously reported in adults (9); in a study conducted by Vares et al. (2013) in Iran, CL had a moderate to very high effect on QOL of about 40% of patients. The most

affected domain was "symptoms and feelings" (10). Similar results have been reported in affected adult patients of other endemic countries (11). In Turkey, patients with CL had significantly higher levels of anxiety and depression and were less satisfied with their body image as compared to controls (9). There is an increased risk of exposure for this age group due to lack of family care for children in many deprived area in Iran, as an endemic country for CL (12). Previous reports from Iran note that pediatric patients comprise around 10% of the cases (12, 13). Children are a special population of CL cases. Compared with adults, especially in younger age groups (lower than 12 years of age) differences in immune response, drug clearance and overall drug exposure in pediatric patients have contributed to this disparity in therapeutic response (14, 15).

To the best of our knowledge, previous published papers focusing on psychological effects of CL in pediatric patients are sparse. In a recent cross-sectional survey among high-school students in Morocco conducted by Bennis et al. (2017), a self-administered questionnaire elicited responses about general knowledge of CL and related scars. Almost 20% out of 448 respondents reported they had CL lesion, and 87% said possible or definite psychological consequences. It was concluded that CL and its ensuing scars led to a considerable psychosocial burden in adolescent age group (16). The aim of current study was to describe psychological impact of CL on QOL as well as depression and anxiety symptoms among children in Iran, as an endemic area of leishmaniasis.

## 2- MATERIALS AND METHODS

### 2-1. Study design and population

In this cross-sectional study, children with CL who referred to the Leishmaniasis clinic of Mashhad University of Medical

Sciences, Mashhad city (Iran), were enrolled by the convenience sampling method from February 2016 to September 2018. All of patients under 16 years of age who had confirmed diagnosis of CL by means of scraping skin smear or skin biopsy (if necessary), and who did not have any chronic or other skin diseases were included in the study. Data were collected by four questionnaires: At first, a predesigned form including baseline characteristics and clinical features of the lesions such as type, location, size, condition, and activity of the lesions were filled by a dermatologist. Quality of life of the patients were evaluated by Children's Dermatology Life Quality Index (CDLQI), Depression and anxiety symptoms of the patients were evaluated using Children's Depression Inventory (CDI), and State-Trait Anxiety Inventory for Children (STAIC), respectively. Questionnaires were filled by parents according to the children's answers.

## **2-2. Measuring tools**

### **2-2-1. Children's Dermatology Life Quality Index (CDLQI)**

CDLQI is a widely used questionnaire to measure the QOL of children aged from 4 to 16 years (17). It is self-explanatory and may be completed by the child with help given by the parents. The 10 questions-based on the preceding week- cover six areas of daily activities including symptoms and feelings, school or holidays, leisure, personal relationships, sleep and treatment. Each question is answered on a 4-point Likert scale scored from 0 to 3. Thus, the range of the total score is from 0 to a maximum score of 30. Higher score was related to greater handicap. Score banding descriptors were established in 2010. The results are divided into five parts based on the acquired score: No effect, Low effect, Moderate effect, High effect and Very high effect. The last two parts are presumed as non-acceptable QOL

in the current study (17). The Persian version of CDQLI was also reported to have acceptable validity and reliability (18).

### **2-2-2. Children's Depression Inventory (CDI)**

CDI is a scale consisted of 27- item designed for use with children aged 6-14 years. Each item consists of three statements that describe severity of the symptom within the last 2 weeks. For each item, the child's score (0, 1, or 2) is in the direction of the depression. Total scores of CDI ranged from 0 to 54 and the cut-off point of > 19 is typically used to identify depressed individuals. The validity and reliability of the CDI are well established and norms for prepubertal children have been developed (19). The CDI has been shown to have high internal reliability. In previous studies in Iran, its reliability has been reported to be 0.81 and its validity to be 0.83 (20). It has acceptable discrimination between depressed and non-depressed children (21).

### **2-2-3. State-Trait Anxiety Inventory for Children (STAIC)**

STAIC consists of 40 items in two parts which assess the levels of state and trait anxiety. The items in the first part measure state anxiety and are based on how the children feel in a given time. Each item begins with I feel.... The second part items measure trait anxiety (22). Each item has three options and is rated on a three-point scale: 1. indicating almost never, 2. indicating sometimes, and 3 indicating often. Scores range between 20 and 60. Higher scores are related to higher levels of anxiety. The validity and reliability of the STAIC are formerly established (22). The validity and reliability of the Iranian versions of indices have been established (23).

## **2-4. Ethical consideration**

The parents of children eligible for the study were introduced to the subject of the study and the nature of the questionnaires. Verbal consent was obtained from patients' parents. Questionnaires were anonymous and confidentiality of information was ensured. The Ethics Committee of the Deputy of Research, Mashhad University of Medical Sciences, approved this research. The approval code is 89227.

### 2-5. Inclusion and exclusion criteria

Patients should be under 16 years of age. Confirmed CL diagnosis was achieved by means of scraping skin smear or skin biopsy (if necessary). Exclusion criteria were obvious disability affecting QOL, any simultaneous skin disease, recent experience of an acute stressful event, having medical treatment for CL in the last 3 months and dissatisfaction to continue by the patient or legal guardian.

### 2-6. Data analyses

Quantitative variables were reported as mean  $\pm$  SD. Qualitative variables were indicated as frequency and percentages. Student's t-test was used to compare the means within groups. The Kolmogorov-Smirnov test was used for evaluation of normality of the scores. The Mann-Whitney U-test was used for the

comparison of scores between two groups of gender. Chi-square tests were used to determine whether there were any differences between patients, which were stratified according to gender, in terms of depression, anxiety and QOL. Statistical analysis was performed using SPSS version 17.0 software (Statistical Package for Social Science, version 17.0). For all analyses,  $P < 0.05$  was considered statistically significant.

## 3- RESULTS

### 3-1. Participants

Forty-two patients including 29 girls (69.04%) and 13 boys (30.95%) were studied. Mean age of the participants was  $9.10 \pm 1.87$  years. Acute lesion of CL was recorded in 25 patients, while 17 patients had chronic CL, which means more than one year had passed since the symptoms. Mean disease duration was  $10.13 \pm 5.68$  months. The number of the lesions ranged from 1 to 5 (Mean  $\pm$  SD of  $2.30 \pm 2.10$ ). There were no significant differences between boys and girls with respect to their age ( $p=0.252$ ) and level of education ( $p=0.380$ ) nor activity ( $p=0.127$ ) and location of the lesions ( $p=0.148$ ). Baseline characteristics and clinical data are stratified by gender and shown in **Table.1**.

**Table-1:** Characteristics of 42 children with cutaneous leishmaniasis stratified by gender.

Variable (unit)	Boy (n=13)	Girl (n=29)	P- value
Age (year)	$9.24 \pm 1.14$	$8.89 \pm 1.56$	0.252
Number of offspring (median)	2.86	2.45	0.625
Residence place (number)			
Urban	7	17	0.116
Rural	6	12	
Educational level (number)			
Elementary school	9	24	0.380
Secondary school	4	5	
History of separation in parents (number)			
Yes	2	2	0.674
No	10	27	
Mother's occupation (number)			
Salaried employee	4	3	0.489

Retired	1	2	
Housewife	8	24	
Father's occupation (number)			
Salaried employee	2	3	0.542
Self employed	7	16	
Retired	2	5	
Unemployed	2	5	
Mother's educational level (grade)			
0-5 years	2	8	0.347
6-12 years	7	17	
> 12 years	4	4	
Father's educational level (grade)			
0-5 years	2	7	0.214
6-12 years	7	15	
> 12 years	4	7	
Number of lesions	2.40 ± 1.74	2.24 ± 1.25	0.243
Disease duration (month)	10.67 ± 3.14	10.23 ± 5.18	0.523
Lesion activity in patients (number of lesions)			
Acute	8	17	0.127
Chronic	4	13	
Distribution of the lesions (number)			
Head and neck	9	17	0.148
Trunk	1	2	
Extremities	5	13	

### 3-2. Psychological Assessments

Mean CDI score was  $14.04 \pm 8.14$ , ranged from 10 to 37. According to the CDI scores, 13 patients (30.95%) had depression disorder. In terms of anxiety scores, mean scores of the patients were  $34.74 \pm 6.58$  and  $31.68 \pm 7.35$  in STAIC-1 and STAIC-2, respectively. According to the STAIC scores, 9 patients (21.42%) had anxiety state and 6 patients (14.28%) had anxiety trait. CDLQI scores ranged from 0-30 with a mean  $\pm$  SD of  $5.94 \pm 6.27$ . According to the obtained scores 24 patients (57.14%) had non-acceptable QOL (Tables 2 and 3).

### 3-3. Correlation of demographic data with psychological findings

Depression was significantly more among female patients compared to male patients ( $p = 0.021$ ). Anxiety and QOL score did not significantly differ between the two genders ( $p$ -value of 0.217 and 0.240, respectively). Lesions' activity did not have any significant correlation with any of the psychological results ( $p$ -value of 0.56, 0.20, and 0.48 for CDLQI, CDI, and STAIC scores respectively). However, those with lesion on face had significantly higher CDLQI score than others ( $p = 0.023$ ). Children with separated parents had significantly lower quality of life in comparison with other children ( $p = 0.038$ ). Correlations of baseline characteristics and clinical data with depression, anxiety and QOL scores are presented in Table.4.

**Table-2:** Psychological evaluation in 42 children with cutaneous leishmaniasis.

Psychological inventories	Values
<b>CDI</b>	
Score (Mean ± SD)	14.04 ± 8.14
No depression	29 (69.04)
Depression	13 (30.95%)
<b>STAIC-1 (Anxiety state)</b>	
Score (Mean ± SD)	34.74 ± 6.58
Anxiety state	9 (21.42%)
No anxiety	27 (64.28%)
<b>STAIC-2 (Anxiety trait)</b>	
Score (Mean ± SD)	31.68 ± 7.35
Anxiety trait	6 (14.28%)
No anxiety	27 (64.28%)
<b>CDLQI</b>	
Score (Mean ± SD)	5.94 ± 6.27
Acceptable	18 (42.85%)
Non-acceptable	24 (57.14%)

CDI: Child Depression Inventory; STAIC: State-Trait Anxiety Inventory for Children; CDLQI: Children's Dermatology Life Quality Index; SD: Standard Deviation.

**Table-3:** CDLQI scores in 42 patients with cutaneous leishmaniasis.

CDLQI domains	Mean ± SD	Minimum	Maximum
Symptoms and feeling	4.06 ± 1.23	0	6
Leisure	6.35 ± 1.47	0	9
Holiday and school	1.68 ± 0.28	0	3
Personal relationship	4.50 ± 1.89	0	6
Sleep	1.72 ± 1.25	0	3
Treatment	2.08 ± 0.76	0	3

CDLQI: Children's Dermatology Life Quality Index; SD: Standard Deviation.

**Table-4:** Depression, anxiety and quality of life among 42 children with cutaneous leishmaniasis and correlation with demographic and clinical data

Variables	Quality of life*		P-value	Depression**		P-value	Anxiety***		P-value
	Acceptable	Non-acceptable		Depressed	Not depressed		Anxious (State-trait)	Not anxious	
Gender, number (%)									
Female	12 (41.37%)	17 (58.62%)	0.240	11 (37.92%)	18 (62.06%)	0.021	11 (37.93%)	18 (62.06%)	0.217
Male	6 (46.15%)	7 (53.84%)		2 (15.38%)	11 (84.61%)		4 (30.76%)	9 (69.23%)	
Age, year			0.360	9.69±2.25		0.445			0.871
Separation in parents, number (%)									
Yes	1 (25%)	3 (75%)	0.038	2 (50%)		0.105	1 (25%)	3 (75%)	0.748
No	17 (44.73%)	21 (55.26%)		11 (28.94%)			14 (36.84%)	24 (63.15%)	
Patients' lesions, number (%)									
Acute	12 (48%)	13 (52%)	0.500	8 (32%)	17 (68%)	0.645	8 (32%)	17 (68%)	0.254
Chronic	6 (35.29%)	11 (64.70%)		6 (35.29%)	11 (64.70%)		7 (41.17%)	10 (58.82%)	
Number of lesions, mean ± SD			0.950	3.33±3.42		0.153			0.305
Duration of disease (month), mean ± SD	15.8±19.53	14	0.890	16	28	0.659	9.43±18.43	19	0.302
Head and neck lesion, number (%)									
Yes	12 (46.15%)	14 (53.84%)	0.023	8 (30.76%)	18 (69.23%)	0.271	8 (30.76%)	18 (69.23%)	0.414
No	7 (43.75%)	9 (56.25%)		7 (43.75%)	9 (56.25%)		7 (43.75%)	9 (56.25%)	

\*Mean children's depression inventory (CDI) score was  $14.04 \pm 8.14$ , ranged from 10 to 37. \*\*: Mean anxiety state and trait scores were  $34.74 \pm 6.58$  and  $31.68 \pm 7.35$  according to the State-Trait Anxiety Inventory for Children (STAIC). \*\*\* Mean score of the Children's Dermatology Life Quality Index (CDLQI) was  $5.94 \pm 6.27$ , ranged from 0-30. SD: Standard Deviation.

#### 4- DISCUSSION

The current study was conducted to evaluate QOL as well as levels of depression and anxiety in children with CL. CL is mostly presented in the literature as a dermatological disorder that has psychological suffering. The psychological distress generated by skin deformation is complex and depends on the severity and visibility of the lesions as well as perception of the patient of the disease affection (24). A few studies have been performed on psychological effects of CL. Involvement of regions such as face, neck and hands causes obvious cosmetic deficit leading to destructive effects on social relations, self-confidence and self-body image. Mood disorders are reported as noticeable psychological problem among such patients (16). Our investigation showed depression in 13

participants (30.95%). Anxiety state and trait was also detected in 9 (21.42%), and 6 (14.28%) of the participants, respectively. The first study of the psychological effects of CL was conducted by Yanik et al. Yanik and colleagues (2004) evaluated psychological impact of CL on adult Turkish patients with leishmaniasis lesions. They quantified anxiety, depression using Body Image Satisfaction QOL. Anxiety and depression were concluded to be more frequent in patients at both the active lesion and scar stage. Significantly greater impairment of QOL was also concluded among the patients compared with the control group. Patients with scars had better DLQI scores than those with active CL lesions. Increased prevalence of depression, anxiety and QOL impairment was similar to our result, however, the study did not examine the psychiatric effects of CL on pediatric

patients (25). Also, contrary to Yanik et al. study, we did not find any significant differences in patients with acute or chronic lesion. We reported non-acceptable QOL in 24 (57.14%) participants. This was more frequent than the previous study by Vares et al. (10). Vares and colleagues (2013) used DLQI questionnaire to measure QOL among 124 adult patients with CL and concluded that CL has significant effect on impairment of QOL among patients. Same as our study, no significant differences were detected in QOL between men and women (10).

Moreover, in two previous clinical trials, the QOL in adult patients with CL was investigated after medical intervention and significant improvement was reported in QOL domains after treatment of acute lesions of CL (26-27). To the best of our knowledge, to date, there is only one study performed on psychological effects of CL among pediatric patients. Turan et al. (2015) studied 54 patients with CL aged between 7 and 18 years through a four scales investigation and compared the outcome with the control group. According to CDI scores, depression was significantly more frequent among patients.

However, no difference was found in anxiety scores between the groups according to STAIC (28). The patients' and the mothers' QOL scores were reported significantly different from those of the control group. Turan et al. reported mean CDI score of  $9.72 \pm 6.11$  among CL patients which is much lower than that among our patients. According to STAIC, the anxiety state and anxiety trait scores were  $47.11 \pm 4.04$  and  $33.94 \pm 8.54$  in their patients, respectively which were both higher than our findings ( $34.74 \pm 6.58$ , and  $31.68 \pm 7.35$  for anxiety state and trait, respectively). It should be noted that persons affected by CL during childhood may become more aware of their affected body image in future when the indelible scars become more visible in their own

eyes, thus psychological effects of the affection may become more apparent in future. Interestingly, a recent study quantified the CL burden by means of estimating the related disability-adjusted life years lost (DALY) based on physical disfigurement only, and stated that the CL burden did not differ in terms of age in the same geographic region, probably because this approach does not take into account the social stigma, or the financial or emotional impact of CL (29). Patients with CL seek help from dermatologists, while they neglect their psychosocial problems. Therefore, dermatologists are often solely responsible for psychodermatological disorders. However, skills to carry out non pharmacological therapies are not typically attained in dermatology training. In a survey among 57 dermatologists in United Arab Emirates, 19 respondents (33%) were able to define psychiatric aspects of psychodermatologic disorders (29). Same results have been obtained in other Middle East countries such as Turkey and Pakistan (30). One very useful idea used by psychiatrists that should be employed by all dermatologists handling these cases is to establish a "therapeutic alliance".

In other words, one should foster the attitude that both doctor and patient should work as a team to fight the disease. CL as a common psychodermatological disorder in Iran needs a multidisciplinary therapeutic approach including dermatologist, psychologist and psychiatrist. A knowledge of psychodermatological issues among dermatologists, general practitioners, psychiatrists and psychologists facilitates appropriate choice and form of treatment, improves QOL, and enables patients to be provided with more complex medical care. We also recommend the incorporation of formal training on psychodermatology in dermatology residency programs. Dermatology–Psychiatry liaison and psychodermatology clinics will improve

management of these patients in clinical settings. After the completion of the current study, patients with high scores of CDI, STAIC-1, and STAIC-2 were referred to a psychotherapist and underwent some sessions of psychotherapy. Possible improvement after pharmacological and non-pharmacological psycho-cutaneous therapies in these patients is being investigated by the authors and will be published subsequently. Besides our positive findings, limitations of the study should be considered when interpreting the results. First, there was not any standard tool for evaluating severity of the lesions, thus we did not compare this item in our analysis. Second, the specific socio-cultural structure of Iran may restrict the generalizability of findings. Hence, since CL is endemic in many countries, it will be helpful to perform more studies about the QOL, and mood disorders of patients with this disease. In addition, the working group is a relatively small sample size, consisting of only 42 patients. Thus, further studies using a larger sample size with matched control group are required.

## 5- CONCLUSION

CL in children leads to disturbed QOL and mental health including depression and anxiety among affected patients. Our results clearly showed the importance of measuring the levels of depression, anxiety and QOL in children who have CL by means of screening instruments.

**6- CONFLICT OF INTEREST:** None.

## 7- ACKNOWLEDGMENT

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