

# Impact of pruritus on quality of life in patients with tinea

## Abstract

**Purpose:** The aim of this study was to determine descriptively the impact of pruritus on quality of life in patients with tinea pedis.

**Methods:** The study included 214 patients referring to dermatology outpatient clinic at Kayseri Research and Teaching Hospital between May 2016 and August 2016 with diagnosis of tinea pedis and meeting the inclusion criteria. Study data was collected by face to face interview with patients via survey form and Dermatological Quality of Life Index (DLQI) and Modified Pruritus Index (MPI) used by two interviewers.

**Results:** Study included 95 females and 119 males, in total 214 patients. Mean age was  $45.6 \pm 16.42$  years. In general mean score of subjects for both DLQI and MPI was  $10.56 \pm 6.57$  and  $9.58 \pm 8.30$ , respectively. Mean DLQI and MPI score was higher in females, between age 50 and 59 years, in patients with disease for more than a year and in patients with diabetes mellitus. Mean DLQI and MPI score was increased with increasing number of disease-specific physical symptoms such as redness, pain, ache, burning and nail changes. Quality of life was negatively affected by increasing both level and severity of pruritus.

**Conclusion:** Mean DLQI and MPI score is significantly higher in patients with physical symptoms specific to tinea pedis. Mean DLQI and MPI score is increased with increasing severity of pruritus and in turn, this negatively affects quality of life.

**Keywords:** tinea pedis, pruritus, quality of life

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## Introduction

Superficial fungal infections are highly frequent in our country as well as on the world.<sup>1</sup> Although tinea pedis with symptoms of pruritus, redness, exfoliation and maceration on the foot, especially at interdigital area, is not life-threatening and doesn't lead to functional impairment, it negatively affects quality of life and relationship of patients with other people by leading to shaming, low self-esteem, loss of self-confidence, social timidity.<sup>2</sup> Itching is one of the most intensely perceived symptoms and it is considered as one the main factors affecting quality of life.

Although tinea pedis is among the most frequently encountered dermatological diseases, number of studies on the effect on quality of life is very few.<sup>3</sup> In studies done to measure the quality of life in dermatological diseases with pruritus, pruritus was suggested as main factor affecting quality of life.<sup>4,5</sup> Therefore the aim of this study was to investigate the effect of pruritus on quality of life in patients with tinea pedis.

## Methods

### Participants

The sample group of study consisted of 214 patients referring to dermatology outpatient clinic at Kayseri Research and Teaching Hospital between May 2016 and August 2016 with diagnosis of tinea pedis and meeting the inclusion criteria.

Study included patients aged over 18 years who are volunteers, speaking and understanding Turkish language and those who are without communication problem.

## Health related quality of life measurement

Study data was collected by face to face interview with patients via survey form and Dermatological Quality of Life Index (DLQI) and Modified Pruritus Index (MPI) used by two interviewers.

Survey form was developed by investigators following a literature search. This forms consisted from 6 questions related with "Socio-demographics" and "Disease related characteristics".<sup>2-10</sup>

DLQI was developed by Finlay et al.<sup>11</sup> and Turkish adaptation, validation and reliability study was done by Gürel et al.<sup>12</sup> in 2005 and alpha reliability coefficient was calculated as 0.77-0.84. DLQI includes 10 questions and each question has answers of four options. Answers range from 0 to 3 and the evaluation is as following: 0= Not at all, 1=a little, 2=a lot, 3=very much. The sum of all answers is calculated to obtain DLQI. DLQI score is maximum 30 and minimum 0. As the score increases, quality of life reduces.

MPI was developed by Desai et al.<sup>13</sup> and Turkish adaptation, validation and reliability study was done by Aksu et al.<sup>14</sup> in 2007 and alpha reliability coefficient was calculated as 0.76- 0.94. In this study, Cronbach alpha coefficient was 0.840 and 0.920 for DLQI and MPI, respectively. MPI survey includes in total 18 answers and options for answers are "Not at all", "a little", "a lot" and "very much". These options are assessed as "0", "1", "2" and "3", respectively. MPI score is maximum 54 and minimum 0. Increasing score shows that pruritus affect negatively the subject.

## Statistical analysis

Data were analyzed by S.P.S.S. 21.0 software and statistical evaluation included percentage calculation, Shapiro-Wilk normality

test to analyze normal distribution of data, independent two samples t test for comparisons between groups, one-side variance analysis, Kruskal Wallis variance analysis and confidence analysis (cronbach alpha) tests.

## Results

For patients included in the study, dermatological quality of life according to descriptive and disease related characteristics and distribution of mean score for modified pruritus index are shown in

**Table 1** Mean score distribution of dermatological quality of life index and modified pruritus index according to patient demographics and disease related characteristics

Demographics and disease related characteristics	Total (n=91) n (%)	Dermatological quality of life index	p	modified pruritus index	p
<b>Gender</b>					
Female	95 (44.4)	11.83±7.04	t= 2.40	10.67±7.06	t= 3.335
Male	119 (55.6)	9.54±6.00	p= 0.016	8.72±6.11	p= 0.001
<b>Groups of age</b>					
20 years and younger	26 (12.1)	11.30±5.66	KW= 4.05 p= 0.542	10.07±7.55	KW= 14.423 p= 0.013
21-29 years	32 (15.0)	8.25±4.43		7.81±5.45	
30-39 years	34 (15.9)	12.00±8.41		12.52±6.77	
40-49 years	36 (16.8)	9.39±4.29		8.30±4.67	
50-59 years	46 (21.5)	12.88±8.95		13.22±10.51	
60 years and older	40 (18.7)	9.95±5.75		6.40±4.40	
<b>Mean age</b>	45.60±16.42				
<b>Disease duration</b>					
0-6 months	84 (39.3)	9.50±5.90	KW= 6.723 p= 0.035	8.57±7.36	KW= 3.701 p= 0.157
7-12 months	29 (13.6)	10.86±7.15		9.58±8.30	
13 months and older	101 (47.2)	12.58±5.60		10.24±9.97	
<b>Concomitant systemic disease</b>					
No systemic disease	114 (53.3)	10.47±5.81	KW= 11.419 p= 0.022	8.91±6.66	KW= 14.077 p= 0.007
Diabetes Mellitus	46 (21.5)	20.25±12.29		28.25±17.58	
Hypertension	30 (14.0)	10.10±6.11		7.43±5.49	
Congestive heart failure	16 (7.5)	10.53±6.98		11.60±9.52	
Other	8 (3.7)	7.62±4.73		7.50±4.35	

Mean DLQI and MPI score was higher in patients with physical symptoms such as redness, pain, swelling, ache, bleeding, exfoliation, pruritus, burning sensation at foot, scall on nail and nail thickness and the difference between them was statistically significant ( $p<0.05$ )

Table 1. Among 214 subject included in the study, 119 were males (55.6%) and 95 were females (44.4%); mean age was 45.6±16.42 years. Tinea pedis was most frequent in patients at age 50-59 years (46%). In 101 patients (47.2%), tinea pedis was present since 13 months and over. No systemic disease was present in 114 (53.3%) patients.

Mean DLQI and MPI score was higher in females, between age 50 and 59 years, in patients with disease for more than a year and in patients with diabetes mellitus (Table 1).

(Table 2). As number of symptoms increased, DLQI and MPI mean scores were also increased, however difference was not significant ( $p>0.05$ ) (Table 3).

**Table 2** Mean score distribution of dermatological quality of life index and modified pruritus index according to disease related physical symptoms in patients

Physical symptoms	n (%)	Dermatological quality of life index	p	Modified pruritus index	p
<b>Redness</b>					
Yes	130 (60.7)	11.80±7.22	t= 3.255	10.89±9.37	t= 2.575
None	84 (39.3)	8.64±4.87	p= 0.001	7.57±5.80	p= 0.010
<b>Pain</b>					
Yes	74 (34.6)	12.89±8.00	t= 2.993	11.29±9.21	t= 2.476
None	140 (65.4)	9.32±5.30	p= 0.003	8.68±7.66	p= 0.013
<b>Swelling</b>					
Yes	66 (30.8)	12.93±12.66	t= 3.706	12.66±10.29	t= 3.374
None	148 (69.2)	9.50±5.92	p= 0.000	8.21±6.85	p= 0.001
<b>Ache</b>					
Yes	64 (29.9)	12.46±7.72	t= 2.466	11.84±9.76	t= 2.819
None	150 (70.1)	9.74±5.85	p= 0.014	8.62±7.43	p= 0.005

Table Continued...

Physical symptoms	n (%)	Dermatological quality of life index	p	Modified pruritus index	p
<b>Bleeding</b>					
Yes	40 (18.7)	15.50±8.73	t= 4.219	14.10±11.07	t= 3.725
None	174 (81.3)	9.42±5.39	p= 0.000	8.51±7.18	p= 0.000
<b>Exfoliation</b>					
Yes	134 (62.6)	12.14±7.25	t= 1.213	10.82±9.48	t= 2.306
None	80 (37.4)	7.90±4.04	p= 0.225	7.52±5.27	p= 0.021
<b>Pruritus</b>					
Yes	162 (75.7)	10.88±6.78	t= 4.402	10.58±8.72	t= 3.378
None	52 (24.3)	9.55±5.80	p= 0.000	6.50±5.94	p= 0.001
<b>Burning sensation at foot</b>					
Yes	128 (59.3)	11.37±6.68	t= 2.610	10.10±8.12	t= 2.405
None	86 (40.2)	9.34±6.24	p= 0.009	8.81±8.55	p= 0.041
<b>Nail scoll</b>					
Yes	112 (52.3)	11.75±7.15	t= 2.465	10.17±8.61	t= 1.268
None	102 (47.7)	9.25±5.61	p= 0.014	7.94±5.94	p= 0.005
<b>Nail thickening</b>					
Yes	137 (64.0)	11.43±6.68	t= 3.268	9.94±8.56	t= 0.881
None	77 (36.0)	9.01±6.11	p= 0.001	7.96±4.85	p= 0.048

**Table 3** Mean score distribution of dermatological quality of life index and modified pruritus index according to disease related physical symptoms in patients

Number of symptoms	n (%)	Dermatological quality of life index	p	Modified pruritus index	p
<b>0-3 Symptoms</b>	65 (30.3)	10.50±7.00	KW= 0.322 p= 0.851	8.72±6.64	KW= 0.665 p= 0.717
<b>4-6 Symptoms</b>	74 (34.6)	10.87±6.04		9.55±8.58	
<b>7-10 Symptoms</b>	75 (35.1)	10.96±6.57		10.43±9.40	

As severity of pruritus increased, mean score of DLQI and MPI was also increased and DLQI and MPI score was even higher in subjects with more severe pruritus and difference was statistically significant ( $p<0.05$ ), (Table 4).

**Table 4** Mean score distribution of dermatological quality of life index and modified pruritus index according to severity of pruritus

Severity of pruritus	n (%)	Dermatological quality of life index	p	Modified pruritus index	p
None	26 (12.1)	7.23±3.34	KW= 42.435 p= 0.000	6.11±4.38	KW= 39.736 p= 0.000
Mild	84 (39.3)	8.61±4.74		6.53±6.20	
Moderate	54 (25.2)	10.70±5.87		9.37±4.75	
Severe	50 (23.4)	17.00±7.53		17.24±11.75	

In general, mean DLQI score was 10.56±6.57 and mean MPI score was 9.58±8.30 (Table 5). Strong ( $r=0.697$ ) positive and significant correlation was detected between dermatological quality of life and modified pruritus index. As pruritus severity and level increased, quality of life was negatively affected ( $p<0.001$ ) (Table 6).

**Table 5** Mean score distribution of dermatological quality of life index and modified pruritus index in patients with tinea pedis

Scales	( $\bar{x} \pm SD$ )	Minimum – maximum values
Quality of Life Index	10.56± 6.57	0 - 30
Modified Pruritus Index	9.58± 8.30	0 - 54

**Table 6** Relationship between dermatological quality of life index and modified pruritus index in patients with tinea pedis

Dermatological quality of life index	Modified pruritus index	
	r	p
	0.697	0.000

## Discussion

Superficial fungal infections are highly frequent in our country as well as on the world.<sup>1</sup> This disease is considered to affect about 20-25% of global population. Although it can occur in everywhere, a variability of 2.6- 56.8% was detected according to data from countries and regions.<sup>15</sup>

Tinea pedis is the most frequently seen clinical type of dermatophyte infections. In USA, tinea pedis infections are second condition of most frequently encountered dermatological diseases.<sup>16</sup> About 1/10 of people are estimated to have tinea pedis at least once per their life time.<sup>6</sup> In a study of Yıldırım and colleagues including 10100 dermatological patients, the rate was 17.5% and this was the most frequently seen superficial fungal diseases.<sup>3</sup>

Pruritus may be due to various etiologies and disturb the patient and it is the most relevant symptom of many dermatological and systemic diseases. Studies done for measuring quality of life in dermatological diseases with pruritus showed that pruritus was the main factor affecting quality of life.<sup>4,5</sup>

In studies on incidence of pruritus and its effect on quality of life, pruritus was more frequent in female patients and affected more quality of life.<sup>17,18</sup> The reason was that severe anxiety and stress were more frequent in women, they were concerned more about how they are looking and they were more sensitive to changes in quality of life.<sup>19</sup> In our study, we observed that pruritus was more frequent in women and affected more quality of life than man.

Skin diseases are frequently encountered health problems and vary according to age. Although all organs have certain changes during aging, skin is a visible organ and ageing-related changes are more remarkably observed and reduces quality of life of individual.<sup>20-22</sup> In general it is well recognized that superficial fungal diseases and pruritus increase at middle and advanced age. In a serial of Yalçın et al.<sup>23</sup> including 4099 patients, fungal infections were most frequently seen second dermatological disease in elderly people with a rate of 15.8% (tinea pedis, 56%). In elderly people, pruritus is most frequently seen and disturbing complaint. Another study demonstrated significant correlation between severity of pruritus and quality of life in elderly people.<sup>24</sup> According to our results, 40.2% of all subjects constituted people at 50 years old and older. Mean score of DLQI and MPI in subjects at 50-59 years was significantly higher compared to other age groups.

Presence of systemic disease and its characteristics play role in development of tinea pedis. Diabetes mellitus is especially a significant health problem with increasing Incidence globally and improving quality of life by its complications. Tinea pedis cases constitute 30% of cutaneous fungal infections in patients with Diabetes Mellitus (DM)<sup>9,25</sup> In case of untreated onychomycosis and tinea pedis in diabetic patients, impaired tissue integrity results in serious bacterial infections, foot ulcers and more importantly diabetic foot picture which in turn reduce more patient quality of life.<sup>9</sup> In our study, we also determined that tinea pedis increased pruritus score and negatively affected quality of life in DM patients.

According to our study results, disease duration is also an important factor affecting MPI and DLQI. Also patients with disease longer than a year, have higher mean score of MPI and DLQI. This suggests that longer disease duration is related with more affected patient by disease related symptoms. Yıldırım et al.<sup>3</sup> also indicated

that quality of life is more impacted by longer duration of superficial fungal diseases.

Study results demonstrated that mean DLQI and MPI score was higher in patients with physical symptoms such as redness, pain, swelling, ache, bleeding, exfoliation, pruritus, burning sensation at foot, scall on nail and nail thickness than asymptomatic patients and that this difference between them was statistically significant. In addition, as number of disease specific symptoms increased, DLQI and MPI mean scores were also increased. Szepietowski et al.<sup>18</sup> studied the impact of onychomycosis on quality of life and indicated that quality of life was negatively affected in patients with symptoms such as color change of nails, thickening and pain. We consider that symptoms negatively affecting physical and psychological condition and leading to increased cost and management of these symptoms should be among priority topics in this field.

Mean score of DLQI and MPI increased by increasing severity of pruritus and patients with more severe pruritus had significantly higher mean score of DLQI and MPI and therefore pruritus was considered to be an important parameter with impact on quality of life. In few studies measuring quality of life in dermatological diseases, main factor affecting quality of life was pruritus. In a study of Sánchez-Pérez et al.<sup>26</sup> sleep quality, pruritus and quality of life were assessed in 323 patients with diagnosis of atopic dermatitis and they found that pruritus reduced quality of life, thus quality of life was negatively affected.

In another study of Balci et al.<sup>4</sup> DLQI in patients with liken planus and pruritus was suggested to affect primarily the quality of life of patients. In study of Ertürk where the impact of dermatosis with itching on quality of life was investigated, score for quality of life was increased by increasing pruritus score of patients and negative impact of pruritus on quality of life has been emphasized.<sup>5</sup>

Although tinea pedis is among the most frequently encountered dermatological diseases, number of studies on the effect on quality of life is very few. In a study by Yıldırım et al.<sup>3</sup> DLQI was applied to 120 patients with superficial mycosis and quality of life in patients with tinea pedis and tinea inguinalis was more affected than patients with tinea versicolor. Among all patients, 87% reported that their quality of life was negatively affected as "a little"; 77% of patients complained from pruritus, 41% from treatments and 36% of patients complained the impact of disease on their turnout; 40% of patients reported that they felt shamed for their disease, 7% of patients reported that disease negatively affect their sexual life and 13% reported their professional life was negatively affected. Although not mentioned in above studies, we consider that slight pruritus or lack of pruritus may less affect quality of life in patients with tinea versicolor.<sup>27</sup>

## Conclusion

In conclusion, in our study we observed that quality of life was reduced especially in female patients at middle age years and in whom systemic disease, prolonged disease duration and symptomatic patients. In addition all studies suggested that pruritus which is the most frequent and most uncomfortable dermatological symptom impaired significantly the quality of life. Dermatological and general well-being symptoms should be managed collectively in order to maintain daily activities and insights. We believe in that life standards of patients will be increased by increasing awareness of negative effects of pruritus in patients with tinea pedis and by a multidisciplinary collaboration.



## With ethical standards

### Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

### Informed consent

Patients were informed about the study objective and were assured that their identity will not be disclosed, and then written informed consent was obtained from each patient.

### Ethical approval

Ethics principles were followed during whole study process. Before initiation of study, approval of Erciyes University Clinical Trials Ethics Committee (2016/412) and necessary written permission form institutional board of Kayseri State Hospitals Association General Secretariat Kayseri research and Training Hospital (52332816/) were obtained.

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## Conflicts of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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