ORIGINAL RESEARCH

Association between clinical signs of oral lichen planus and oral health-related quality of life

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ABSTRACT

Aim: The objective of the present study was to examine levels of overall and aspects of Oral Health-Related Quality of Life in a cohort of patients with OLP using both an OLP-specific Quality of Life instrument (COMDQ-15) and non-specific oral health-related QoL instrument (OHIP-14).**Methods:** This cross-sectional study comprised of 100 patients was conducted at Shri Shankaracharya institute of medical sciences, Chhattisgarh and the study was approved by ethical committee. Patients with clinical and histopathologically confirmed OLP based upon modified WHO diagnostic criteria were included. Demographic characteristics were collected, included gender, age, patient types and the lesion duration since the first diagnosis of OLP, using dental records. For the clinical characteristics, OLP lesions were recorded for localization (buccal mucosa, tongue, lip, gingiva, palate, floor of the mouth and soft palate), types (reticular, atrophic, erosive/ulcerative, bullous, pigmented and plaque type), and clinical severity classified by the Thongprasom sign scoring system.**Results:** The study group consisted of 80 women (80%) and 20 men (20%). The mean age was 55.1±13.9 years. Sixty-two of them (62%) had OLP lesions for 1-5 years; 20% for more than 5 years, and 18% less than 1 year. Almost all patients (95%) complained of having pain. However, mean pain intensities were mostly mild (60%), followed by moderate (38%) and severe (2%). The mean NRS pain scores were 2.56 ±2.32. Ninety-six percent of OLP patients had oral symptoms and their influence on daily activities on their daily performance. The most prevalent impacted performance was eating (86%) followed by cleaning the oral cavity (65%) and emotional stability (62%). In addition, there were also symptoms and their influence on daily activities on social activities (16%) and smiling (15%). Although the overall prevalence of oral symptoms and their influence on daily activities was high, the mean overall percentage score was low (12.1 ±13.3, range 0-77.5). The highest mean performance score was that of eating (8.1 ±6.8), followed by cleaning the oral cavity (6.6 ±7.5) and emotional stability (5.3 ±7.2). A correlation analysis showed a statistically positive association between clinical severity and the intensity of oral symptoms and their influence on daily activities ($r_s = 0.490$, $p < 0.001$). The intensity of oral symptoms and their influence on daily activities increased for each step, increasing in clinical severity scores between 2 and 4. Oral symptoms and their influence on daily activities were perceived as little, moderate and severe to very severe intensity with clinical scores of 2, 3, and 4 respectively.**Conclusion:** The current study demonstrated that nearly all patients had oral symptoms and their influence on daily activities. The impacts were frequently related to eating, cleaning the oral cavity and emotional stability. There were significant associations between OLP clinical signs and OHRQoL, as well as OLP pain perception among OLP patients.

Key words: Oral lichen planus, oral symptoms and their influence on daily activities, OIDP, oral health-related quality of life, thongprasom sign score

INTRODUCTION

Oral lichen planus (OLP) is a common chronic immune-mediated condition causing persistent inflammation and ulceration of the oral mucosa. Most patients are female and onset occurs most commonly in the fifth or sixth decade of life [1]. The disease is characterized by a spectrum of disease activity from asymptomatic white lesions (reticular, papular, plaque-like) to painful erythematous and erosive/ulcerative lesions [2]. Common OLP symptoms vary from a burning sensation to severe chronic pain [3]. As the erosive lichen planus is painful

and the primary management goal is to relieve painful symptoms and maintain adequate quality of life (QoL) level of affected individuals [4]. OLP is generally not life-threatening; however, the consequence of OLP could cause deterioration in Oral Health-Related Quality of Life [OHRQoL] both physical,psychological and social dimensions difficulties with some types of food [3], which could lead to weight loss or malnutrition in severe cases, has been reported. Compromised food satisfaction can affect joy and social abilities [4]. In addition, speech difficulties that could have resulted from xerostomia were also reported in OLP patients [6]. Additionally, the presence of an erosive/ulcerative lesion limits the ability to carry out daily oral hygiene practices [7].

The concept of OHRQoL had been developed and introduced into all fields of dentistry, including oral medicine [8]. For clinicians, the application of OHRQoL revealed the importance of understanding the disease from the patient's perspectives. Moreover, the goal of OLP treatment should focus, not only on healing the lesion and reducing pain, but also improving OHRQoL. Taking these factors into considerations, we consider that using merely clinical indicators is not sufficient, and the added value of subjective patients' symptoms and OHRQoL in the research studies was anticipated [9, 10].

Quantitative assessment of OHRQoL consists of a variety of measurement tools, both General Health and Oral-Health quality of life indices and a specific Chronic Oral Mucosal Disease Quality of Life Index (COMDQ). Various patient-based outcomes were used, for example, pain, self-perceived oral health, oral health satisfaction, as well as OHRQoL indices. Among the studies that applied the OHRQoL index, the Oral Health Impact Profile index (OHIP) was most frequently used.

Thus, The objective of the present study was to examine levels of overall and aspects of Oral Health-Related Quality of Life in a cohort of patients with OLP using both an OLP-specific Quality of Life instrument (COMDQ-15) and non-specific oral health-related QoL instrument (OHIP-14).

MATERIALS AND METHODS

This cross-sectional study comprised of 100 patients was conducted at shri shankaracharya institute of medical Sciences, Chattisgarh and the study was approved by ethical committee.

INCLUSION CRITERIA

Patients with clinical and histopathologically confirmed OLP based upon modified WHO diagnostic criteria [11].

EXCLUSION CRITERIA

1. Evidence of oral epithelial dysplasia in the biopsy specimen.
2. Evidence of proven hypersensitivity to dental restorative materials.
3. Evidence of oral lichenoid lesions associated with graft-versus-host disease and systemic lupus erythematosus.
4. Coexisting chronic neuropathic orofacial pain such as burning mouth syndrome, persistent idiopathic facial pain and trigeminal neuropathic pain.
5. Patient-reported significant underlying systemic conditions (ASA 3 or more) and/or some psychiatric illnesses as defined by DSM-5, which might interfere with study participation such as Parkinson's disease, Alzheimer's disease and schizophrenia.

Using 85% power and 95% confidence interval level, the estimated sample size was 76. Ten percent over-sampling was applied, resulting in the total sample size of 85 patients.

Demographic characteristics were collected, included gender, age, patient types and the lesion duration since the first diagnosis of OLP, using dental records. For the clinical characteristics, OLP lesions were recorded for localization (buccal mucosa, tongue, lip, gingiva, palate, floor of the mouth and soft palate), types (reticular, atrophic, erosive/ulcerative, bullous, pigmented and plaque type), and clinical severity classified by the Thongprasom sign scoring system, demonstrated as: "0", no lesions; "1", white striae only; "2", white striae with atrophic area less than 1 cm^2; "3", white striae with atrophic area equal to or greater than 1 cm^2; "4", white striae with an erosive area less than 1 cm^2; "5", white striae with erosive area equal to or greater than 1 cm^2[12]. In case of multiple OLP lesions, the highest score among all the lesions was recorded.

In relation to pain, participants were asked for the Numeric Rating Scale (NRS) pain score by stating the number that best represented their current OLP-related pain intensity, ranging from 0 to 10: "0" for no pain at all, and "10" for the worst imaginable pain. Scores were grouped into three levels of "mild pain" (0-3), "moderate pain" (4-7) and "severe pain" (8-10) [12].

To calculate the OIDP, the frequency score and the severity score were multiplied, resulting in a performance score which could range from 0-25. The sum of eight performance scores (ranging from 0-200), were divided by 2, resulting in a percentage score ranging from 0 to 100, and in which higher scores indicated poorer OHRQoL. In addition to the score, we calculated "the intensity" of oral symptoms and their influence on daily activities which was shown to better represent the degree of subjective perception than using the percentage score. The intensity of oral impact scores was allocated into five groups, based on the highest of the eight performance scores: 1-2, "very little"; 3-5, "little"; 6-12, "moderate"; 15-16, "severe"; 20-25, "very severe" [13].

STATISTICAL ANALYSIS

All statistical computations were performed by SPSS statistics for Windows, version 20.0.

Mann-Whitney U tests were used. Spearman's correlation was used to evaluate the association between the intensity of oral symptoms and their influence on daily activities and OLP clinical severity, pain perception (NRS) and the association between OLP pain perception and OHRQoL. The significance level was set at 5% ($p < 0.05$).

RESULTS

Table 1: Patient Characteristics

Variables	N%
Gender	
Male	20 (20)
Female	80 (80)
Mean age	55.1±13.9
OLP lesions time period	
Less than 1 year	18 (18)
1-5 years	62 (62)
More than 5 years	20 (20)
Pain intensities	
Mild	60 (60)
Moderate	38 (38)
Severe	2 (2)
Mean NRS pain scores	2.56 ±2.32

The study group consisted of 80 women (80%) and 20 men (20%). The mean age was 55.1±13.9 years. Sixty-two of them (62%) had OLP lesions for 1-5 years; 20% for more than 5 years and 18% less than 1 year. Almost all patients (95%) complained of having pain. However, mean pain intensities were mostly mild (60%), followed by moderate (38%) and severe (2%). The mean NRS pain scores were 2.56 ±2.32.

Table 2:Prevalence, Intensity and Impact Score of the Oral Symptoms and their Influence on Daily Activities

Total	Overall Impact	Daily Performances n (%)							
		Eating	Speaking	Cleaning	Relaxing,Sleeping	Emotion	Smiling	Working	Social Activities
Prevalence	96	86 (86)	7 (7)	65 (65)	6 (6)	62 (62)	15 (15)	8 (8)	16 (16)
Intensity level									
No	3 (3)	11 (11)	94 (94)	35 (35)	94 (94)	36 (36)	85 (85)	93 (93)	84 (82)
Very little	12 (12)	15 (15)	2 (2)	13 (13)	0	25 (25)	1 (1)	4 (4)	12 (12)
Little	12 (12)	16 (16)	1 (1)	10 (10)	0	3 (3)	6 (6)	0	1 (1)
Moderate	35 (35)	34 (34)	2 (2)	16 (16)	0	17 (17)	4 (4)	3 (3)	1 (1)
Severe	20 (20)	10 (10)	0	18 (18)	2 (2)	7 (7)	0	0	1 (1)
Very severe	18 (18)	14 (14)	1 (1)	8 (8)	4 (4)	12 (12)	4 (4)	0	1 (1)
Impact score									
Mean±SD	12.1±13.3	8.1±6.8	0.7±2.9	6.6±7.5	1.2±4.9	5.3±7.2	1.3±0.5	0.3 ±1.3	0.9±3.2
Median	8	6	0	4	0	2	0	0	0
Min-Max	0-77.5	0-25	0-20	0-25	0-25	0-25	0-25	0-6	0-20

Ninety-six percent of OLP patients had oral symptoms and their influence on daily activities on their daily performance. The most prevalent impacted performance was eating (86%) followed by cleaning the oral cavity (65%) and emotional stability (62%). In addition, there were also impacts on social activities (16%) and smiling (15%). Although the overall prevalence of oral symptoms and their influence on daily activities was high, the mean overall percentage score was low (12.1 ±13.3, range 0-77.5). The highest mean performance score was that of eating (8.1 ±6.8), followed by cleaning the oral cavity (6.6 ±7.5) and emotional stability (5.3 ±7.2).

Table 3:Association and Distribution of the Intensity of Oral Symptoms and their Influence on Daily Activities and NRS by the OLP Clinical Severity According to the Thongprasom Sign Score

Thongprasom Sign Score	n (%)	Intensity Level (Median)	Correlation Co-efficient,p-Value	NRS (Mean±SD)	Correlation Co-efficient, p-Value
1	4 (4)	Severe	rs = 0.490 p < 0.001	3.66 ±1.52	rs = 0.298 p = 0.013
2	30 (30)	Very little		1.54± 2.04	
3	40 (40)	Moderate		2.48± 2.40	
4	18 (18)	Severe-Very severe		3.75 ±2.45	
5	8 (8)	Very severe		4.00 ±1.00	
Total	100 (100)	Moderate		2.56± 2.32	

A correlation analysis showed a statistically positive association between clinical severity and the intensity of oral symptoms and their influence on daily activities (rs = 0.490, p < 0.001). The intensity of oral symptoms and their influence on daily activities increased for each step, increasing in clinical severity scores between 2 and 4. Oral symptoms and their influence on daily activities were perceived as little, moderate and severe to very severe intensity with clinical scores of 2, 3, and 4, respectively. Statistically significant differences in the intensity of oral symptoms and their influence on daily activities, compared to a one-step clinically lower score, were observed (p < 0.001), that is, lesions scored 2 had significantly lower oral symptoms and their influence on daily activities than those scored 3 (p = 0.002), while lesions scored 3 had significantly lower impacts than those scored 4 (p = 0.030). However, there was no statistically significant difference in the intensity of oral symptoms and their influence on daily activities between lesions scored 4 and 5 (p = 0.604). Moreover, patients with score 1 reported the intensity of oral symptoms and their influence on daily activities with severe intensity level, higher than the impacts of patients with lesions of score 2 (p = 0.010).

Table 4:Association of OLP involvement at soft palate, erosive/ulcerative OLP and number of affected lesion sides with OHRQoL and pain perception

Variables	n (%)	Intensity Level (Median)	Correlation Coefficient, p-Value	NRS (Mean±SD)	Correlation Co-efficient, p-Value
Soft palate					
No	97 (97)	Moderate	p = 0.039	2.55 ±2.35	p = 0.636
Yes	3 (3)	Very severe		3.00± 0	
Erosive/ulcerative					
No	74 (74)	Moderate	p<0.001	2.09 ±2.24	p = 0.004
Yes	26 (26)	Severe-Very severe		3.88 ±2.05	
1 affected side	7 (7)	Moderate	p = 0.316	4.20 ±3.42	p=0.280
2 affected sides	40 (40)	Moderate		1.96± 2.09	
3 affected sides	18 (18)	Severe		2.61 ±2.21	
4 affected sides	20 (20)	Moderate		3.40 ±2.29	
5 affected sides	8 (8)	Very severe		2.25 ±2.21	
6 affected sides	7 (7)	Moderate severe		1.75 ±2.36	

Our study highlighted the OLP on soft palate had a significantly greater impact on OHRQoL with very severe intensity level (p = 0.039), As regards the type of OLP, patients with the erosive/ulcerative OLP reported a severe to very severe intensity level, which was significantly worse than that of the other types (p < 0.001). Furthermore, patients with the erosive/ulcerative type of OLP had significantly higher pain, with mean NRS scores (3.88 ±2.05), compared to the scores of the others (2.09 ±2.24; p = 0.004). Additionally,neither OHRQoL nor pain perception depended on the number of affected lesion sides (p = 0.316, and p = 0.280, respectively).

DISCUSSION

Oral lichen planus (OLP) is a chronic inflammatory disease that can lead to open sores in the mouth. Most patients are female and onset occurs most commonly in the fifth or sixth decade of life[1,3,14]. The characteristics of OLP, include reticular, atrophic, erosive/ulcerative, papular and plaque types [3]. Many clinical indices had been established to classify OLP, and were developed, based on the clinical features, including size, color and site-based distribution. However, none of the available indices have been universally used [9].

The findings from this study have extended our understanding of OLP impacts on OHRQoL. Three predominantly relevant daily activities, corresponding

to a deterioration in OHRQoL, were eating, cleaning the oral cavity and emotional stability. Some participants expressed their eating behavior had been changed, in that they frequently avoided or altered some types of food and beverages thought to be causes of chronic soreness or exacerbating symptoms. These included eating softer foods with a more liquid consistency, as well as the avoidance of highly seasoned, spiced, or acidic food. Our results are similar to those of Czerninski *et al.'s* study, which reported that patients with tongue lesions avoided acidic citrus fruits and tomatoes [6]. In addition, our study's participants with oral cleaning problems indicated that they had changed their oral hygiene products, such as dentifrice to the products with mild taste and smell. This finding are consistent with a previous study reporting that OLP patients were more likely to be allergic to aroma substances such as spearmint in oral hygiene products, compared to healthy subjects [7].

The participants with emotional difficulties, in our study, reported that they frequently tried to ignore or distract themselves from their problems. This finding is consistent with a previous study by Alves *et al.* [15] that assessed emotional state of OLP patients, compared to controlled subjects without disease. They showed that OLP patients were more likely to suffer from anxiety and depression as well as other negative impacts on quality of life. Therefore, understanding the characteristics of oral symptoms and their influence on daily activities caused by OLP might help clinicians give appropriate instructions to their patients. Subjective pain assessment is generally used as a patient-based outcome in OLP research. Our data exhibited a relationship between clinical severity of OLP and OHRQoL, similar to that with pain. Therefore, this finding supported the validity of the OIDP index to assess the effects of OLP on OHRQoL. The results from this study revealed, for the first time, an association between the clinical severity of OLP, according to the Thongprasom sign scoring system, and the OIDP. Greater clinical severity of OLP was associated with a poorer OHRQoL. Therefore, Thongprasom clinical scores 2 to 4 classify OLP patients according to the degree of daily life problems caused by OLP.

In terms of OLP types, our findings revealed that erosive/ulcerative type of OLP was associated with more painful symptom and poorer OHRQoL. This was in line with abovementioned finding, indicating OHRQoL worsening for the transition of Thongprasom clinical score 3 to score 4, and was consistent with previous studies reporting more severe pain and problems in quality of life in patients with erosive/ulcerative OLP [16,17]. Furthermore, our findings revealed that OHRQoL and pain were not significantly associated with the number of OLP lesions. This finding might be comparable with that of Osipo *et al.* [18], indicating that the total area of anatomic lesion or the entire average area of generalized lesion was not significantly associated OLP symptoms.

With respect to OLP pain perception, our data exhibited the relationship between OLP clinical severity and pain perception which was similar to the other OLP clinical grading criteria [19,20].

This finding confirmed the construct validity of the NRS for assessing pain perception in OLP patients. The results corroborated the earlier findings of Chainani-Wu *et al.* [19] who had validated the pain measurement tools in OLP patients including NRS, Visual Analogue Scale (VAS), and Change in Symptom Scale (CSS) and concluded that all three pain measuring tools were valid and reliable but NRS showed better construct validity. Furthermore, our findings revealed the superior strength of association between clinical severity and the intensity of oral symptoms and their influence on daily activities than NRS. This indicated a trend favoring the usefulness of the OHRQoL measurement, since it reflected the impacts not only the pain perception but also the multidimensional aspects of the life. Our findings showed that the intensity of oral symptoms and their influence on daily activities and OLP pain perception did not depend upon the number of affected lesion sides, but rather on the most severe clinical lesion. As regards localization related to the OHRQoL, the OLP lesions most frequently involved were on the buccal mucosa followed by the gingiva, tongue and lip, while the involvement of the hard palate, floor of the mouth and soft palate were rarely affected. These results are in accordance with previously published studies [1,14,21]. Osipo *et al.* [18] found that OLP of the tongue was the most painful lesion, which differed from our results that showed no difference in the pain perception with respect to the location. Interestingly, the present study demonstrated that OLP involving the soft palate could cause substantial impact on OHRQoL.

The current finding of reticular lesions, Thongprasom sign score 1 differ from current literature that reticular lesions might not cause any or much problem to patients' quality of life. We found that patients having such lesions reported higher impacts on OHRQoL during the past 6 months, as well as higher current pain level, than those having OLP scored at 2. Previous studies reported that patients with symptomatic reticular type were more anxious and depressed than those with non-symptomatic reticular OLP [22,23].

CONCLUSION

The current study demonstrated that nearly all patients had oral symptoms and their influence on daily activities affecting their daily activities. The symptoms and their influence on daily activities were frequently related to eating, cleaning the oral cavity and emotional stability. There were significant associations between OLP clinical signs and OHRQoL, as well as OLP pain perception among

OLP patients. However, some increasing clinical scores did not correspond with increasing OHRQoL. Therefore, using only an OLP sign scoring index or other clinical indicators might fail to acknowledge patient's perceptions. The results supported the application of OHRQoL assessment to complement OLP clinical measures.

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