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Original Research Article

Evaluation of Correlation of Symptoms of Anxiety, Depression, and Xerostomia in Oral Lichen Planus (OLP) Patients Using Questionnaires

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***Background and Aim*:** Oral Lichen Planus is a relatively common mucocutaneous disorder with autoimmune etiology. Considering its malignant potential, diagnosing and treating this disorder from all dimensions is crucial. One such multi-dimensional aspect of OLP was aimed to be put forth through our study of the correlation of anxiety, depression, and xerostomia using questionnaires. ***Materials and Methods*:** A group of 15 Oral Lichen Planus patients included in this study from outpatients in a college in Uttar Pradesh. The symptoms of Anxiety-Depression disorder and salivary gland disorders in oral lichen planus were recorded using two standard questionnaires, and their correlation was assessed using student's t-test analysis. ***Results*:** The co-occurrence of symptoms of both disorders in Oral Lichen Planus patients was statistically significant. The results demonstrate an association between anxiety, depression, and xerostomia in Oral Lichen Planus patients. ***Conclusion*:** Most patients showed the simultaneous occurrence of all three parameters in the same patients, thus indicative of a positive correlation between themselves.

Keywords: Lichen Planus, Oral Lichen Planus, Xerostomia, Anxiety, Depression.

INTRODUCTION

Oral Lichen Planus (OLP) is a T-lymphocyte-mediated chronic inflammatory mucocutaneous disorder with female predilection and a 0.5-2% prevalence. Its age range varies globally [1, 2]. Clinically, it is multifocal and bilaterally present in the oral cavity. The most common sites involved are the buccal mucosa, the lateral surface of the tongue, and the gingiva. It can present in various forms, mainly reticular, papular, plaque-like, bullous, and atrophic [3]. Current treatment guidelines are mainly targeted to produce anti-inflammatory and immunosuppressive activity and eliminate the cause [4, 5].

AIM AND OBJECTIVES

- To evaluate the correlation of symptoms of anxiety and depression and salivary gland disorders (XEROSTOMIA) in oral lichen planus patients.
- To compare the severity of these symptoms in different clinical types of OLP.

MATERIALS AND METHODS

An observational cross-sectional study design was used for this study in accordance with STROBE's checklist.

Settings and Participants

Ethical clearance was obtained from the Institutional Review Board and Ethics Committee of Babu Banarasi Das College of Dental Sciences, Lucknow, India and written consent was obtained from the patients prior to the beginning the study. Random patients attending the outpatient department (OPD) of the Department of Oral Medicine and Radiology from January 2022 to October 2022 were screened for Oral Lichen Planus. Clinically and histopathologically proven, fifteen OLP patients were included in the "Case" group. Fifteen non-OLP-affected adults were included in the "Control" group. In addition, those showing adequate cooperation to complete the questionnaire were only included.

Subjects with any other oral premalignant conditions, consuming tobacco or those medications affecting salivary glands in general and xerostomia in the specific or psychosomatic system, having systemic

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and salivary gland-specific diseases, or having undergone radiotherapy were excluded from the study.

Variables and Measurements

All the patients underwent a complete general and oral examination by the same operator and clinically were diagnosed with OLP. Further, they were subjected to histolopathological examination and proven ones were selected finally. The three variables assessed were anxiety, depression and xerostomia using questionnaires. Parents were asked to tick the most appropriate answer.

Two questionnaires were used in the study for these three variables, viz. Modified Multidisciplinary Salivary Gland Society (MSGS) questionnaire of the Q10 version (Figure 1) and Original Hospital Anxiety and Depression Scale (HADS) (Figure 2).

QUESTIONS	SCORES
1. Evaluate the intensity of your mouth dryness	No dryness 0 1 2 3 4 5 6 7 8 9 10 Maximal dryness
2. Evaluate the frequency of your mouth dryness during the day	Never 0 1 2 3 4 5 6 7 8 9 10 Constantly during the day
3. Evaluate the quality of your saliva	Normal (even if diminished) 0 1 2 3 4 5 6 7 8 9 10 very thick/sticky/watery (serous)/no saliva
4. Evaluate the taste of your saliva	Normal 0 1 2 3 4 5 6 7 8 9 10 very salty and/or sweet and/or bitter and/or acid and/or bad taste
5. At which frequency do you feel the need to moisture your mouth during the day (either by drinking water / chewing gums / or by using moisturizing sprays)?	Never 0 1 2 3 4 5 6 7 8 9 10 constantly
6. How frequently do you wake up at night to drink water?	Never 0 1 2 3 4 5 6 7 8 9 10 Very frequently
7. Evaluate your talking difficulty related to your dry mouth	No difficulty 0 1 2 3 4 5 6 7 8 9 10 very important difficulty (constant need to moisturize to be able to speak)
8. Evaluate your level of difficulty to chew and swallow food	No difficulty 0 1 2 3 4 5 6 7 8 9 10 very important difficulty (constant need to drink water to chew and swallow food)
9. Evaluate the dryness of your lips	No dryness 0 1 2 3 4 5 6 7 8 9 10 maximal dryness
10. Evaluate the dryness of your nose	No dryness 0 1 2 3 4 5 6 7 8 9 10 maximal dryness
11. Evaluate the dryness of your eyes	No dryness 0 1 2 3 4 5 6 7 8 9 10 maximal dryness
12. Are you physical activities disturbed because of your dry mouth?	No 0 1 2 3 4 5 6 7 8 9 10 yes, I avoid any activity which makes me Uncomfortable because of my dry mouth
13. Evaluate your quality of life regarding to your dry mouth	Perfect 0 1 2 3 4 5 6 7 8 9 10 completely unsatisfying

Figure 1: Showing Modified MSGS Questionnaire (Q10 version)

Hospital Anxiety and Depression Scale (HADS)

Tick the box beside the reply that is closest to how you have been feeling in the past week.
Don't take too long over you replies: your immediate is best.

D	A		D	A	
		I feel tense or 'wound up':			**I feel as if I am slowed down:**
	3	Most of the time	3		Nearly all the time
	2	A lot of the time	2		Very often
	1	From time to time, occasionally	1		Sometimes
	0	Not at all	0		Not at all
		I still enjoy the things I used to enjoy:			**I get a sort of frightened feeling like 'butterflies' in the stomach:**
0		Definitely as much		0	Not at all
1		Not quite so much		1	Occasionally
2		Only a little		2	Quite Often
3		Hardly at all		3	Very Often
		I get a sort of frightened feeling as if something awful is about to happen:			**I have lost interest in my appearance:**
	3	Very definitely and quite badly	3		Definitely
	2	Yes, but not too badly	2		I don't take as much care as I should
	1	A little, but it doesn't worry me	1		I may not take quite as much care
	0	Not at all	0		I take just as much care as ever
		I can laugh and see the funny side of things:			**I feel restless as I have to be on the move:**
0		As much as I always could		3	Very much indeed
1		Not quite so much now		2	Quite a lot
2		Definitely not so much now		1	Not very much
3		Not at all		0	Not at all
		Worrying thoughts go through my mind:			**I look forward with enjoyment to things:**
	3	A great deal of the time	0		As much as I ever did
	2	A lot of the time	1		Rather less than I used to
	1	From time to time, but not too often	2		Definitely less than I used to
	0	Only occasionally	3		Hardly at all
		I feel cheerful:			**I get sudden feelings of panic:**
3		Not at all		3	Very often indeed
2		Not often		2	Quite often
1		Sometimes		1	Not very often
0		Most of the time		0	Not at all
		I can sit at ease and feel relaxed:			**I can enjoy a good book or radio or TV program:**
	0	Definitely	0		Often
	1	Usually	1		Sometimes
	2	Not Often	2		Not often
	3	Not at all	3		Very seldom

Please check you have answered all the questions

Scoring:
Total score: Depression (D) _____ Anxiety (A) _____
0-7 = Normal
8-10 = Borderline abnormal (borderline case)
11-21 = Abnormal (case)

Figure 2: Showing HADS Questionnaire

The original MSGS questionnaire was presented during the second International Sialendoscopy Conference in Dubai 2020. It contains twenty questions divided into two groups, thirteen regarding xerostomia and seven regarding sialadenitis. In our modified questionnaire version, we used only thirteen questions about xerostomia. Each question is rated on a ten-point scale with a minimum score of zero and a maximum score of one hundred thirty. We considered the abnormal range as a score of less than 25% of the total score.

The HADS questionnaire was initially developed by Zigmond and Snaith (1983). It contains fourteen items and consists of two subscales: anxiety and depression. Each item is rated on a four-point scale, giving maximum scores of twenty-one for anxiety and depression. Scores of 11 or more on either subscale are considered a significant 'case' of psychological

morbidity, while scores of 8-10 represent 'borderline' and 0-7 as 'normal.'

Statistical Analysis

The data were coded and organized using MS Excel (Microsoft Corporation, 2018) and assessed using www.socscistatistics.com. Anxiety, depression and xerostomia scores were expressed as categorical variables as average mean. The association between anxiety, depression and xerostomia scores with OLP was assessed using t-test and p-values. The simultaneous co-occurrence of the three variables in OLP were assessed using 3-D scatter diagram.

RESULTS

The data showed a marked difference in mean xerostomia scores between the case and control groups. The difference in mean scores of depression between the case and control groups was also appreciable (Figure 3).

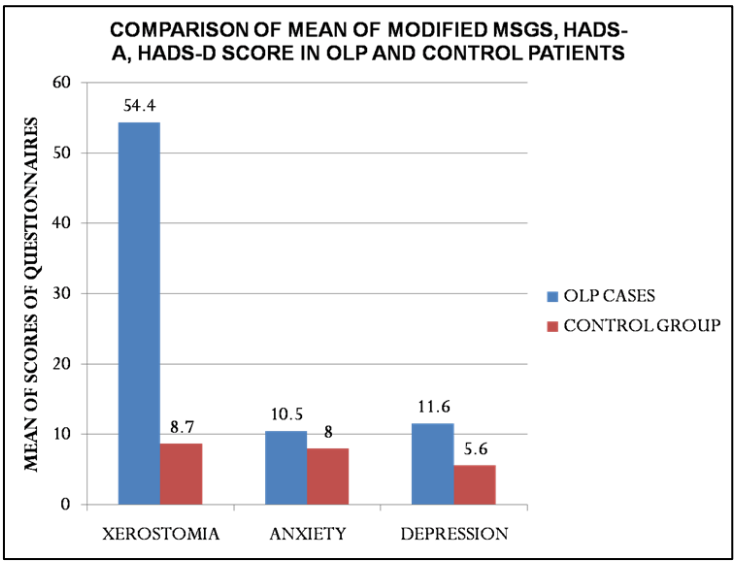

Figure 3: Showing comparison of scores of case and control group

However, the difference in mean scores of anxiety was not appreciable. Further, by using the t-test, the mean differences were found to be statistically significant (p-value < 0.05) in the case of xerostomia and depression and insignificant (p-value> 0.05) in the case of anxiety (**Table 1).**

Table 1: Showing statistical analysis of difference of mean scores between cases and controls

QUESTIONNAIRE	OLP CASE GROUP (n=15)		NON-OLP CONTROL GROUP (n=15)		t-value	p-value (P<0.05)
	MEAN	SD	MEAN	SD		
1. MODIFIED MSGS SCORE	54.4	27.03	8.7	2.4	6.51858	0.000001
2. HADS-A SCORE	10.5	6.5	8	1.73	1.45674	.077966
3. HADS-D SCORE	11.6	5.6	5.87	1.85	3.7559	.000403

DISCUSSION

In the present study, 73% of the case group and 0% of the control group had xerostomia, 67% of the case group and 67% of the control group had anxiety, and 73% of the case group had 13.3% of the control group had depression. However, there was no difference in the percentage of occurrence of anxiety in OLP patients and the control group (results not statistically significant). This could be due to the growing prevalence of anxiety in present times. This is well supported by the "Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic" study, published in Lancet public health estimated an

increase of about 35 percent in the prevalence of anxiety and depression in India.

Overall ages of occurrence of OLP in the present study were forty years (middle-aged adults). This finding was consistent with previous studies by Burkhart NW *et al.*, (1996), Zheng Y. Shen *et al.*, (2012), Anita D. Munde (2013), and Gabrielle Dennis *et al.*, (2022) [6-9].

Seventy-three percent of our subjects with OLP were female, and this finding is in agreement with previous findings of Axell T. A(1976), Silverman S (1991), Michele D. Mignogna *et al.*, (2005), Soma Susan Varghese *et al.*, (2016), Alokenath Bandyopadhyay *et al.*, (2017), and Gabrielle Dennis *et al.*, (2022). [9-14] But contradicting the results of Bouquot JE. (1986), Zain RB *et al.*, (1997), Micheelis W *et al.*, (1999) [15-17]. This could be attributed to a sizeable epidemiological sample size in these four studies, unlike former studies.

In the modified MSGS questionnaire, three questions regarding dryness of lips, nose, and eyes were seen in one patient with a similar severity pattern as dryness of the mouth. She was recalled for further investigation, but unfortunately, she did not report, so nothing conclusive could be stated. One question regarding Quality of Life showed an average 70% unsatisfaction score of OLP patients with xerostomia. More research on xerostomia in OLP patients affecting the quality of life is suggested.

In the present study, a comparison of the difference in mean scores between different clinical types of OLP was made. By using a t-test, the differences in mean scores of xerostomia and depression were found to be remarkably on the higher sides in atrophic and erosive types as compared to the reticular type (Table 2).

Table 2: Showing statistical analysis of difference of mean scores between Reticular and Erosive-Atrophic type of OLP

QUESTIONNAIRE	ATROPHIC & EROSIVE TYPE (n=10)		RETICULAR TYPE (n=5)		t-value	p-value (P<0.05)
	MEAN	SD	MEAN	SD		
1. MODIFIED MSGS SCORE	70.7	7.3	30.2	31.7	-4.191	**0.0011**
2. HADS-A SCORE	11.9	2.4	8.4	7.03	-1.459	**0.1684**
3. HADS-D SCORE	14.5	3.34	5	8.1	-3.283	**0.0059**

Finally, a 3-D scatter diagram was plotted for all three parameters (Figure 4).

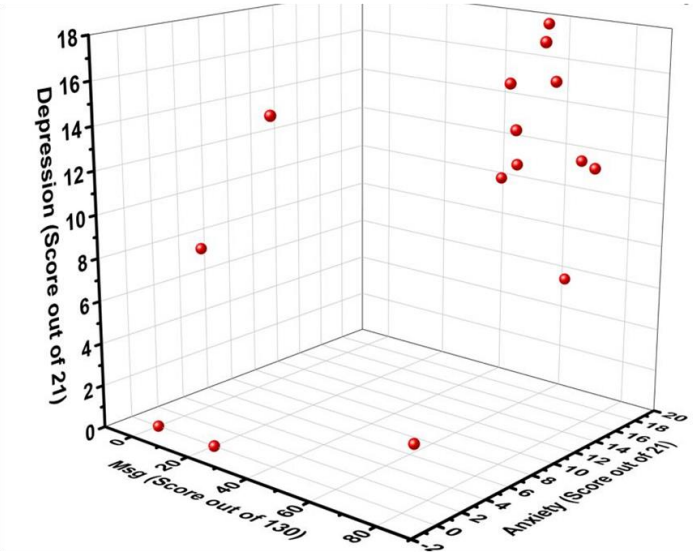

Figure 4: Showing 3D scatter diagram showing positive association between Anxiety, Depression and Xerostomia in OLP patients

A cluster of their higher values was seen in the same region, indicative of the co-occurrence of these three parameters in patients of OLP. This co-occurrence could be further supported by the flowchart that we prepared after going through a group of studies (Figure 5) [18-26].

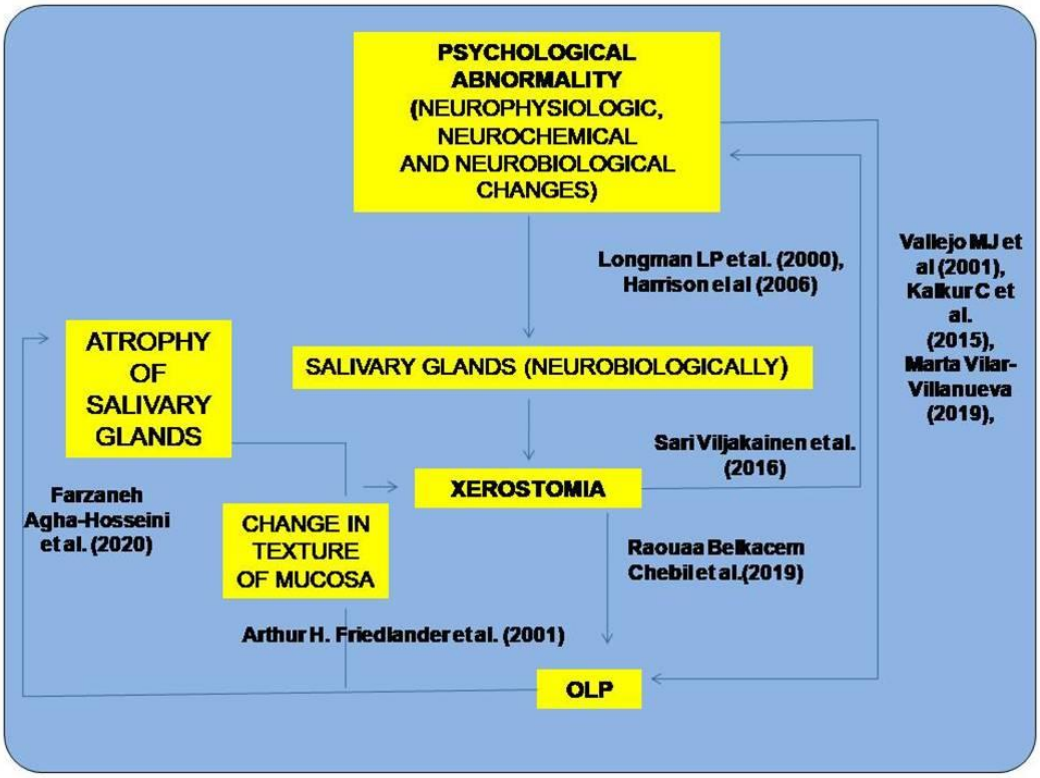

Figure 5: Showing flowchart of correlation between Xerostomia, Anxiety and Depression

Future Prospects

Owing to the limitation of the small sample size in our present study, a similar study with a large sample size is warranted. In addition, a comparative study to evaluate the chances of relapse of OLP with and without managing these symptoms could be of great help.

CONCLUSION

Based on the above results, it would be logical to claim that psychiatric and xerostomic evaluation is necessary. Further, appropriate treatment of the patients for these symptoms and routine treatment of OLP lesions should be recommended. Oral physicians should be well-versed in psychological counseling (pay attention to the emotional state of their patients) along with good knowledge of the management of xerostomia.

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