A comprehensive documentation on sociodemographic data of patients with oral lichen planus in a teaching hospital

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ABSTRACT

Background: Oral lichen planus (OLP) is a chronic inflammatory and autoimmune condition of the oral mucosa with significant variation in pathophysiology. Accordingly, the present study aims to evaluate the socio-demographic profile of OLP patients in an eastern Indian population, examining the interplay between socio-economic status (SES), lifestyle factors, and disease characteristics.

Methods: This prospective study was conducted at a teaching hospital in eastern India from January 2019 to February 2022. Out of 1589 diagnosed OLP patients, 546 voluntarily agreed to participate in the study. We collected socio-demographic data, such as age, gender, education level, occupation, income, lifestyle habits, and comorbidity, through structured interviews and medical records. We performed statistical analyses using SPSS 20.0 software to identify significant associations between these variables and the clinical features of OLP.

Results: Among the 546 participants, 54.02% were women and 45.97% were men, with the highest prevalence (40.10%) in the middle aged adult group (31–40 years). Furthermore, the majority of participants came from lower castes (64.64%), belonged to a lower socio-economic class (45.60%), and over 53% were involved in agricultural farming and daily labor. From a lifestyle perspective, 53.39% of participants were highly addicted to paan, gutka, cigarettes, and alcohol. Common comorbidities included hypertension (18.68%), diabetes (16.84%), thyroid disorders (10.62%), and past hepatitis C infection history (16.84%). Approximately 70.69% experienced stress, anxiety, and depression, while 21.79% frequently encountered chronic trauma post-OLP development.

Conclusion: This study highlights OLP prevalence and severity in a teaching hospital, where lower socio-economic status and lifestyle factors, such as tobacco use, comorbidities, and hepatitis C infection, are significantly associated with OLP manifestations.

KEY WORDS: Oral lichen planus, socio-demographic profile, socio-economic status, prevalence, eastern India, public health interventions.

INTRODUCTION

Oral lichen planus (OLP) is a chronic inflammatory disorder that affects the mucous membranes inside the mouth. It is characterized by white, lacy patches, red swollen tissues, which can cause pain or discomfort. OLP can affect any area of the oral cavity, including the gums, tongue, and inner cheeks (1,2). Based

on the symptoms of OLP can be differentiated into five types include reticular, erosive, atrophic, bullous, and plaque OLP (2). Among these erosive and atrophic OLP is very vulnerable one with high risk towards malignant transformations. Global prevalence rate is 1.80 to 2% and that affects approximately 0.5 to 2.6% of population in various region in India, female predominant (3,4). According to WHO reported malignance transformation ration is 1.43 to 2.25% till 2023 (1,2). Although the precise etiology of OLP remains unclear, experts hypothesize that it involves an immune-mediated mechanism (4-8). This mechanism suggests that the body's immune system erroneously targets and destroys the keratinocytes of the oral mucosa, leading to the characteristic lesions observed in OLP. As a chronic inflammatory disease, OLP triggers a number of mechanisms that involve the activity of keratinocytes, cytokines, and chemokines pathways (7,9,10). Along with immunological factors, genetic predisposition, stress, and certain medications may all contribute to its development (11-13). Currently, there is no available medical intervention to cure OLP; instead, treatments focus on managing symptoms and reducing inflammation by recommending anti-inflammatory and immune-modulator regimens (8,14,15).

According to various reports, OLP has a diverse range of sociodemographic characteristics, with multiple factors contributing to its pathogenesis and occurrence (9,16). Middle-aged adults (35-40 years) population are the most commonly diagnosed with OLP (17). Lifestyle factors such as the use of tobacco products, including chewing tobacco, betel nuts, gutka, and gudakhu (Local language 'Gudakhu' made from fine tobacco leaf dust, sheera (molasses), lime, gerumati (red soil), and water), as well as smoking and alcohol consumption, may also impact the incidence and severity of OLP (9,12). OLP is often associated with other systemic conditions, including autoimmune disorders (e.g., thyroid diseases, rheumatoid arthritis) and chronic liver diseases (18-21). Despite these insights, the exact etiology of OLP remains elusive, necessity to research on fully understand its underlying mechanisms and risk factors (8,22).

In scientific research, beyond molecular genetics and biochemistry, collecting socio-economic status (SES) data on a regional basis is crucial for understanding the complex nature of the prevalence, progression, and management of autoimmune diseases like OLP. This comprehensive approach enables the investigation of how socio-economic disparities impact healthcare access, health literacy, and overall quality of life among OLP patients. SES influences variations in diet, smoking habits, exposure to environment, and stress levels, all of which can influence the etiology and exacerbation of OLP (23-25). Understanding these correlations enables us to identify risk factors and develop targeted interventions to mitigate their impact on disease progression (17).

The study aimed to identify the socio-economic factors associated with the development of OLP, which could inform future policies for its diagnosis and management.

MATERIALS AND METHODS

This study investigates preliminary pathophysiology and records the socio-epidemiological status of the OLP patients attending a tertiary care teaching hospital (Dermatology OPD Institute of Medical Sciences & SUM Hospital), Bhubaneswar, Odisha, India (a part of eastern India). We recorded the socio-epidemiological data from January 2019 to February 2022, adhering to proper institutional ethics guideline and obtaining a signed consent form. The study included male and female patients, ranging in age from 20 to 60 years. During the aforementioned period, we were able to locate around 546 OLP patients with proper clinical appearance and histopathological reports (Supplementary S1).

To better focus on OLP, excluded people who had cutaneous lichen planus, drug-induced lesions, chronic medications, a history of systemic diseases, pregnant or breastfeeding, or had oral squamous cell carcinoma in the study. Included all type of OLP manifestation patients with consent and follow-up patients and don't have any objection include in the study. We utilized a series of questionnaires to gather information from each OLP patient's age, gender, address, religion, caste, educational status, number of family members, occupation, marital status, and social status. Also included in the clinical data were past tooth procedures, the type of lesions and where they were located, the duration of OLP symptoms, the patient's treatment history, any other diseases or habits (like smoking, drinking, eating nuts like areca nuts and paan (betel), tobacco, etc.), comorbidity diseases (like diabetes, high blood pressure, stress, thyroid, etc.), chronic trauma or irritation, neuropsychiatric disorders (present or absent), and a history of hepatitis B or C, whether the person was infected or not.

In order to maintain accurate records and ensure the smooth conduct of the socio-economic status of the OLP patients, we first entered the retrospective data from patient consent into a Microsoft Excel sheet, followed by a comprehensive statistical analysis using the SPSS Version 23.0 software. We delineated categorical variables in terms of frequency (N) and percentage (%) and depicted quantitative variables by

Figure 1. Confirmation of OLP through clinical manifestations appearance followed by histopathology reports tissue biopsy before adding in our prospective study. The dotted circle highlighted the patches of lichen planus lesions.

their respective means and standard deviation (SD). Further, the difference in parameters was assessed by a Pearson's chi-square test, and $p < 0.05$ was considered statistically significant.

RESULTS

Within three years of OPD data, identified 1589 OLP-affected individuals, of who 1043 declined participation in the study, and a total of 546 participants provided proper consent in our investigation. Primarily, the OLP was confirmed through clinical manifestations appearance, clinical observation followed by histopathology reports (Figure 1). We presented the socio-economic characteristics of OLP patients across three distinct tables. In brief, Table 1 presents the socio-economic status; Table 2 presents associated risk factors and co-morbidities recorded from patient history and habits, as well as clinical relevance through different parameters recorded in Table 3. Additionally, we have presented these investigated socio-economic profiles in a bar diagram (Figure 2, 3) to enhance understanding and highlight their statistical significance. In 546 participants' records, 295 cases (54.02%) were women, a significantly higher percentage than the 251 cases (45.97%) men. The age groups of 31–40 years had a higher number of OLP patients (40.10%) compared to those of 41–50 years (29.67%), 21–30 years (17.94%), and 51–60 years (12.27%) (Table 1). The ratio of men to women is not statistically significant to each other (CI at 95%: 19.73-0.013; p = 0.051) due to the small sample size and difference, but it is highly significant between the age groups (CI at 95%: 10.75-1.48, $p = 0.001$). The above observation suggests that OLP is primarily a female autoimmune disorder, particularly affecting the middle-aged adult group (41-50 years' age).

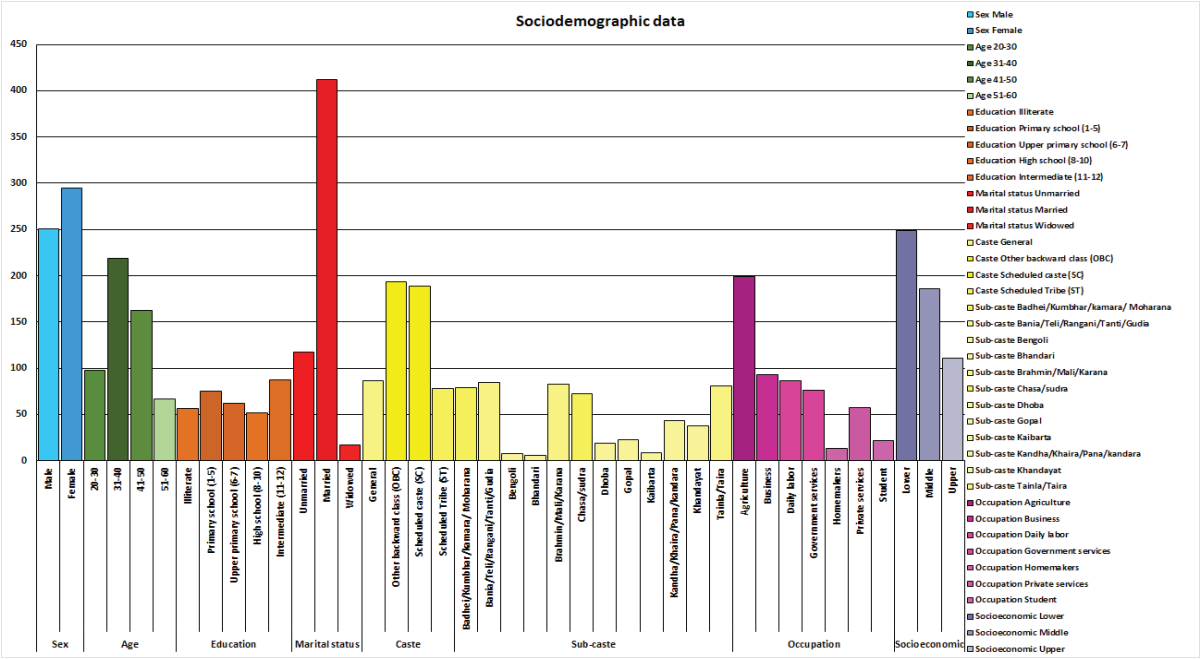

Figure 2. Sociodemographic data of individual OLP participants (n=546). The data was recorded through set-up questionnaires and presented with a bar diagram for better understanding (see Table 1).

From the perspective of educational status, we observed a higher percentage of participants who graduated (19.23%) and pursued higher studies (19.96%), while the lowest percentage was in high school (09.50%), with the illiterate (10.25%) category following closely. As a result, most of the patient age-educated groups and within seven groups are statistically significant (CI: 31.48-9.17%; $p < 0.001$). The study included an average number of educated people around 66.4 ± 0.61. From the records, we found that a higher percentage of the married group (75.45%) supported the adult age groups compared

Table 1. General characteristics and status of the OLP participants included in our socio-demography investigation. All information's are collected through set of questionaries' and consent.

Sl. No.	General characteristics profiles of each individual participants	Individual participants	Percent (%) from total	Confidence interval (at 95%)	*p-value*
1.	**Sex**				
	Male	251	45.97	19.73-0.013	0.051
	Female	295	54.02		
2.	**Age**				
	20-30	98	17.94	10.75-1.48	0.001
	31-40	219	40.10		
	41-50	162	29.67		
	51-60	67	12.27		
3.	**Educational status**				
	Illiterate	56	10.25	31.48-9.17	<0.001
	Primary School (1-5)	75	13.73		
	Upper Primary School (6 and 7)	62	11.35		
	High School (8-10)	52	09.50		
	Intermediate (11 and 12)	87	15.93		
	Graduate (13 and above)	105	19.23		
	Higher studies	109	19.96		
4.	**Marital status**				
	Unmarried	117	21.42	3.69-0.21	0.092
	Married	412	75.45		
	Widowed	17	03.11		
5.	**Caste**				
	General	86	15.75	11.54-1.61	<0.001
	Other backward class (OBC)	193	35.34		
	Scheduled caste (SC)	189	34.61		
	Scheduled Tribe (ST)	78	14.28		
6.	**Sub-caste (lower and upper)**				
	Badhei/Kumbhar/kamara/ Moharana	79	14.46	21.76-9.04	<0.001
	Bania/Teli/Rangani/Tanti/Gudia	85	15.56		
	Bengoli	08	01.46		
	Bhandari	06	01.09		
	Brahmin/Mali/Karana	83	15.20		
	Chasa/sudra	72	13.18		
	Dhoba	19	03.47		
	Gopal	23	04.21		
	Kaibarta	09	01.64		
	Kandha/Khaira/Pana/kandara	43	07.87		
	Khandayat	38	06.95		
	Tainla/Taira	81	14.83		
7.	**Occupational status**				
	Agriculture	199	36.44	11.85-3.37	<0.001
	Business	93	17.03		
	Daily labor	86	15.75		
	Government services	76	13.91		
	Homemakers	13	02.38		
	Private services	57	10.43		
	Student	22	04.02		
8.	**Economic status**				
	Lower	249	45.60	10.22-0.63	0.012
	Middle	186	34.06		
	Upper	111	20.32		

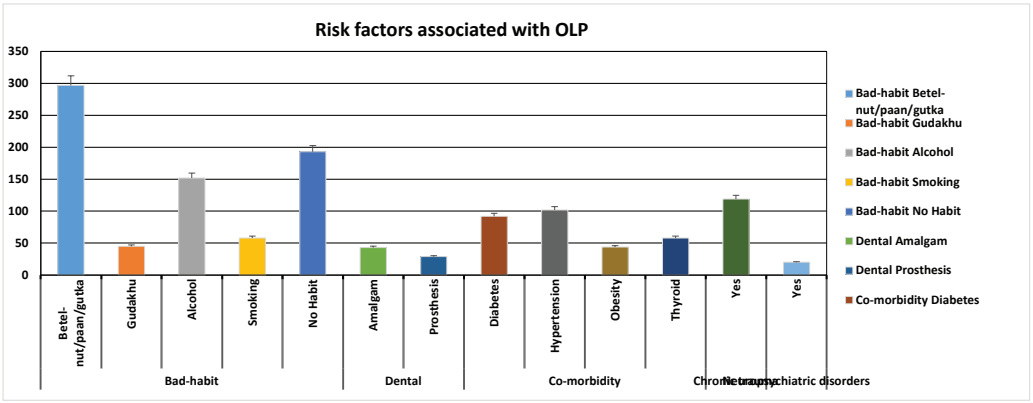

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Figure 3. Identified risk factors associated with OLP through questionnaires and presented in a bar diagram for better understanding (see Table 2).

to the unmarried group (21.42%) and widowed group (03.11%), but this difference is not statistically significant (CI: 3.69-0.21%; $p = 0.092$). According to records, around 35.34% of OLP patients are from backward classes (OBC), 34.61% are from scheduled castes (SC), and the rest are from general (15.75%) and scheduled tribes/ST (14.28%). Furthermore, according to sub-castes (lower and upper caste), there is no such difference in lower sub-castes (15.56% belongs to bania/teli/ rangani/tanti/gudia) and upper sub-castes (15.20% belongs to brahmin/mali/karana/ khandayat). Nonetheless, there are highly significant differences (CI: 21.76-9.04%; p <0.001) between the 12 groups of participants (Table 1).

According to each individual record's occupation, approximately 36.44% of participants are from the agriculture sector. Mostly, the patients were coming from rural area and occupied in a higher percentage in our study. From scientific background, farmers are commonly consume paan, betel nut, gudakhu, and gutkha for their stress relief. As a results, illiteracy and without any awareness, the percentage are highly recorded in our study. Rest of the 17.03% are from business backgrounds, 15.75% are from the daily labour class, 13.91% are from government service holders, 10.43% are from private job holders, and the remaining patients are homemakers (2.38%) and students (4.02%). We found statistical significance between all seven occupational groups (CI: 11.85-3.37%; p <0.001). In terms of economic status (lower, middle, and upper class), a higher proportion of participants come from lower class backgrounds (45.60%), compared to middle class backgrounds (34.06%) and upper class backgrounds (20.32%), respectively (Table 1). Out of the 546 individual data on caste, sub-caste, occupations, and economic burden that correlated

Table 2. Recorded relevant risk factors associated with OLP of each individual participant recorded through proper questionnaires of the OLP participants.

Sl. No.	Recorded risk factors each individual participants	Individual participants	Percent (%) from total	Confidence interval (at 95%)	*p-value*
1.	**Addicted daily habits**				
	Betel-nut/paan/gutka	297	53.39	6.52-1.15	0.001
	Gudakhu	45	08.24		
	Alcohol	152	27.83		
	Smoking	58	10.62		
	Not above of them	193	35.34		
2.	**Dental procedure**				
	Amalgam	43	07.87	115.48-1.6	0.009
	Prosthesis	29	05.31		
3.	**Associated co-morbidities**				
	Diabetes	92	16.84	30.36-4.5	<0.001
	Hypertension	102	18.68		
	Obesity	44	08.05		
	Thyroid	58	10.62		
4.	**Chronic trauma/ irritation**	119	21.79	3.22-0.83	0.32
5.	**Neuropsychiatric disorders**	20	03.66	0.76-2.33	0.47

Table 3. Recorded clinical parameters of the OLP participants.

Sl. No.	Clinical parameters records	Number of suspect	Percent (%) from total
1.	Past history of hepatitis	92	16.84
	Hepatitis B (Sero-positive)	13	2.38
	Hepatitis C (Sero-positive)	26	4.76
2.	Impairment (stress, anxiety, depression, etc.,) of lifestyle for OLP	386	70.69
3.	Patient having other body part involvement in LP	52	9.52
4.	No. of family members affected	Nil	Nil

with hygienic condition and healthy diet plan, some factors influence or contribute to the development and progression of autoimmune diseases like OLP.

Furthermore, we recorded the addicted daily habits (experienced with smoking, alcohol, paan, and gutkha) through a simple set of questionnaires in the OLP associated risk factor category. The majority of patients (53.39%) reported frequent addiction to betel nuts, paan, gutka, and alcohol in their daily lives, while approximately 35.34% reported no addiction to these daily habits (Table 2). Statistically, we found there is a significance difference between the groups, and the above habits may be counted as some influencer parameters for OLP progression as per previous reports (25). As OLP is a mucosal lesion, we added two questionnaires to know if participants had experience with dental procedures (amalgam/prosthesis). Only 43 (07.87%) had experience with amalgam, while 29 (05.31%) had experience with prosthesis (Table 2). One of the most common comorbidities among OLP patients is high blood pressure (102 cases, or 18.68% of the total). This is followed by diabetes (92 cases, or 16.84%), thyroid problems (58 cases, or 10.62%), and obesity (44 cases, or 8.05%), with a higher statistical significance between the four groups (CI: 30.36–4.5; p <0.001). As a result, more than half of the patients (54.19%) had the aforementioned comorbidities, which could potentially exacerbate the severity and recurrence chance of OLP, according to a previous study (Table 2). Additionally, 119 (21.79%) individuals frequently experienced chronic trauma or irritation after OLP development, whereas only 20 (3.66%) of them had neuropsychiatric disorders that negatively impacted OLP patients' quality of life (Table 2).

At the end, we also recorded another set of clinical parameters of individual participants, such as whether they were hepatic positive or not, whether they felt impairment (stress, anxiety, depression, etc.), whether they developed lichen planus in other body parts after the occurrence of OLP, and whether they had a family history of the condition (Table 3). Out of 546 individuals, 92 (16.84%) had a history of hepatitis infections, with the majority having 26 (4.76%) and 13 (2.38%) cases of hepatitis C, relative to other serotypes. According to previous reports, the majority of OLP patients experienced hepatitis C, which also played a crucial role in the development of OLP due to immune compromise. Around 70.69% of individual's experience stress, anxiety, and depression in their daily lives following the onset of OLP, primarily due to chronic pain in the mucosal region. In addition, around 9.52% of participants experienced lichen planus infection in other body parts like nails, cutaneous, genital area, and oral mucosal area (5). In our study, we did not find any patients with a family history of OLP, which suggests that the condition has inherited characteristics that can be passed down from generation to generation. Overall, a single-variable analysis showed that sociodemographic and economic status have a significant impact on the development and occurrence of OLP.

DISCUSSION

As far as we know, OLP is a skin autoimmune disorder similar to lupus, psoriasis, vitiligo, scleroderma, etc. that is associated with complex metabolic pathways and has a diversified characteristic (10). Estimates place the global prevalence of OLP between 0.5% to 2.5%, with regions outside Asia, such as Europe and Africa, exhibiting comparatively higher prevalence rates (3,24,27). Particularly in India, the prevalence rate ranges from approximately 0.49% to 1% (3,25). Currently, there are several research hypotheses and investigation is going on to understand the pathogenesis of OLP (7,8,10).

Several new prevalence studies from a wide range of cohorts or populations show that OLP is growing and getting worse, and that this trend is strongly linked to a number of socio-economic factors (9,12). For instance, our retrospective study found that the majority of participants shared common comorbidities such as hypertension, diabetes, and thyroid, which is consistent with previous community-based studies in India (19,28). Socio-demographic studies showed that more than half of OLP patients had stressful lives, which could be making things worse

in their daily lives (18,24) chronic trauma is an overlooked factor strongly linked to post-OLP. Most case studies also revealed that rural people with lower socioeconomic backgrounds are highly affected than urban communities, which indicates the influencer role of lifestyle and food habits (11,18).

In a global prospective, a recent study found that about 21% of OLP patients were addicted to tobacco, 41% were addicted to alcohol, and 33% had a psychoemotional disorder (4). Our prospective study also identified the addictive detrimental habits and depression disorder trends among OLP patients from the previous study (4,5). However, the percentages of past history of hepatitis infection were not much higher in previous reports, as we found in our cohort study (4). Surprisingly, OLP patients showed higher levels of education, marriage, belonging to other backward castes, and a lower socioeconomic status, whereas sub-caste and gender did not differ (5,6). An analysis of a geographical epidemiology study reveals a frequent relationship between pain perception and mental health and socio-demographic, economic, social, and cultural aspects, which may vary across different countries or geographical areas within the same country (6,23,30).

in conclusion, the SES records (like income, education, occupation, and other social determinants of health) on a certain group of people or region have a big impact on finding patterns and differences in the occurrence and severity of OLP, even when medical science isn't involved. Moreover, regional SES records provide valuable insights for public health planning and resource allocation. In summary, incorporating regional SES records into OLP research enriches the understanding of the disease by elucidating the complex interplay between socio-economic factors and health outcomes.

LIMITATIONS

We had a small sample size and a short subjective assessment methods. This data based on the previous recorded patient data, so that further follow-up process not done.

CONCLUSION

The study conducted at an eastern India teaching hospital, aimed to delineate the socio-demographic profile of patients with OLP. The findings indicate that OLP predominantly affects middle-aged adults, with a higher prevalence in females. We observed a significant correlation between lower SES and increased disease severity and progression. Patients from lower SES backgrounds often faced delays in diagnosis and suboptimal disease management due to barriers to accessing specialist care and affording prescribed treatments. The study also highlighted the impact of lifestyle factors, such as tobacco use and alcohol consumption, which were more prevalent in lower SES groups and contributed to the exacerbation of OLP. In addition, the link between OLP and systemic conditions like high blood pressure, diabetes, thyroid, and past history of hepatitis C infection was correlated. This means that these comorbidities are important risk factors for the development and progression of OLP. This research provides a foundation for future policies aimed at mitigating the impact of SES on OLP and improving patient outcomes in similar socio-economic contexts.

Ethics approval and consent to participate

All protocols were approved by the institutional ethics guideline and written informed consents were obtained from the participants.

References:

1. Nukaly HY, Halawani IR, Alghamdi SMS, Alruwaili AG, Binhezaim A, Algahamdi RAA, *et al.* Oral Lichen Planus: a narrative review navigating etiologies, clinical manifestations, diagnostics, and therapeutic approaches. Journal of Clinical Medicine. 2024; 13(17):5280.
2. Srivastava KC, Saini RS, Lin GSS, Heboyan A, Shrivastava D. A Decadal Bibliometric Analysis on the Therapeutic Strategies in Oral Lichen Planus. Health Sci Rep. 2025;8(2):e70403.
3. González-Moles MÁ, Warnakulasuriya S, González-Ruiz I, González-Ruiz L, Ayén Á, Lenouvel D, *et al.* Worldwide prevalence of oral lichen planus: A systematic review and meta-analysis. Oral Dis. 2021;27(4):813-828.
4. Aguirre-Urizar JM, Alberdi-Navarro J, Lafuente-Ibáñez de Mendoza I, Marichalar-Mendia X, Martínez-Revilla B, Parra-Pérez C, *et al.* Clinicopathological and prognostic characterization of oral lichenoid disease and its main subtypes: A series of 384 cases. Med Oral Patol Oral Cir Bucal. 2020;25(4):e554-e562.
5. Adamo D, Calabria E, Canfora F, Coppola N, Leuci S, Mignogna M, *et al.,* SIPMO (Italian Society of Oral Pathology, Medicine). Anxiety and depression in keratotic oral lichen planus: a multicentric study from the SIPMO. Clin Oral Investig. 2023;27(6):3057-3069.
6. Adamo D, Calabria E, Canfora F, Coppola N, Lo Muzio L, Spirito F, *et al.,* SIPMO (Italian Society of Oral Pathology and Medicine). Where do you live? North versus Central-South differences in relation

to Italian patients with oral lichen planus: a cross-sectional study from the SIPMO (Italian Society of Oral Pathology and Medicine). BMC Oral Health. 2022;22(1):184.

7. Afzali S, Mohammadisoleimani E, Mansoori Y, Mohaghegh P, Bahmanyar M, Mansoori B, *et al.,* The potential roles of Th17 cells in the pathogenesis of oral lichen planus. Inflamm Res. 2023;72(7):1513-1524.
8. Choi Y. Animal models to study the pathogenesis and novel therapeutics of oral lichen planus. Front Oral Health. 2024;5:1405245.
9. Amin NR, Yussif N, Ahmed E. The effect of smoking on clinical presentation and expression of TLR-2 and CD34 in Oral lichen Planus patients: clinical and immunohistochemical study. BMC Oral Health. 2020;20(1):129.
10. El-Howati A, Thornhill MH, Colley HE, Murdoch C. Immune mechanisms in oral lichen planus. Oral Dis. 2023;29(4):1400-1415.
11. Yuwanati M, Gondivkar S, Sarode SC, Gadbail A, Sarode GS, Patil S, Mhaske S. Impact of oral lichen planus on oral health-related quality of life: a systematic review and meta-analysis. Clin. Pract. 2021;11:272-286.
12. Lin HJ, Wang XL, Tian MY, Li XL, Tan HZ. Betel quid chewing and oral potential malignant disorders and the impact of smoking and drinking: A meta-analysis. World J Clin Cases 2022; 10(10):3131-3142.
13. De Porras-Carrique T, Ramos-García P, Aguilar-Diosdado M, Warnakulasuriya S, González-Moles MÁ. Autoimmune disorders in oral lichen planus: A systematic review and meta-analysis. Oral Dis. 2023;29(4):1382-1394.
14. Andabak-Rogulj A, Vindiš E, Aleksijević LH, Škrinjar I, Juras DV, Aščić A, Brzak BL. Different treatment modalities of oral lichen planus—a narrative review. Dentistry Journal. 2023; 11(1):26.
15. Wongpakorn P, Chantarangsu S, Prapinjumrune C. Factors involved in the remission of oral lichen planus treated with topical corticosteroids. BDJ Open. 2024;10:34.
16. Nosratzehi T. Oral Lichen Planus: an overview of potential risk factors, biomarkers and treatments. Asian Pac J Cancer Prev. 2018;19(5):1161-1167.
17. Mutafchieva MZ, Draganova-Filipova MN, Zagorchev PI, Tomov GT. Oral Lichen Planus - known and unknown: a review. Folia Med (Plovdiv). 2018;60(4):528-535.
18. Wiriyakijja P, Porter S, Fedele S, Hodgson T, McMillan R, Shephard M, Ni Riordain R. Health-related quality of life and its associated predictors in patients with oral lichen planus: a cross-sectional study. Int Dent J. 2020;71(2):140–52.
19. Dave A, Shariff J, Philipone E. Association between oral lichen planus and systemic conditions and medications: Case-control study. Oral Dis. 2021;27(3):515-524.
20. Vijayan AK, Muthukrishnan A, Nair AM, Baby JJ. Demographics, clinicopathological profile of oral lichen planus of south kerala population: a cross-sectional study. Cureus 2022;14(9):e29688.
21. Liu W, Deng Y, Shi H, Shen X. Clinical investigation on oral lichen planus and associated comorbidities needs a holistic concept. Oral Dis. 2023;29(1):327-329.
22. Louisy A, Humbert E, Samimi M. Oral Lichen Planus: an update on diagnosis and management. Am J Clin Dermatol. 2024;25(1):35-53.
23. Chaitanya NC, Reshmapriyanka D, Pallavi K, Ameer S, Appala A, Chowdhary A, *et al.* Serological and psychological assessment of patients with oral lichen planus using serum cortisol levels and hads questionnaire-a case control study. J Popul Ther Clin Pharmacol. 2020;27(2):e19-e27.
24. De Porras-Carrique T, González-Moles MÁ, Warnakulasuriya S, Ramos-García P. Depression, anxiety, and stress in oral lichen planus: a systematic review and meta-analysis. Clin Oral Investig. 2022;26(2):1391-1408.
25. Kumar A. Prevalence of oral lichen planus among north Indian population: a descriptive epidemiological study. EUREKA: Health Sciences 2022;3:17–21.
26. Sangar S, Vadivel J K, Ramanathan V. Prevalence of tobacco smoking/ smokeless tobacco in patients with oral lichen planus. Int J Dentistry Oral Sci. 2021;8(8):4005-4009.
27. Li C, Tang X, Zheng X, Ge S, Wen H, Lin X, *et al.* Global prevalence and incidence estimates of oral lichen planus: a systematic review and meta-analysis. JAMA Dermatol. 2020;156(2):172-181.
28. Mallah N, Ignacio Varela-Centelles P, Seoane-Romero J, Takkouche B. Diabetes mellitus and oral lichen planus: A systematic review and meta-analysis. Oral Dis. 2022;28(8):2100-2109.
29. Geng L, Zhang X, Tang Y, Gu W. Identification of potential key biomarkers and immune infiltration in oral lichen planus. Dis Markers. 2022;2022:7386895.
30. Parlatescu I, Tovaru M, Nicolae CL, Sfeatcu R, Didilescu AC. Oral health-related quality of life in different clinical forms of oral lichen planus. Clin Oral Investig. 2020;24(1):301-308.