

A Study on Prevalence of Oral Mucosal Lesions in the Geriatric Population of Eastern India

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ABSTRACT

Background: Geriatric population is at a higher risk for developing oral mucosal lesions (OMLs), which can impede the quality of living through detrimental effects on mastication, swallowing, and speech with symptoms of burning, irritation, and pain.

Aims and objective: To determine the prevalence of OML in the geriatric population attending the Outpatient department (OPD) of a government hospital in Patna, Bihar, Eastern India.

Materials and methods: The study was conducted on patients aged 60 years and above attending the OPD in one year duration. A detailed medical and dental history was recorded along with the demographic details, clinical examination performed under adequate artificial illumination. Diagnosis was made on the basis of clinical features of the lesion.

Results: The lesions identified were classified under several sub headings based on their etiology namely potentially malignant disorders and malignancies, lesions of infectious origin, reactive lesions, denture related lesions, immune mediated lesions, pigmented lesions and lesions related to tongue. Leukoplakia (19.04%) was the commonest OML encountered followed by atrophic tongue (16.65%), oral submucous fibrosis (14.75%), lichen planus (14.25%), smokers palate (13.16%), traumatic ulcer (11.46%). Buccal mucosa was the most affected part of the oral cavity followed by tongue and hard palate.

Conclusion: The present study showed an increased prevalence of OML in the geriatric population of Bihar, Eastern India with the most common entity being leukoplakia, a potentially malignant disorder, which is worrisome. This necessitates educating the elderly about importance of oral health and designing of suitable accessible, affordable and much needed health outreach programmes.

Key words: Denture related lesions, Geriatric, Immune mediated lesions, Infectious lesions, Leukoplakia, Oral mucosal lesions, Potentially malignant disorders, Reactive lesions.

INTRODUCTION

Ageing, an inevitable biological process, is characterized by a progressive loss of physiological integrity resulting in functional changes and thus, resulting in an increased vulnerability to death.¹ India as a nation

is classic exemplar of rapidly changing morbidity and mortality demographic patterns, and has been categorized under the United Nations' definition of 'ageing' countries.² According to WHO, a population aging more than 60 years should be regarded as an elderly population.³ 7.7% of the Indian population is above 60 years old, with an estimation that the number of elderly people would rise to about 324 million by the year 2050.⁴ Availability and advancements of better health care services in the country has resulted in a sharp decline of the crude death rate, increase in life expectancy, thus, resulting in an increase in the geriatric population.^{5,6} Henceforth, it is imperative to peruse towards disease prevention for the betterment of quality of life in old age.

Ageing changes are seen in all the tissues including the oral cavity. Oral cavity shows a myriad of changes including loss of taste sensation due to depapillization, reduced bone density, friable and easily injurable oral mucosa, changes in inter alveolar space and relation, reduced salivary secretion resulting in xerostomia and gradual loss of motor nervous control.^{7,8} Oral mucosa performs a myriad of functions like defence, lubrication, sensation and defence.⁹ Major histological changes evident in the oral mucosa are presence of less prominent epithelial ridges, epithelial atrophy, reduction in cellular density and mitotic activity, loss of elastin and adipose tissue in the sub mucosa, increase in fibrous connective tissue with degenerative changes in collagen.^{8,10} All of these changes further make the mucosa more permeable and less resistant to toxic agents and carcinogens, thus predisposing the mucosa to further damage, and even cancer in some cases.¹¹ Moreover, the situation gets more convoluted as these group of patients are more vulnerable and at risk of developing several pathologies of the oral cavity due to increased occurrence of systemic diseases, age-related metabolic changes, nutritional deficiencies, long term medication use, use of prosthesis, and long term deleterious habits like tobacco or alcohol use, which can interfere with day to day activities and adversely affect the quality of life.^{12,13}

Geriatric population is at a higher risk for developing oral mucosal lesions (OMLs), which can impede the quality of living through detrimental effects on mastication, swallowing, and speech with symptoms of burning, irritation, and pain.¹⁴ Oral mucosal lesion (OML), can be described as any abnormal alteration in colour, surface aspect, swelling, or loss of integrity of the oral mucosal surface, and can be attributed to one or more of several factors including bacterial or viral or fungal infections, local trauma or irritation, systemic diseases, and excessive consumption of tobacco, betel quid, and alcohol.¹⁵⁻¹⁷ Despite the fact that several OMLs are benign, pose no threat and require no active treatment, some may present with serious pathology, especially oral potentially malignant disorders which may progress to malignancy.¹⁵ WHO recommends analysis of OML prevalence in specific population age groups to understand the extension and characteristics, and is also essential for the improvement of oral health promotion and prevention programs.¹⁸ Thus, this study was undertaken to determine the prevalence of OML in the geriatric population attending the Out patient department (OPD) of a government hospital in Patna, Bihar, Eastern India and to the best of our knowledge, no such study has been carried out earlier in the mentioned geographical area.

MATERIALS AND METHODS

The present study was conducted on the patients aged 60 years and above attending the OPD of a government hospital in Patna, Bihar in a one year duration from February 2019 to March 2020. A total of 1893 geriatric individuals reported to the OPD. Ethical clearance was obtained from the Institutional Ethical Committee, and informed written consent was obtained from all the participants of the study. Elderly patients who denied consent for the study were not included.

A detailed medical and dental history was recorded for each patient along with the demographic details. Clinical examination was performed by a single examiner using sterile armamentarium under adequate artificial illumination. According to the WHO guidelines, a thorough systematic examination was performed in the following sequence: labial mucosa and labial sulci (upper and lower), followed by labial part of the commissures and buccal mucosa (right and left), tongue (dorsal and ventral surfaces, margins), floor of the mouth, hard and soft palate, alveolar ridges/gingiva (upper and lower).¹⁸ Sterile gauze was used to remove debris and to test if a white lesion could be wiped off. Diagnosis was made on the basis of clinical features of the lesion. Presence of intra oral lesion including its location, size, colour, type of lesion, margins, surface, discharge and duration of lesions was recorded. In cases where clinical features were not diagnostic, a biopsy of the lesion was performed, and sent for histopathological examination. All

developmental lesions such as leukoedema, lingual varices, fordyces granules, benign migratory glossitis and fissured tongue were not considered. All the data were charted and descriptive analysis done.

RESULTS

Of the 1893 geriatric individuals who attended the OPD, 53% of them i.e. 1003 showed evidence of OML. Individuals ranged between 60 to 95 years. Among the 1003 individuals showing evidence of the entities, 672 were males while 331 were females, thus, showing a male predilection. Out of 1003 individuals presenting with OML, 178 were dentulous while the remaining 825 were edentulous (87 completely edentulous and 738 partially edentulous). 13.57% of the edentulous individuals i.e. 112 out of 825 people were denture wearers. 625 (62.3%) individuals had history of tobacco or areca nut consumption in various forms. The most common systemic conditions seen in the patients were hypertension (13.5%), diabetes mellitus (9.2%), impaired vision (8.9%), and cardiovascular diseases (5.6%). Other systemic conditions observed were hearing loss (5.2%), tuberculosis (4.8%), asthma (3.3%), neuralgic pain (2.7%), arthritis (2.4%), thyroid disorders (1.4%) and skin manifestations (1%) (Graph 1).

Graph 1: Prevalence of systemic diseases in the geriatric population.

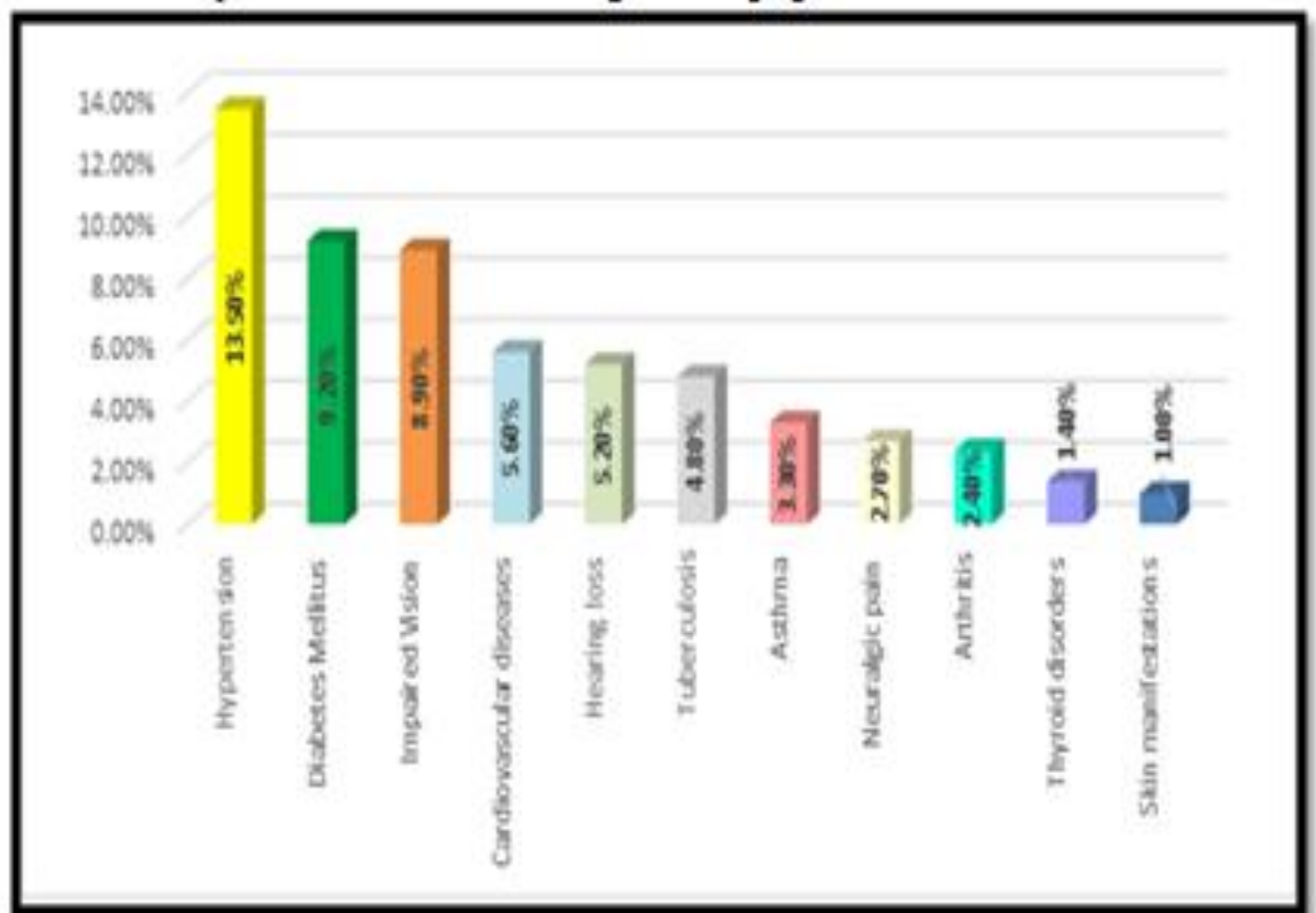


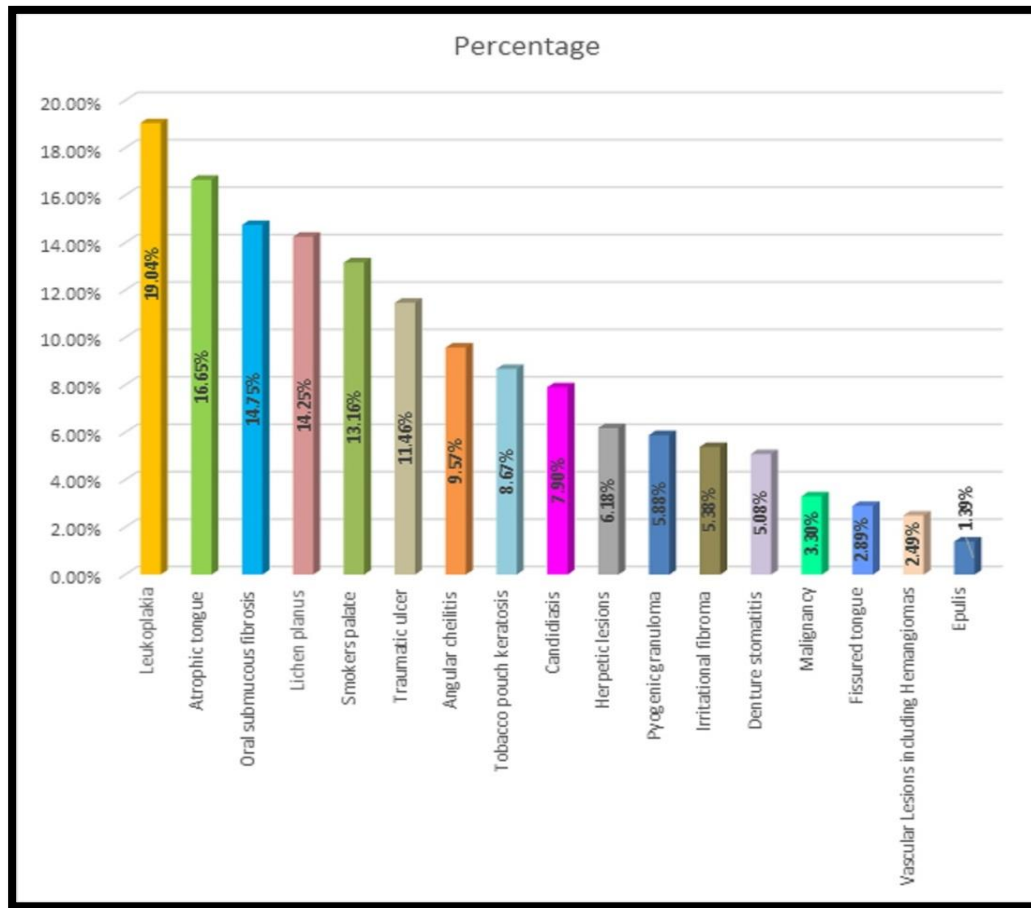
Table 1, graph 2 summarizes the OML encountered in the population. The lesions identified during the study were classified under several sub headings based on their aetiology namely potentially malignant disorders and malignancies, lesions of infectious origin, reactive lesions, denture related lesions, immune mediated lesions, pigmented lesions and lesions related to tongue (graphs 3 and 4). The lesions were distributed into seventeen clinical entities. Buccal mucosa was the most affected part of the oral cavity followed by tongue and hard palate.

Table 1 : Summary of OML encountered in the elderly population

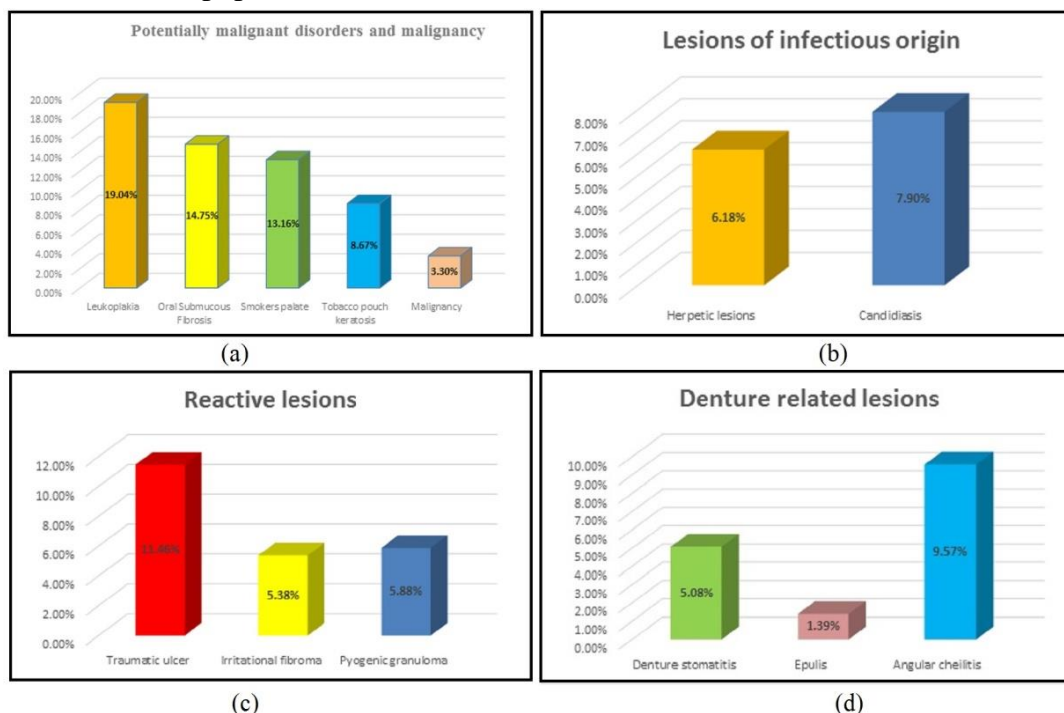
Oral lesions	Percentage	No. of affected individuals
Potentially malignant disorders and malignancy		
i)Leukoplakia	19.04%	191
ii)Oral Submucous Fibrosis	14.75%	148
iii)Smokers palate	13.16%	132
iv)Tobacco pouch keratosis	8.67%	87
v) Malignancy	3.3%	33
Lesions of infectious origin		
i) Herpetic lesions	6.18%	62
ii)Candidiasis	7.9%	80
Reactive lesions		
i)Traumatic ulcer	11.46%	115
ii)Irritational fibroma	5.38%	54
iii)Pyogenic granuloma	5.88%	59
Denture related lesions		
i)Denture stomatitis	5.08%	51
ii)Epulis	1.39%	14
iii)Angular cheilitis	9.57%	96
Immune mediated lesions		
i)Lichen Planus	14.25%	143
Pigmented lesions		
i)Vascular lesions including hemangiomas and AV malformation.	2.49%	25
Lesions related to tongue		
i)Atrophic tongue	16.65%	167
ii)Fissured tongue	2.89%	29

Maximum number of lesions were in the potentially malignant disorders category associated with tobacco or areca nut misuse. Of single entities, leukoplakia (19.04%) was the commonest OML encountered followed by atrophic tongue (16.65%), oral submucous fibrosis (14.75%), lichen planus (14.25%), smokers palate (13.16%), traumatic ulcer (11.46%). Other lesions detected were angular cheilitis (9.57%), tobacco pouch keratosis (8.67%), candidiasis (7.9%), herpetic lesions (6.18%), pyogenic granuloma (5.88%), irritational fibroma (5.38%), denture stomatitis (5.08%) malignancy (3.3%), fissured tongue (2.89%), vascular lesions including hemangiomas (2.49%) and epulis (1.39%). Figures 1 to 8 depict the varied clinical presentations of the lesions.

Graph 2: Summary of OML encountered in the elderly population.



Graph 3: a - Prevalence of potentially malignant disorders and malignancy; b - Prevalence of herpetic lesions and candidiasis (lesions of infectious origin); c - Prevalence of reactive lesions in the elderly population; d - Prevalence of denture related lesions.



Graph 4 : a - Prevalence of immune mediated lesion (Lichen planus) ; b - Prevalence of vascular lesions; c - Prevalence of tongue related disorders.

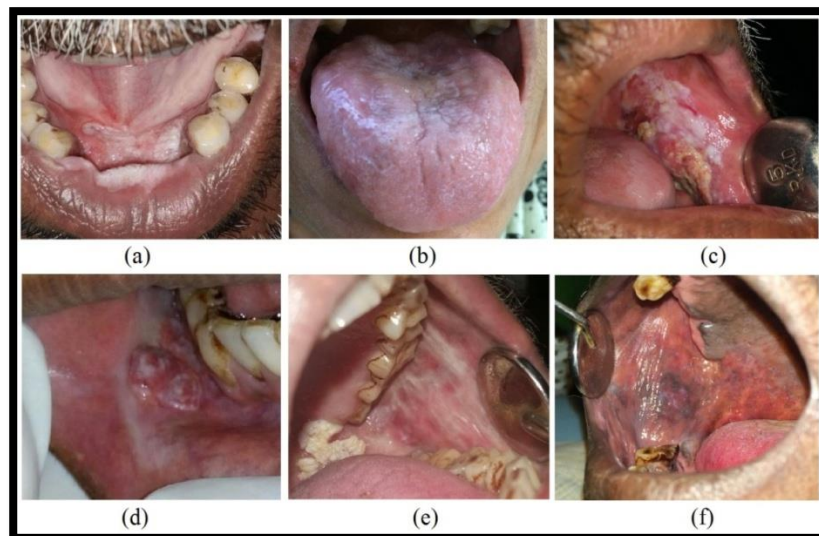
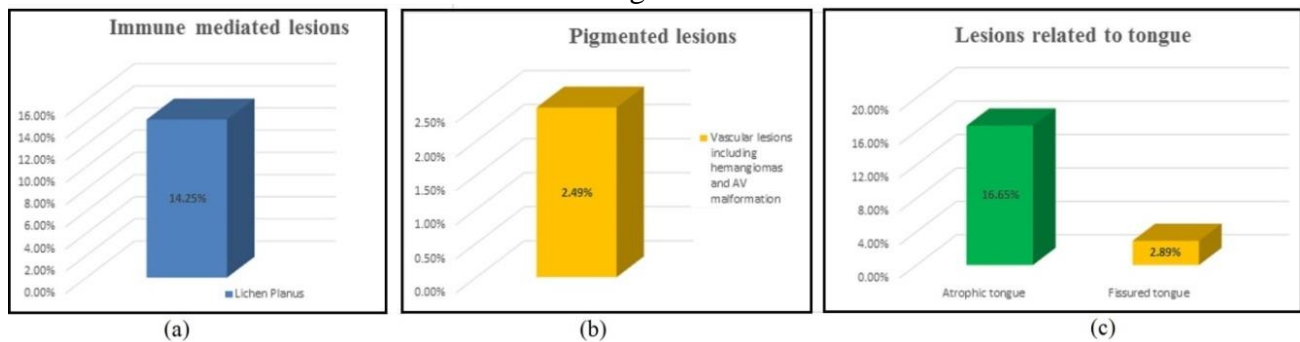


Figure 1: Clinical presentation of oral potentially malignant disorders. (a - Homogeneous leukoplakia ; b - Leukoplakia presenting on the dorsum of tongue ; c - Leukoplakia with malignancy ; d - Malignancy co existing with OSMF; e - OSMF; f - Smokers palate and melanosis.)

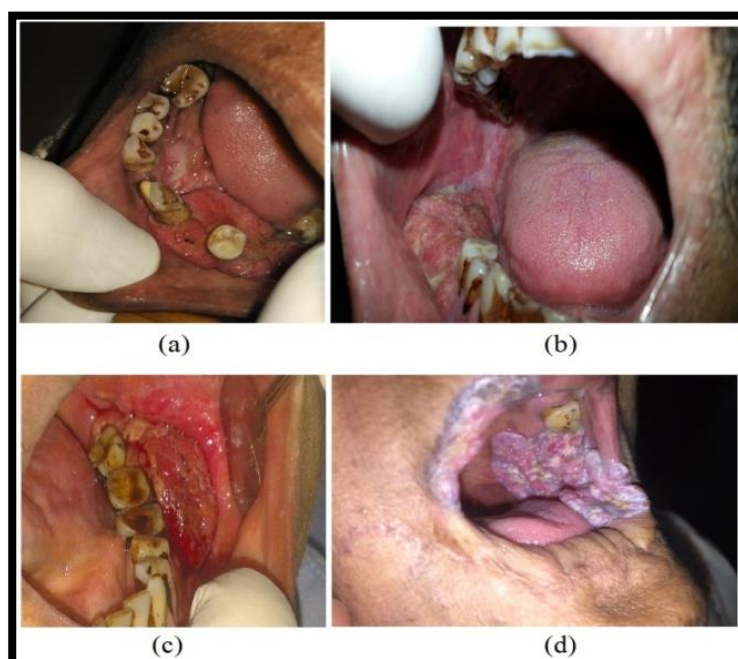


Figure 2 : Varied clinical presentations of malignancy.



Figure 3: Clinical presentations of Lichen Planus (immune mediated disorder)



Figure 4: Lesions of infectious origin (a - Candidiasis ; b - Herpetic vesicles)

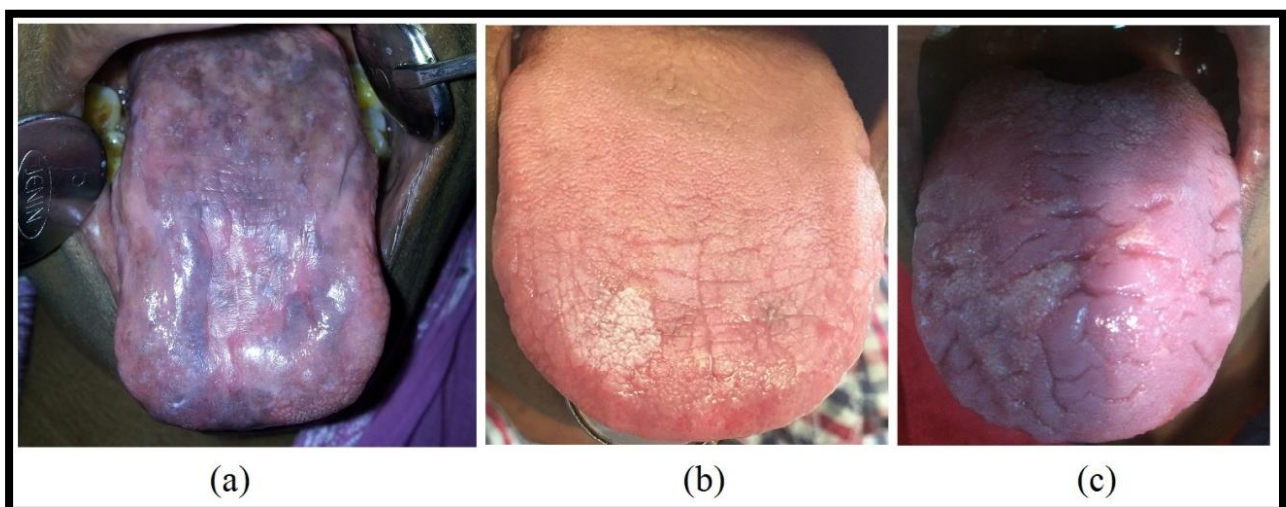


Figure 5: Clinical presentation of lesions related to tongue. (a - atrophic tongue devoid of papilla; b - atrophic tongue with leukoplakic changes seen at the tip; c - fissured tongue).

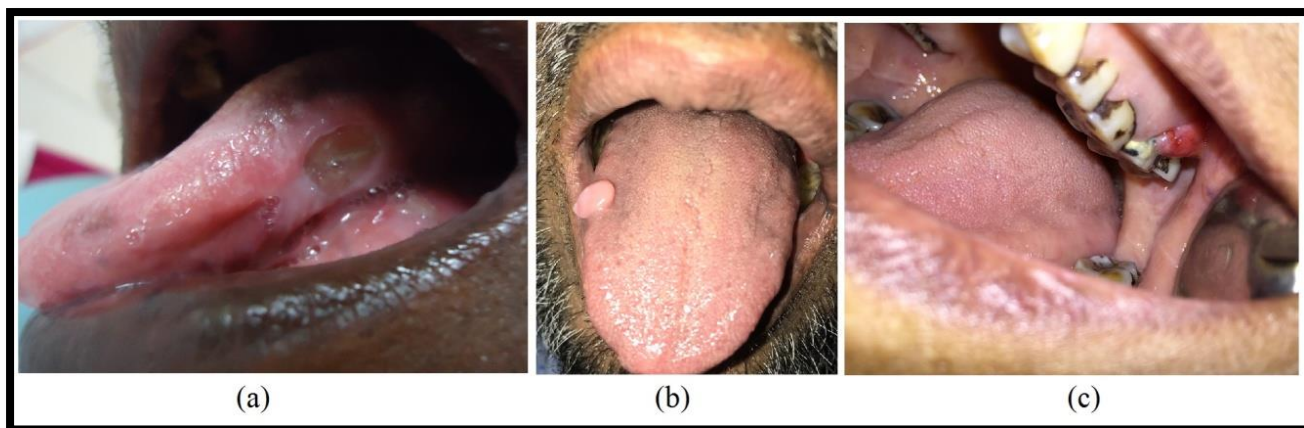


Figure 6: Clinical presentation of reactive lesions (a - traumatic ulcer; b - irritational fibroma; c - Pyogenic Granuloma)

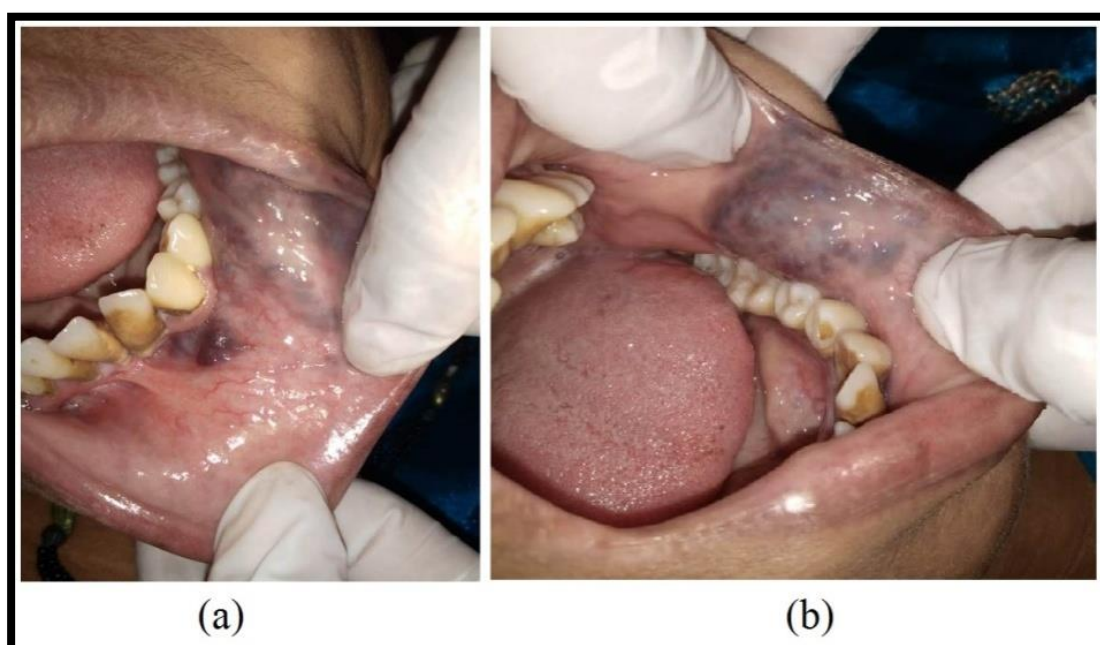


Figure 7: Clinical presentation of vascular lesion.

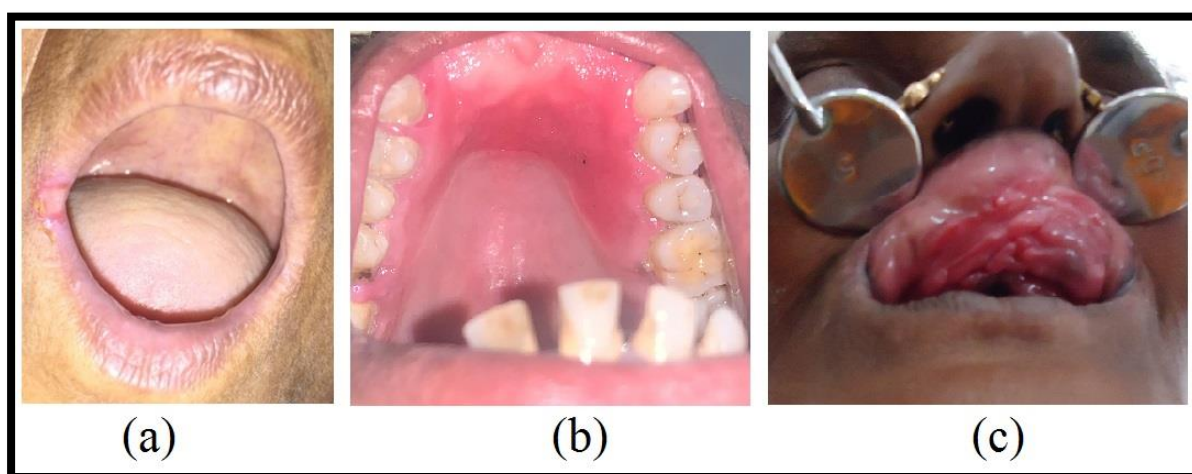


Figure 8: Clinical presentation of denture related lesions. (a - angular cheilitis; b - denture stomatitis; c - epulis fissuratum).

DISCUSSION

Factors like ageing changes, systemic diseases, metabolic changes, nutritional factors, use of prosthesis, medications, psychobiological habits and deleterious habits among the elderly are responsible for oral pathologies to be a common finding among them. All these predisposing factors result in a plethora of entities including neoplasms, infections, immunological, haematological, and systemic disorders, which results in oral pain and discomfort, which in turn adversely affects the overall health of an individual.¹⁹

Our study aimed at determining the prevalence of OML in the geriatric population attending the OPD of a government hospital in Patna, Bihar, and the prevalence rate was found to be 53%. This was in accordance with the results obtained by Mujica *et al*, Espinoza *et al*, Al- Aswad *et al*.¹⁹⁻²¹ Varied prevalence rates have been recorded in various studies. Patil *et al* reported a 64% prevalence rate among the elderly population of Jodhpur, Rajasthan, India.²² El Toum *et al* divulged the prevalence rate of OML in Lebanese population to be 61.8%, while a 67.5% prevalence was reported by Cueto *et al* in Chile's elderly population.^{23,24} Rastogi *et al* reported 58% prevalence rate in the old population of Meerut, Uttar Pradesh, India.²⁵ High prevalence rates of 77.1% was reported by Al Maweri *et al* in elderly Yemeni patients and a staggering 98% prevalence rate was reported in institutionalized elderly people in Mashhad, Northeast Iran by Mozafari *et al*.^{26,27} On the other end of the spectrum, lower prevalence rates were reported by several authors like Shet *et al* (48% in Indian population), Yadav *et al* (44% among the elderly population residing in old age homes in Delhi, India), Dundar *et al* (40.7% among the elderly in a Turkish School of Dentistry), Tasneem *et al* (8% prevalence rate in Kashmir, India), Ghanaei *et al* (19.4% rate in Rasht, Iran), Intapa *et al* (a 7.19% prevalence in Thailand) and Peter *et al* (2.47% in Karnataka, India).²⁸⁻³⁴ This disparity in results could be elucidated to different methodologies used, cultural differences, oral habits, educational level, and even genetic difference.²⁵

Our study showed a male preponderance for OMLs. Similar male predilection was reported by Patil *et al*, Al Maweri *et al*, Shet *et al*, Yadav *et al*, Ghanaei *et al*, Peter *et al*, and Rohini *et al*.^{22,26,28,29,32,34,35} This finding can be justified by the fact that men are more prone to get accustomed to deleterious habits as compared to women probably due to the easier availability of tobacco and areca nut products to them due to the social stigma. Moreover, women are more health and hygiene conscious as compared to their counterpart. On the contrary, a female preponderance was reported by Mujica *et al*, Mosqueda *et al* and Gonzalez *et al*.^{19,36,37}

According to our study, leukoplakia (19.04%) was the commonest OML encountered followed by atrophic tongue (16.65%), oral submucous fibrosis (14.75%), lichen planus (14.25%), smokers palate (13.16%) and traumatic ulcer (11.46%). Rastogi *et al* and Yadav *et al* also reported leukoplakia to be the commonest entity encountered, a finding similar to our study.^{25,29} Contrarily, other authors have reported varied entities. Patil *et al* and Tasneem *et al* reported the commonest entity to be smoker's palate.^{22,31} According to Rohini *et al* and Alshayeb *et al*, OSMF was the most frequently encountered lesion.^{35,38} Peter *et al* reported a grave finding that malignancy was the most common OML they came across in their study.³⁴ One common finding among all the studies was that the most common OML seen was as a result of deleterious habits. The occurrence of different types of potentially malignant disorders can be attributed to the use of different types of products in different ways in various geographical areas. For instance, use of tobacco in chewable form could result in leukoplakia, smoking tobacco especially reverse smoking leads to smokers palate, while OSMF has mainly been attributed to the use of areca nut and its products.^{39,40}

According to our study, atrophic tongue was the second most common entity encountered, which may be a secondary to anaemia or due to any inflammatory condition. On the contrary, according to Al Maweri *et al*, Mozafari *et al* and Ghanei *et al* the most frequently observed lesion was fissured tongue.^{26,27,32} In our study, out of the 825 edentulous individuals, 112 were denture wearers. Among denture related lesions, angular cheilitis (9.57%) was the commonest lesion followed by denture stomatitis (5.08%) and epulis (1.39%). Angular cheilitis may result due to increased span of denture use which suggests loss of vertical height, wherein over closure of the jaws will produce folds at the angles of the mouth in which saliva tends to pool and the skin subsequently becomes secondarily infected.²⁸ As opposed to our findings, Cueto *et al* reported denture-induced stomatitis (37.1%) as the most frequent lesions.²⁴

Buccal mucosa was the most affected part of the oral cavity followed by tongue and hard palate in our study. Similarly, Yadav *et al*, Peter *et al*, Rohini *et al* and Alshayeb *et al* also reported buccal mucosa to be the most commonly affected site, a finding in concordance with ours.^{29,34,35,38} On the other hand, Patil *et al*

and Tasneem et al reported palate to be the most affected site while Rastogi et al, Al Maweri et al, Mozafari et al and Ghanaei et al reported tongue to be the most affected part.^{22,25-27,31,32} With increasing age, the oral epithelium gets thinner and collagen synthesis by connective tissue decreases hence, decreased tissue regeneration and decreased disease resistance. Moreover, the thinned out epithelium does not act as an apt barrier, thus allowing noxious substances to percolate easily and cause the disease process.^{8,41}

Several OMLs may not pose any threat serious threats to an individual sans discomfort or pain, but few of them some may present with serious pathology, especially oral potentially malignant disorders.^[15] According to our study, leukoplakia, OSMF, lichen planus and smokers palate were amongst the most commonly encountered OMLs, all of which could potentially transform into malignancy. The malignant transformation rate of leukoplakia ranges from 4-17.5%, for lichen planus is between 0-9%.^{42,43} Smokers palate also has a significant risk of malignant transformation.⁴⁴ OSMF, a chronic debilitating collagen metabolism disorder has a malignant transformation rate of 7-12%.^{40,45} Persistent trauma due to any sharp structure, is home to chronic inflammation, a condition that would favour oral cancer development.

Not many studies have been done in the Indian geriatric population gauging the prevalence of oral mucosal lesions. Table 2 gives an overview of the studies done in the Indian population regarding the same. The current study reflects on the poor oral health conditions of the geriatric section of the society which adds on to their discomfort and misery. The biggest hindrance in oral health care of the elderly is the underestimation of oral health care need by them. Factors that directly or indirectly influence the geriatric people's utilization of dental services include illness and health related factors (general deteriorated health, functional limitation), socio demographic factors, dental service related factors (accessibility, dentists behaviour and attitude, cost factor, service satisfaction, transport services) and other subjective factors like no perceived need or importance of dental treatment, fear and anxiety, financial constraint.¹¹ The need of the hour is to educate the elderly about the importance of oral health in maintenance of overall general health and provide them with easily accessible and affordable health care. Hence, the government should take necessary steps and design such programmes to outreach this section of the society.

Table 2 : Overview of prevalence studies of oral mucosal lesions in Indian population.

S No.	Authors	Year of study	OMLs seen in geriatric population	Site most commonly affected	Geographic al area
01.	Reddy et al ⁴⁶	2020	Denture stomatitis (42.5%), Traumatic ulcer (17.5%), Angular cheilitis (15%), Frictional keratosis (7.5%), Epulis fissuratum (6.3%), Chemical burn (5%), Oral mucositis (2.5%), Actinic cheilitis (1.3%), Cracked lips (1.3%), Necrotising sialometaplasia (1.3%).	Palate	Chennai
02.	Cheruvathoor et al ⁴⁷	2020	Coated tongue (19.8%), Oral submucous fibrosis (7.5%), Smoker's melanosis (7.4%), Depapillation of tongue (7.4%), Fissured tongue (6.6%)	Tongue	Kozhikode, Kerala

03.	Farzana et al ⁴⁸	2020	Malignancy (25.4%), Dermatological etiology (19.2%), Premalignant and infective etiologies (16.9%), Other miscellaneous conditions (13.8%), inflammatory (4.6%), developmental (2.3%) and systemic etiologies (0.8%). Amongst malignancy, squamous cell carcinoma was the common clinical type. Second most frequently observed condition was oral candidiasis (12.4%). Amongst dermatological etiology, most common was lichen planus (8%). Leukoplakia (8.5%) was the most common premalignant condition, followed by oral submucous fibrosis (7.7%).	Buccal mucosa	Vishakapatnam, Andhra Pradesh
04.	Rohini et al ⁴⁹	2020	Oral submucous fibrosis (21.33%), Smoker's palate (20%), Leukoplakia (14.66%), Tobacco pouch keratosis (10.66%), Frictional keratosis (1.33%), Aphthous ulcer (5.33%), Geographic tongue (4%), Fissured tongue and traumatic ulcer of tongue (1.33%)	Buccal mucosa	Chennai, Tamil Nadu
05.	Yadav et al	2018	Leukoplakia (15%), Lichen planus (4.52%), Ulcerations (11.63%), Abscess (6.03%) Acute Necrotizing Ulcerative Gingivitis (2.8%), Malignant tumours (1.5%), Candidiasis (0.86%)	Buccal mucosa	Delhi
06.	Peter et al	2018	Malignancy, Oral Candidiasis, Oral Lichen Planus, Premalignant etiologies (Leukoplakia, Oral Submucous Fibrosis).	Buccal mucosa	Karnataka

07.	Rastogi et al	2015	Leukoplakia (12%), Smoker's melanosis (10%), Smoker's palate (9%), Pigmentation on tongue (6%), Frictional keratosis (5%), Lichen planus (3%), Denture stomatitis (2.5%), Aphthous ulcers (2%), Angular cheilitis (1.5%), Oral submucous fibrosis (1.5%), Melanotic macule (1.5%), Candidiasis (1.5%), Irritation fibroma (1%), Geographic tongue (1%), Median rhomboid glossitis (1%), Traumatic ulcer (1%)	Tongue	Meerut, Uttar Pradesh
08.	Patil et al	2015	Smoker's palate (43%), Denture stomatitis (34%), Oral submucous fibrosis (30%), Frictional keratosis (23%), Leukoplakia (22%), Pyogenic granuloma (22%).	Hard palate	Jodhpur, Rajasthan
09.	RGK Shet et al	2013	Lingual varices, Oral squamous cell carcinoma, Fibroma and Denture induced inflammatory fibrous hyperplasia were more commonly associated with geriatric patients. Fibroma and Lichen planus were strongly associated with women while leukoplakia was strongly associated with men.	Tongue	-
10.	Bhagawat hi et al ⁵⁰	2013	Oral cancer, Growth, Pigmentation, Red lesion, Ulcer, White lesions.	-	Ghaziabad

CONCLUSION

The present study has shown an increased prevalence of oral mucosal lesions in the geriatric population of Bihar, Eastern India with leukoplakia, a potentially malignant disorder being the commonest entity. Findings of this study suggest that the geriatric population is at higher risk for developing oral cancer. This necessitates the designing of suitable accessible, affordable and much needed health outreach programmes. Moreover, the elderly need to be made aware of the importance of oral health as if these are left untreated and ignored would adversely affect the well being of an individual.

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