ORIGINAL RESEARCH

Prevalence of Oral Mucosal Lesions and Normal Variants of the Oral Mucosa in 12 to 15-year-old School Students in Lucknow – A Cross-sectional Survey

Arunendra Singh Chauhan[1], Sabyasachi Saha[2], L. Vamsi Krishna Reddy[3], Pooja M. Sinha[4]

ABSTRACT

Introduction: The diagnosis of oral mucosal lesions and normal variants of the oral mucosa is an essential aspect of dental practice and traditionally the mucosal membrane of the oral cavity has been looked on as a mirror of general health. Epidemiological studies conducted to date have been in adults and populations at high risk for specific lesions.

Aims: The aim of the study was to determine the prevalence of oral mucosal lesions and normal variants of the oral mucosa in 12–15-year-old school students in Lucknow and the relationship between the occurrences of these lesions with the possible risk factors.

Materials and Methods: A cross-sectional survey was done on 925 school going children of age 12–15 years, selected by multi-stage cluster random sampling. The data collection involved a pre-designed questionnaire to collect demographic information and smoking and smokeless tobacco chewing habits. The WHO Guide to Epidemiology and Diagnosis of Oral Mucosal Diseases (1980) was used to record the presence and anatomical location of the lesions. Oral mucosal examination was performed by a single trained and calibrated investigator. Statistical analysis was done by Chi-square test and Fisher's exact using SPSS version 22.0.

Results: The study result showed that 154 (16.6%) were diagnosed with at least one mucosal lesion at the time of examination. The prevalence of any oral mucosal lesion was 16.4% among boys and 16.9% among girls, but there were no statistically significant differences in oral mucosal lesion by gender. The prevalence of oral mucosal lesions was found to be statistically significant with tobacco habit.

Conclusions: This study suggests that oral mucosal lesions were diagnosed minimally in adolescents. Significant higher prevalence of lesions was noticed among subjects with a tobacco habit. There is a need to increase the awareness regarding oral mucosal lesions and also to prevent the deleterious oral habits.

[1]Student, [2]Ex-vice Principal and Professor and Head, [3]Professor and Head, [4]Senior Lecturer

[1-4]Department of Public Health Dentistry, Sardar Patel Post Graduate Institute of Dental and Medical Sciences, Lucknow, Uttar Pradesh, India

Corresponding Author: Dr. Arunendra Singh Chauhan, Department of Public Health Dentistry, Sardar Patel Post Graduate Institute of Dental and Medical Sciences, Lucknow, Uttar Pradesh, India. E-mail: dr.arun00@gmail.com

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INTRODUCTION

The diagnosis of oral mucosal lesions and normal variants of the oral mucosa is an essential aspect of dental practice, and traditionally the mucosal membrane of the oral cavity has been looked on as a mirror of general health.[1]

Oral cavity reflects the various systemic conditions caused by simple vitamin deficiencies to HIV infections. A study of variation from normal oral mucosa can help in detection of systemic diseases and conditions.[2]

Besides dental caries and periodontal diseases, oral mucosal lesions are another significant problem of public health importance. The prevalence of oral mucosal lesions is an important parameter in evaluating the oral health of any population. Except for oral cancer and potentially malignant oral conditions, the epidemiological literature on oral mucosal lesions and its normal variants is scarce.

While the diagnosis of the wide variety of mucosal lesions which occur in the oral cavity is an essential part of dental practice, the epidemiological literature on oral mucosal conditions in children and adults is limited when compared to that of dental caries and periodontal diseases.

Most of the studies conducted to date have been done in adults and populations at high risk for specific lesions of interest.[3]

Hence, the present cross-sectional study was undertaken with the aim to determine the prevalence of oral lesions and normal variants of oral mucosa in 12–15-year-old school children residing in Lucknow and also to assess the possible relationship between the occurrences of these lesions with existing risk factors.

MATERIALS AND METHODS

A cross-sectional survey was done on 925 school going children of age 12–15 years, selected by multi-stage cluster random sampling. The purpose of the study was reviewed by the Institutional Ethical Committee of the institution, and ethical clearance was obtained. Prior approval was obtained from the school authorities before the commencement of this survey. Informed written consent was obtained from parents/guardians. The duration of the study was from 1st November 2014 to 30th April 2015, for a period of 6 months.

A pilot study was conducted on 10 school children to assess the operational feasibility of the study and needful changes were made in the pro forma. The final study sample comprised 925 secondary school going children of age group 12–15 years, representative of Lucknow.

Multistage cluster random sampling was done in which Lucknow city was divided into 5 zones, i.e. East, West, North, South, and Central. 25 schools were present in the zone.

5 schools were selected from each zone which comprised 15 private and 10 public schools. 38 children from each public and private school were randomly selected from lottery method thus making sample size of total 925 children.

Inclusion Criteria

The following criteria were included in the study:

- Children whose parents/guardians gave consent.
- Children who are permanent residents of that area.
- Children with fair to poor oral hygiene status.

Exclusion Criteria

The following criteria were excluded from the study:

- Children who are medically compromised.
- Children those who were absent on the day of examination.

Method of Data Collection

The data collection involved a pre-tested questionnaire to collect demographic information and smoking and smokeless tobacco chewing habits. The World Health Organization's Guide to Epidemiology and Diagnosis of Oral Mucosal Diseases (1980) was used as the diagnostic criteria for the location of each lesion and was recorded according to the presence and anatomical location of the lesions.[4] Oral mucosal examination was performed by a single trained and calibrated investigator. Mouth mirrors, disposable retractors, disposable gloves, mouth mask, kidney tray, cotton, and natural and/or artificial light were used to examine the students.

The tabulated data were evaluated by Chi-square test and Fisher's exact test to determine the association of oral mucosal lesions with different covariates using Statistical Package for the Social Sciences (SPSS) version 22.0.

RESULTS

Out of 925 children enrolled in the study, 506 (54.7%) were male and 419 (45.3%) were female [Table 1].

Majority of children enrolled in the study were from private schools 549 (59.4%). A total of 376 (40.6%) were from public schools [Table 2].

Prevalence of adverse oral habits was significantly higher in males (30.6%) as compared to females (0%) ($P < 0.001$). Smoke form of tobacco was used by 9 (1.8%) males and no females. Statistically, this difference was significant ($P = 0.006$). Smokeless form of tobacco was used by 155 (30.6%) of males and no females.

Statistically, this difference was significant ($p<0.001$). Both forms of tobacco were used by 9 (1.8%) males and no females. Statistically, this difference was significant ($P = 0.006$) [Table 3].

Labial commissure was the most common affected site ($n = 72$; 7.8%), followed by tip of the tongue ($n = 19$; 2.1%), labial mucosa and cheek (buccal mucosa) ($n = 18$; 1.9% each), dorsum of tongue ($n = 11$; 1.2%), base of tongue ($n = 10$; 1.1%), anterior gingival and alveolar ridge (process) labially ($n = 4$; 0.4%), and posterior gingiva and alveolar ridge (process) buccally and buccal sulcus ($n = 3$; 0.3% each) [Table 4].

A total of 154 oral mucosal lesions and normal variants were diagnosed in 925 children; thus, the prevalence of oral mucosal lesions in study population was 16.6%. Linea alba ($n = 45$; 4.9%) was the most common oral mucosal lesion followed by physiologic pigmentation ($n = 35$; 3.8%), angular cheilitis ($n = 29$; 3.1%), recurrent oral aphthae and Fordyce's granules ($n = 18$; 1.9% each), acute herpetic gingivostomatitis ($n = 4$; 0.4%), leukodema ($n = 3$; 0.3%), and geographic tongue ($n = 2$; 0.2%), respectively [Diagram 1].

The prevalence of oral mucosal lesions and normal variants was observed to be 16.4% in males and 16.9% in

Table 1: Distribution of subjects according to gender

Total	Gender *n* (%)			
	Male		Female	
925	506 (54.7)	54.7	419 (45.3)	45.3

Table 2: Distribution of subjects according to type of school

Type of school		
Total(n)	Private *n (%)*	Public *n (%)*
925	549 (59.4)	376 (40.6)

Table 3: Distribution of subjects according to adverse oral habits

Adverse oral habits	Type *n* (%)			Total *n* (%)
	Smoking tobacco	Smokeless tobacco	Both smoking and smokeless tobacco	
Male	9 (1.8)	155 (30.6)	9 (1.8)	155 (30.6)
Female	0 (0)	0 (0)	0 (0)	0 (0)
"*P*" (Chi-square test)	0.006	<0.001	0.006	

Table 4: Distribution of subjects according to sites of lesions

Site of lesions	Oral mucosal lesions and normal variants *n* (%)
Vermilion border	0 (0)
Labial commissures	72 (7.8)
Labial mucosa	18 (1.9)
Labial sulci	0 (0)
Cheek (buccal mucosa)	18 (1.9)
Buccal sulcus	3 (0.3)
Buccal sulcus	0 (0)
Posterior gingiva and alveolar ridge (process) buccally	3 (0.3)
Anterior gingiva and alveolar ridge (process) labially	4 (0.4)
Posterior gingiva and alveolar ridge (process) palatally and lingually	0 (0)
Anterior gingiva and alveolar ridge (process) palatally and lingually	0 (0)
Dorsum of the tongue	11 (1.2)
Base of the tongue	10 (1.1)
Tip of the tongue	19 (2.1)
Margin of the tongue	0 (0)
Ventral (inferior) surface of the tongue	0 (0)
Floor of the mouth	0 (0)
Hard palate	0 (0)
Soft palate	0 (0)
Anterior tonsillar pillar	0 (0)

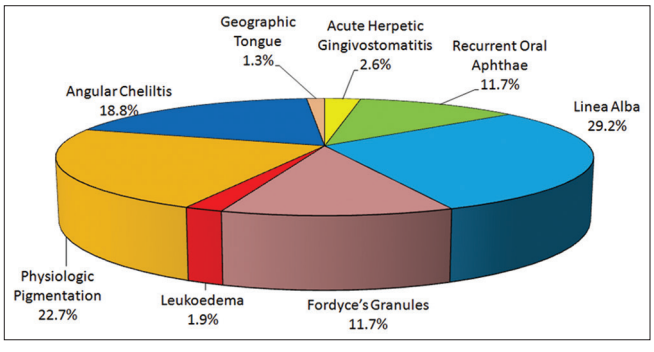


Diagram 1: Distribution of subjects according to the distribution of lesions

females, thus showing no statistically significant difference between two genders ($P = 0.826$) [Graph 1].

DISCUSSION

Diagnosis of the wide variety of oral mucosal lesions and normal variants which occur in the oral cavity is an essential part of dental practice. The epidemiological literature on oral mucosal conditions in children and adults is limited when compared to that of dental caries and periodontal diseases.[5]

The present cross-sectional survey identified the prevalence of oral lesions and normal variants of oral mucosa in 12–15-year-old school children and the possible relationship between the occurrences of these lesions with existing risk factors.

In this study, a total of 154 oral mucosal lesions were diagnosed in 925 children. Thus, the prevalence of oral mucosal lesions and normal variants in the study population was 16.6%. This study was similar to Jahanbani *et al.*, where a higher prevalence of 28% was observed.[1]

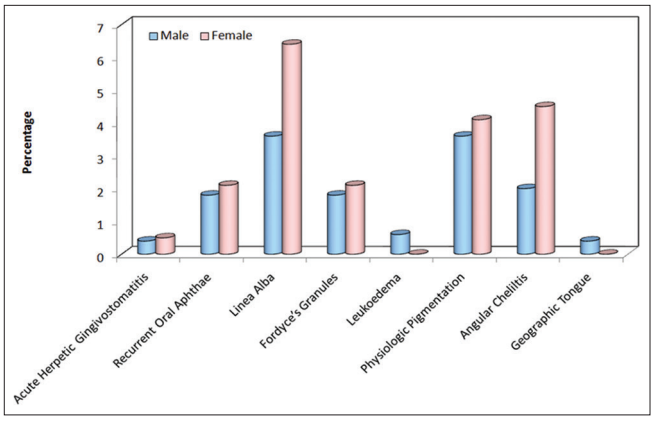
Smoke form of tobacco was used by 9 (1.8%) males and no females. Statistically, this difference was significant ($P = 0.006$). Smokeless form of tobacco was used by 155 (30.6%) of males and no females. Statistically, this difference was significant ($P < 0.001$). Both forms of tobacco were used by 9 (1.8%) males and no females.

Statistically, this difference was significant ($P = 0.006$). Similar observation was reported by Khude *et al.*, where the prevalence of tobacco habits was higher among boys.[6]

The study result showed that 154 (16.6%) were diagnosed with at least one mucosal lesion at the time of examination. The prevalence of any oral mucosal lesion was 16.4% among boys and 16.9% among girls, but there were no statistically significant differences in oral mucosal lesion by gender. This is similar to the study done by Jahanbani *et al.*, where the prevalence of oral mucosal lesion was 29.2% among the boys and 26.9% among the girls.[1]

The prevalence of oral mucosal lesions was found to be statistically significant with a tobacco habit. Prevalence of adverse oral habits was significantly higher among those having oral mucosal lesions (32.5%) as compared to those not having lesions (13.6%) ($P < 0.001$) [Table 5]. This was identical to the study reported by Shivakumar *et al.*, where the prevalence of oral mucosal lesions was found to be statistically significant with a tobacco habit.[7]

The most significant observation was the confirmation that the subjects with adverse oral habits were more likely to have oral mucosal lesions than their counterparts who did not have the habits. To the best of our



Graph 1: Prevalence of oral mucosal lesions according to gender

Table 5: Association between adverse habits and oral mucosal lesions

Adverse oral habit	Oral mucosal lesion *n* (%)	
	Present (*n*=155)	Absent (*n*=771)
Yes (*n*=155)	50 (32.5)	105 (13.6)
No (*n*=770)	104 (67.5)	666 (86.4)

knowledge, this is the first study of its kind in assessing the prevalence of oral mucosal lesions and normal variants of oral mucosa among 12–15-year-old school students in Lucknow. The results of this work will be instrumental in assessing the prevalence of oral mucosal lesions and normal variants of oral mucosa in school students in Lucknow.[8-12] This will also act as a surrogate measure to assess the effectiveness of the ban imposed by the government on the sale of tobacco.[13-17]

CONCLUSION

The study suggests that oral mucosal lesions and normal variants of oral mucosa were diagnosed minimally in adolescents.

Significant higher prevalence of oral mucosal lesion and normal variants of oral mucosa was noticed among subjects with adverse oral habits. There is a need to increase the awareness regarding oral mucosal lesions and also to prevent the deleterious oral habits.

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