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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.

Keywords: Oral mucosal lesions, Prevalence, Normal variants.


Source of support: Nil

Conflicts of interest: None

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 necessary 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 ginviva 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 = 18; 2.1%), 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
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

**Table 3:** Distribution of subjects according to adverse oral habits

<table>
<thead>
<tr>
<th>Adverse oral habits</th>
<th>Smoking tobacco</th>
<th>Smokeless tobacco</th>
<th>Both smoking and smokeless tobacco</th>
<th>Total n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>9 (1.8)</td>
<td>155 (30.6)</td>
<td>9 (1.8)</td>
<td>155 (30.6)</td>
</tr>
<tr>
<td>Female</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td><strong>“P” (Chi-square test)</strong></td>
<td>0.006</td>
<td>&lt;0.001</td>
<td>0.006</td>
<td></td>
</tr>
</tbody>
</table>

**Table 4:** Distribution of subjects according to sites of lesions

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

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

**REFERENCES**