

# Prevalence of oral mucosal changes among 6- 13-year old children in Sulaimani city, Iraq



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## Abstract

**Objectives:** Understanding the distribution, etiology and epidemiology of oral mucosal changes is essential for preventive and treatment planning. The aim of this study was to determine the prevalence and distribution of oral mucosal lesions and normal variations among 6- to 13-year old children in Sulaimani city, north of Iraq.

**Method:** A cross-sectional survey was carried out on primary school students in Sulaimani city. A total of 5113 Kurdish children was examined; 2757 (53.92%) were males and 2356 (46.08%) were females, enrolled in 20 primary public schools. Any oral mucosal changes observed at the time of examination were recorded.

**Results:** The prevalence of oral mucosal changes was found to be 12.87% (658 children): 12.91% (356) males and 12.82% (302) females, with no statistically significant gender variations ( $P>0.05$ ). Twelve different oral mucosal changes/lesions were diagnosed and the most common were herpes labialis (3.2%), aphthous ulcers (2.25%), linea alba (1.72%), angular cheilitis (1.7%), traumatic ulcers (1.58%) and geographical tongue (1.33%). No statistically significant association was found between different types of lesions and gender ( $P>0.05$ ). The lips were found to be the most common affected site (27.36%) followed by buccal mucosa (23.86%), tongue (18.54%), labial mucosa (14.13%), and the lip commissures (13.22%).

**Conclusion:** The present study represents the first cross-sectional epidemiological study of the prevalence and distribution of oral mucosal lesions among Kurdish Iraqi children in Sulaimani city providing the baseline data for future relative preventive and health service programs.

**Keywords:** Oral mucosal lesion, Sulaimani city, oral health.

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## Introduction

While diagnosis of the wide variety of mucosal lesions, which occur in the oral cavity, is an essential part of dental practice, there are relatively few systematic studies of the prevalence of such lesions in children and youths. This is a critical deficiency since appropriate diagnosis and treatment requires knowledge of the relative frequency or probability of possible lesions<sup>(1)</sup>.

Epidemiological studies have showed a wide variability in prevalence rates of oral lesions in different age groups in populations. It has been reported that diseases of the oral mucosa may affect 25–50% of individuals, depending on the population studied<sup>(2)</sup>.

Despite World Health Organization (1980) recommendations<sup>(3)</sup> to encourage more epidemiological assessment of oral mucosal lesions, the volume of literature in this area is much more limited than that on other oral conditions such as dental caries and periodontal diseases<sup>(4)</sup> and a limited information is available

on oral mucosal conditions in Iraqi population<sup>(5,6)</sup>. As the variability is quite high, there is a need of data concerning the prevalence rates of oral mucosal lesions in specific populations to develop a rational oral health policy<sup>(7)</sup>.

The aim of this study was to investigate the prevalence of oral lesions among 6 to 13-year old Kurdish children in Sulaimani city, and a potential relationship between gender and the occurrence of these lesions.

## Methods

Sulaimani City is located in the north east of Iraq and the majority of the population is of Kurdish origin. After achieving research approval from the Ethical Committee of the Faculty of Medical Sciences and the Scientific Committee of the School of Dentistry/ University of Sulaimani, proper authorities and primary school administrators,

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a cross-sectional survey was carried out on Kurdish primary school children aged between 6 to 13-years old.

Calculation of the sample size was based upon an expected oral mucosal lesion prevalence of 25%<sup>(2,7)</sup> with a precision of 0.05 and a confidence level (CI) of 99%. Twenty primary schools were randomly selected from different geographical parts of the city center for our survey and the total sample number reached 5113 children of Kurdish ethnicity, which satisfied our sample size requirement. For oral lesions with recurrent behavior, if observed, a questionnaire was sent to the parents of those children to clarify the medical history of their children. Periapical swellings and fistula due to dental caries and periodontal diseases were not included in this study.

The World Health Organization (1980) clinical criteria recommendations were followed for recording of oral soft tissue lesions<sup>(3)</sup> depending on visual examinations only. All children were examined in their schools by the same examiner.

A special medical case recording chart was prepared for the data collection. Data analysis was performed using the SPSS software program (Version 16.0, SSPS Inc, Chicago, Ill, USA). The chi square test was used for the data analysis. Statistical significance (P value) was calculated as follows:  $P > 0.05$  as non significant and  $P < 0.05$  as significant.

## Results

A total of 5113 children were examined in this study: 2757 (53.92%) males and 2356 (46.08%) females. The prevalence of oral mucosal lesions was found to be 12.87% (658 children): 12.91% (356) males and 12.82% (302) females. Statistically there was no association between prevalence of oral mucosal lesions and gender (Table 1).

Table 2 shows the distribution of different types of oral mucosal lesions according to the gender. Twelve different mucosal lesions were diagnosed, of which the most commonly found were herpes labialis (3.32%), aphthous ulcers (2.25%), linea alba (1.72%), angular cheilitis (1.7%), traumatic ulcers (1.58%) and geographical tongue (1.33%).

Herpes labialis, linea alba, angular cheilitis, geographical tongue and traumatic ulcers were found to be more common in males, while aphthous ulcers and fissured tongue were more common in females. However, statistically there was no association between the type of the lesion and gender of the child ( $P > 0.05$ ) (Table 2).

The lips (including the vermilions) were found to be the most common affected site for oral mucosal lesion occurrence (27.36%) followed by buccal mucosa (23.86%), tongue (18.54%), labial mucosa (14.13%), and lip commissures (13.22%), (Figure 1).

## Discussion

Previous studies showed different prevalence rates in children in different countries and among different ethnic groups. There are no previous Iraqi studies considering oral mucosal lesion in children. Therefore, other global studies are considered for comparison. A cross-sectional survey among 13 to 16-year old students in Duzce (Turkey) reported a 26.2% prevalence for oral mucosal lesions<sup>(7)</sup> and a 28% prevalence of oral lesions and normal variations of oral mucosa was reported in a study on 12 to 15-year-old students in Tehran (Iran)<sup>(8)</sup>, while a 10.26% prevalence was reported among children and youths aged between 2 to 17-years old in USA<sup>(9)</sup>. A cross-sectional study on the oral mucosal conditions among Indians from central Amazonia, Brazil revealed that 52.57% of the children up to 12 years old and 73.44% of patients aged 13 years or older presented at least one oral mucosal

Table 1: Sample distribution and prevalence of oral mucosal lesions by gender.

| Gender | Existence of Lesions |        |      |        |       |        | Chi Square Test |
|--------|----------------------|--------|------|--------|-------|--------|-----------------|
|        | Yes                  |        | No   |        | Total |        |                 |
|        | No.                  | %      | No.  | %      | No.   | %      |                 |
| Male   | 356                  | 12.91% | 2401 | 87.09% | 2757  | 53.92% | N.S*            |
| Female | 302                  | 12.82% | 2054 | 87.18% | 2356  | 46.08% |                 |
| Total  | 658                  | 12.87% | 4455 | 87.13% | 5113  | 100%   |                 |

\*  $P > 0.05$ : Not significant (N.S)

Table 2: Distribution of different types of oral mucosal lesions in children by gender.

| Type of the lesion        | Gender |      |        |      |       |      | Chi Square Test |
|---------------------------|--------|------|--------|------|-------|------|-----------------|
|                           | Male   |      | Female |      | Total |      |                 |
|                           | No.    | %    | No.    | %    | No.   | %    |                 |
| Herpes labialis           | 92     | 3.34 | 78     | 3.31 | 170   | 3.32 | N.S*            |
| Aphthous ulcer            | 58     | 2.1  | 57     | 2.42 | 115   | 2.25 | N.S             |
| Linea alba                | 48     | 1.74 | 40     | 1.7  | 88    | 1.72 | N.S             |
| Angular cheilitis         | 49     | 1.78 | 38     | 1.61 | 87    | 1.7  | N.S             |
| Fissured tongue           | 17     | 0.62 | 15     | 0.64 | 32    | 0.63 | N.S             |
| Traumatic ulcer           | 45     | 1.63 | 36     | 1.53 | 81    | 1.58 | N.S             |
| Geographic tongue         | 37     | 1.34 | 31     | 1.32 | 68    | 1.33 | N.S             |
| Fordyce spots             | 7      | 0.25 | 5      | 0.21 | 12    | 0.23 | N.S             |
| Mucocele                  | 1      | 0.04 | 1      | 0.04 | 2     | 0.04 | -               |
| Strawberry tongue         | 1      | 0.04 | 0      | 0    | 1     | 0.02 | -               |
| Fibroma                   | 1      | 0.04 | 0      | 0    | 1     | 0.02 | -               |
| Median rhomboid glossitis | 0      | 0    | 1      | 0.04 | 1     | 0.02 | -               |

\* P>0.05: Not significant (N.S)

condition<sup>(10)</sup>. Recent epidemiological studies have shown a wide variability in the prevalence of oral mucosal lesions in different regions of the world and have led researchers to draw disparate conclusions<sup>(11)</sup>.

The prevalence of oral mucosal lesions in the present study of primary school children aged 6-13-years old was 12.87% with no statistically significant gender variations. Although no statistically significant gender variation was found, males (12.91%) showed more prevalence than females (12.82%). Such findings are also reported in other studies<sup>(7,9)</sup>.

The lips, tongue and buccal mucosa were found to be the most common sites for oral mucosal lesion occurrence and this result agrees with previous studies<sup>(12)</sup>. The most common lesions found were herpes labialis, aphthous ulcers, linea alba, angular cheilitis, traumatic ulcers and geographical tongue. The epidemiological literature relating to oral mucosal lesions in children and adolescents is mostly related to oral mucosal lesions such as oral ulceration, herpes labialis and other mucosal alterations which are of interest because of the absence of a clear understanding of their aetiology and relationship to other conditions<sup>(13)</sup>.

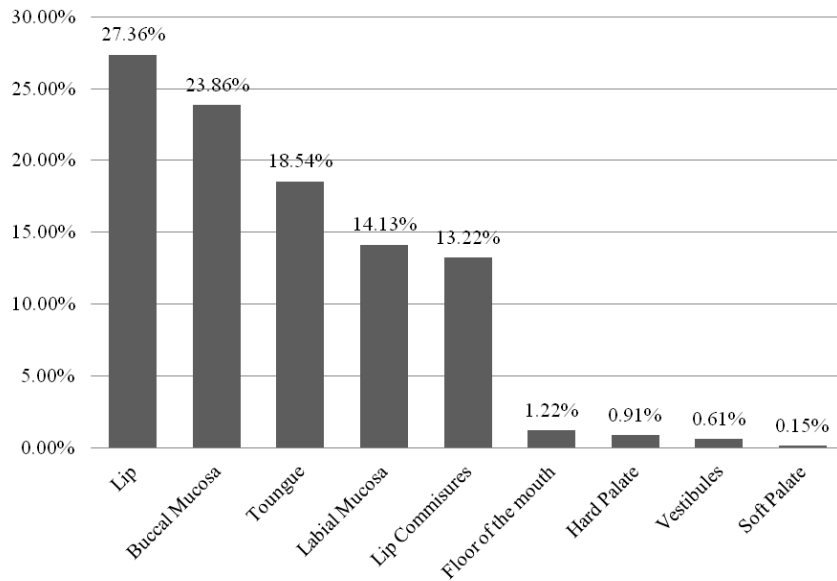
Herpes labialis was found to be the most common lesion (3.32%) in this study and its close

to similar findings by other studies<sup>(7,14)</sup>, while differs from some studies<sup>(1,15)</sup>. Herpes labialis is the reactivation of the primary infection, often following a prodromal period, and lesions present early on as clusters of vesicles on the lip which soon burst and scab over<sup>(13)</sup>.

It has been estimated that a third of school-age children have a history of recurrent aphthous stomatitis<sup>(16)</sup>. One or more small ulcer may occur at frequent intervals and the majority of aphthous ulcers in children are of a minor variety, usually healing within 2 weeks. The major type is rarer, affecting one in 10 patients with recurrent aphthous stomatitis. It normally has its onset after puberty and it is chronic, with ulceration lasting several weeks<sup>(17)</sup>.

Prevalence of aphthous stomatitis was 2.25% and slightly more prevalent in females than males. This figure is close to a prevalence rates reported from Spain<sup>(18)</sup>. However, slightly lower rates reported from Brazil<sup>(1,10)</sup> and USA<sup>(4)</sup>, and higher prevalence rates were reported from Slovenia<sup>(19)</sup>. With respect to gender, there appears to be no clear predilection for one sex or the other<sup>(10)</sup>. As was found in our study, some studies found a slightly higher susceptibility of aphthous stomatitis in females<sup>(11)</sup>.

Linea alba was found to be the third most common lesion in our study with a prevalence rate



**Figure 1:** Distribution of oral mucosal lesions according to the location in the oral cavity.

of 1.72%. However, Jahanbani et al, reported linea alba as the most common finding among adolescent students from Tehran<sup>(8)</sup>, while Parlak et al. reported it to be the second most common lesion in Turkish adolescents<sup>(7)</sup>.

Although the prevalence rate of angular cheilitis (1.7%) was lower than results found by some studies reported from South Africa<sup>(20)</sup>, Iran<sup>(8)</sup> and Turkey<sup>(7)</sup>, but it is in accordance with other studies reported from North America<sup>(9)</sup>, Southern India<sup>(21)</sup>, Argentina<sup>(14)</sup> and Slovenia<sup>(19)</sup>. Although our study did not explore the etiological factors for angular cheilitis, but nutritional deficiencies and anemia are among the proposed causative factors that should be considered when observing children with such lesions<sup>(7,8)</sup>.

Traumatic ulcers on the lips, tongue, labial and buccal mucosa accounted for 1.58% of the lesions. Such ulcers are usually due to trauma from external injuries (e.g. falls during playing) or caused by lip and tongue biting or from a sharp edge of a carious tooth causing frictional ulcers. Kleinman et al.<sup>(4)</sup> reported a prevalence rate of 0.09% for traumatic ulcers among North American children and youth while and Shulman<sup>(9)</sup> found that cheek/ lip bites (1.89%) were the most prevalent lesions in a different study and these results are comparable to our study and they are from national epidemiological surveys. However, other studies<sup>(10,18)</sup> provide different prevalence rates for traumatic ulcers and such differences may be due to different sample selection. There is an association between the occurrence of all traumatic lesions and age, with a reduction in their prevalence with increasing age. A traumatic ulcer rapidly heals within a few days

after elimination of the causal agent, confirming its traumatic origin and therefore its diagnosis<sup>(11)</sup>.

Epidemiological studies have shown a high frequency of tongue diseases among mucosal lesions of the oral cavity, although the prevalence varies in different parts of the world<sup>(11,22)</sup>. Most frequently occurring conditions are fissured and geographic tongue<sup>(22)</sup>. This variability is produced by differences in the race, sex and age of samples and by the use of different diagnostic criteria, methodologies and procedures by different researchers<sup>(22)</sup>.

Geographic tongue (benign migratory glossitis) is more common in girls and the condition has no known cause, although it has been associated with allergies in children<sup>(12)</sup>. However, Furlanetto et al.<sup>(13)</sup> reviewed 18 papers about geographical tongue and found great variations in the prevalence rate, which ranged from 0.2% to 14.3%. Also stated that “the average prevalence in most studies is low, which could indicate that this lesion is not seen very often in children”<sup>(13)</sup>. The occurrence of fissured tongue varies between 0.6 and 15.7%, rising to 25–50% in some studies and a connection between the occurrence of geographic tongue and fissured tongue been suggested by some authors<sup>(22)</sup>.

The prevalence of geographic tongue in the present study was 1.33% of all children examined with no statistically significant gender variation and this figure is close to those prevalence rates reported by some studies from South Africa 1.6%<sup>(37)</sup> and USA (American Caucasian students) 1.41%<sup>(23)</sup>, while differ from other studies<sup>(6,24)</sup>. Such differences may be related to the difference in sample selection and the diagnostic criteria

employed and this difference is also present in the prevalence rate of fissured tongue which was only 0.63%.

### Conclusion

The present study represents the first epidemiological cross-sectional study of prevalence and distribution of different oral mucosal lesions and normal variations in Iraq and in particularly among Kurdish Iraqi 6 to 13-year old children in Sulaimani city.

Further epidemiological studies are recommended for younger children and adolescents among the Kurdish population for future relative preventive and health service programs.

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