Original Article

Recurrent Aphthous Stomatitis and Related Factors Among 12-17-Year-Old Students in Zahedan, Iran.

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ARTICLE INFO

Article History
Received: Nov 2019
Accepted: Dec 2019
ePublished: Feb 2019

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ABSTRACT

Background and Aim: Recurrent aphthous stomatitis (RAS) is one of the most common lesions in the oral mucosa. The etiopathogenesis of RAS is not clear. RAS is multifactorial, and several factors can contribute to RAS development. This study aimed to evaluate the RAS prevalence and some related factors in 12-17-year-old schoolchildren in Zahedan City (Southeast of Iran).

Materials and Methods: In this descriptive-analytical study, 800 students (12-17 years old) of Zahedan City were examined for the assessment of RAS prevalence and related factors. After filling the questionnaire, oral examinations were done by an oral medicine specialist for RAS prevalence determination. Data were analyzed in SPSS 21 software according to the analysis of variance (ANOVA) and the chi-square test.

Result: The RAS prevalence in 12-17-year-old students (400 boys and 400 girls) was 40.7%. The RAS prevalence in girls was significantly higher than that in boys (51% vs 20.5%; P=0.02). RAS had no significant correlation with age or the dominant hand (P>0.05). Family history of RAS, stress, and trauma from toothbrushing correlated with RAS. The most common location of RAS was the lower lip (29.4%) followed by the mandibular vestibule (19.3%) and the right buccal mucosa (11.58%).

Conclusion: RAS prevalence was high among 12-17-year-old students of Zahedan City. Girls were more susceptible to RAS. Age group and the dominant hand did not affect RAS development. It seems that predisposing factors, such as family history of RAS, stress, and trauma from toothbrushing, could contribute to RAS development. The most common location of RAS is the labial mucosa.

Keywords: Aphthous Stomatitis, Prevalence, Stress Disorders

J Res Dentomaxillofac Sci 2020, 5(1):34-39

Introduction:

Recurrent aphthous stomatitis (RAS) is one of the most common lesions in the oral mucosa. [1] The prevalence of RAS ranges between 2% and 66% in different populations. Aphthous ulcers are painful and coated with a grayish membrane surrounded by an erythematous halo. These oral ulcers occur on the nonkeratinized mucosa, including the lateral border of the tongue, the labial vestibule, and the buccal mucosa.[2]

RAS is divided into major, minor, and herpetiform subtypes based on the size of the ulcer. [1-3]

The most common type is the minor aphthae, constituting 80% of RAS cases. The diameter of the lesion in the minor aphthae is less than one cm with well-defined borders.

This form of RAS heals during 10-14 days without scarring. The major aphthae are 1-5 cm in diameter; the healing process takes several weeks, and they usually leave scars. The herpetiform aphthae are rare with multiple ulcers less than one cm in diameter; they heal between 7 and 10 days.[1,2,4]

Recurrent aphthae are more common in females, and their first demonstration is in the second decade. RAS episodes generally develop 3-6 times per year.[2]

Various studies have been conducted on the prevalence of RAS and related factors across the world with different results.[2,5,6] In a study by Çiçek et al among 11360 individuals who presented to the Atatürk University (Turkey), the prevalence of RAS was 25.5%; it was more prevalent in females and nonsmokers.[7]

RAS prevalence rate has been reported to be 25.2% in Iran [8] and 17.7% in Sweden.[9]

Patil et al and Mathew et al reported the RAS prevalence in the Northern and Southern India to be about 2.1% and 21.7%, respectively.[10,11] In a study conducted by Rajmane et al, the prevalence of RAS in the Western population of Maharashtra, India, was 0.1%.[2]

The etiopathogenesis of RAS is still unclear. Several factors have been known as triggers of RAS, such as genetic, immunological, local, nutritional, medicinal, gastrointestinal, hormonal, psychological, and allergic factors.[2,12-14] Patil et al revealed that the most common trigger for RAS is stress while nutritional deficiency is the second most common factor.[10]

Considering the different reported RAS prevalence rates and the diversity of related factors, this study aimed to assess the RAS prevalence and some related factors in 12-17-year-old students in Zahedan City, Iran.

Materials and Methods

In this descriptive-analytical and cross-sectional study, 800 students (12-17 years old) of Zahedan City were examined for RAS and related factors in 2015. Based on randomized cluster sampling, five schools were selected from five geographic regions of Zahedan City (Northern, Southern, Western, Eastern, and Central regions).[15] Students were selected randomly from each school. An oral medicine specialist recorded the information through observation, interviewing, and clinical examination. The questionnaire was designed based on the World Halth Organization (WHO) guidelines for epidemiology and diagnosis of oral lesions.[4] The questionnaire contained three parts, including demographic information, medical history, and oral examination. The questions in the third section were about the location of RAS (the buccal mucosa, the labial mucosa, floor of the mouth, etc.), the size of the ulcers (≤10 mm and >10 mm), the number of the lesions (<10 and >10), and the type of the ulcers (minor, major, and herpetiform). In this research, the RAS diagnosis was based on the criteria presented by the WHO.[4] The examination was performed by an oral medicine specialist between 8 and 12 p.m., and related information was recorded in the questionnaire. Before filling the questionnaire, the researcher described the study goal to the participants, and oral examinations were performed after receiving informed consent forms from the parents. The clinical examination was done using latex gloves, a dental mirror, and a headlight. Only the children with active lesions were included in the study, and subjects with a history of RAS were excluded to minimize error. Based on the WHO criteria for RAS diagnosis, patients with traumatic ulcers were excluded from the research.[4] All volunteers were examined for RAS four times (every 10 days).

Data were analyzed using SPSS 21 software (SPSS Inc., Chicago, IL, USA) according to the analysis of variance (ANOVA) and the chi-square test. $P<0.05$ was considered as significant

Results:

In the studied population, including 800 students (12-17 years old, 400 boys and 400 girls), 326 subjects (40.7%), including 204 girls (51%) and 121 boys (20.5%), were clinically diagnosed with RAS. Based on the chi-square analytical test, RAS occurrence significantly differed in two genders ($r=0.87$, $P=0.02$). There was a higher

RAS occurrence in girl students as compared to boys (Table 1).

In this study, the students were divided into two age groups (12-14 and 15-17 years), and each age group included 400 subjects. One-hundred and fifty-nine 12-14-year-old students (39.8%) and one-hundred and sixty-seven 15-17-year-old students (41.8%) had aphthous ulcers. Based on the chi-square analytical test, RAS occurrence did not significantly differ in the two age groups [degree of freedom (df)=1, P>0.05; Table 1].

Table 1: The prevalence of recurrent aphthous stomatitis (RAS) based on sex, age, and the dominant hand in the studied population

Groups / Variables	RAS N	RAS %	Healthy N	Healthy %	P-Value
Sex					
Boy	122	30.5	278	69.5	0.02
Girl	204	51	196	49	
Age (year)					
12-14	159	39.75	241	60.25	>0.05
15-17	167	41.75	233	58.25	
Dominant hand					
Right	288	41	414	59	>0.05
Left	38	38.8	60	61.2	
Total	326	40.7	474	59.3	

Out of the 800 studied subjects, 98 individuals (12.3%) were left-handed. Out of them, 38 subjects (38.8%) were affected by RAS. Out of the 702 right-handed subjects (87.7%), 288 (41%) had aphthous ulcers. Based on the chi-square test, RAS occurrence did not differ in these two groups. There was no significant correlation between the dominant hand and RAS (P>0.05; Table 1).

RAS occurrence at the four screening times is shown in Figure 1. RAS occurrence showed no significant difference (ANOVA) at the four screening times (df=1, P>0.05).

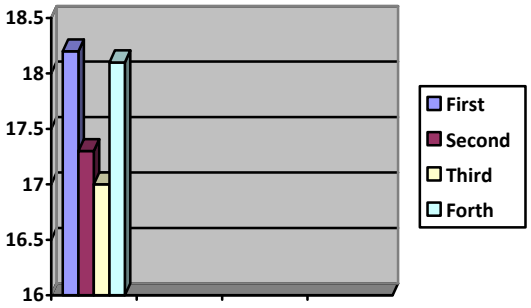

Figure 1. Recurrent aphthous stomatitis (RAS) prevalence rate at the four screening times in the studied population

The assessment of RAS types (minor, major, and herpetiform) revealed that all RAS subjects were affected by minor aphthae. Major and herpetiform aphthae were not seen in the studied RAS patients. Most RAS subjects (303 individuals, 93%) had 1-2 ulcers in the oral mucosa. Others (23 cases, 7%) had 3 ulcers in the oral cavity. The most common location of RAS in the oral mucosa was the lower lip (96, 29.4%), followed by the mandibular vestibule (62, 19.3%), the right buccal mucosa (41, 12.58%), and the left buccal mucosa (35, 10.74%; Figure 2).

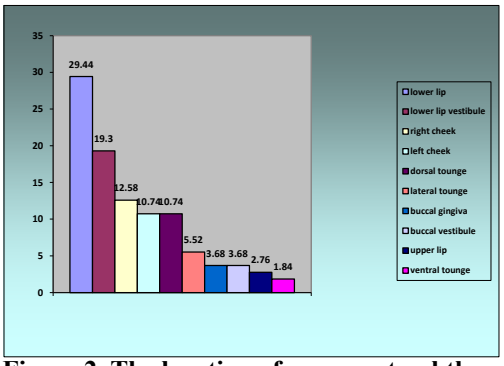

Figure 2. The location of recurrent aphthous stomatitis (RAS) in the oral mucosa in the studied population

All the affected students (100%) experienced frequent episodes of RAS. Three hundred students (92%) reported that the recurrent ulcers heal in less than 10 days while 26 subjects (8%) reported that the ulcers lasted between 10 and 14 days.

The studied populations without RAS had no history of allergy (0.0%). Out of the 326 affected subjects, 32 subjects (9.8%) had an allergy history. Twenty-two subjects (68.75%) had drug allergy, and 10 individuals (31.25%) had a history of food allergy. There was a significant correlation (chi-square test) between RAS and a history of allergy (P=0.02, r=0.7).

From the students who were asked to report any factor correlated with the beginning of RAS, 273 subjects (83.75%) noticed that anxiety and stress were the predisposing factors for the onset of recurrent ulcers. Twenty subjects (6.13%) reported that trauma from toothbrushing related to the onset of recurrent aphthae. Thirty-three students (10.12%) could not correlate any factor with the onset of RAS.

In this study, there was a significant correlation between RAS and family history of RAS (chi-square test) as 74 subjects (22.6%) out of the 326 RAS subjects had a family history of RAS while 252 individuals (77.4%) had no family history (P=0.01, r=0.84). Family history of RAS was not reported in the population without RAS.

Discussion:

Recurrent aphthous ulceration is the most common ulcerative condition in the oral cavity. It is painful and affects people throughout the life span. [2,7,10,16] RAS is more prevalent in women and often occurs in the second and third decades. It usually involves the nonkeratinized oral mucosa, including the soft palate, lips, tongue, and buccal mucosa. [2,17,18]

Various epidemiological studies have been conducted on RAS prevalence throughout the world with different findings. The RAS prevalence rate has been documented to be 20% in the general population. [1,2,5,6]

The overall RAS occurrence in the present study was 40.7%, which was approximately similar to the study conducted in the United States on a sample of children (40%).[19] This prevalence rate was higher than that reported by studies conducted in an Iranian population (25.2%) and an Indian population (21.7%). [8,11] RAS prevalence was 25.5% in Turkey, [7] 27% in Kuwait, [20] and 17.7% in Sweden. [9]

In our study, 326 subjects (40.7%) had RAS. Rajmane et al reported a much lower prevalence of 0.1% in an Indian population.[2] Safadi reported a much higher prevalence of 78% among a Jordanian population.[17] The cause of the dissimilarities may be the differences in the age group of the participants, the lifestyle of the subjects, genetic factors, socioeconomic levels, etc.

RAS prevalence is higher in children. The frequency and the severity of RAS decrease with age. [2,8,10]

The etiology of RAS is still unclear but several predisposing factors have been documented for RAS development in the scientific literature. An immunologic basis has been described for RAS. Nutritional deficiencies, including deficiencies in Iron, Vitamin B complex, and Folic Acid, are more common in patients with RAS.[1]

In the present study, girls (51%) were more frequently affected than boys (20.5%); this difference was significant (P=0.02). This finding was in line with studies of Safadi, [17] Davatchi et al,[8] and Rajmane et al.[2] Women are more sensitive to emotional situations and stress, which can involve the immune system. The hormonal changes in females during menstruation and pregnancy can play an important role in RAS development.[1,2] However, McCartan and Sullivan found no correlation between RAS and pregnancy, menopause or premenstrual period.[21]

RAS patients with mild symptoms do not need any treatment. Topical steroids, such as triamcinolone, can reduce the frequency and the severity of aphthous ulcers.[2] Also, Aloe Vera extract is beneficial for the treatment of RAS lesions.[22]

The most comprehensive research about RAS has been conducted on 10,000 young people of 21 different countries.[23] The study revealed that 49.7% of females and 38.7% of males were affected by RAS. [23]

A genetic predisposition for RAS development has been established as up to 40% of RAS patients have a family history of RAS. The ulcers

occur earlier in these individuals. Also, the severity of the ulcers is higher in patients with a positive family history.[2,16]

Similarly, our study revealed that there is a positive correlation between RAS and a family history of this condition. None of the subjects without RAS had a family history of this condition while 22.6% of the subjects with RAS had a family history of RAS (P=0.02).

Several studies have documented a positive correlation between the psychological status of the patients and RAS. Ajmal et al, [24] Soto Araya et al, [25] Cohen,[26] and Albanidou-Farmaki et al [27] revealed that stress and anxiety are important reasons for RAS. In the present study, 83.75% of the students who had experienced RAS reported that stress could be related to the onset of recurrent ulcers.

Stress and anxiety have been proposed as etiological factors in RAS. Stress may cause parafunctional habits (cheek biting), which can induce trauma to the oral mucosa and cause ulceration.[1] Gallo et al stated that psychological stress might be a triggering factor rather than a contributing factor in RAS subjects.[28]

Trauma to the oral mucosa due to local injections, sharp teeth, dentistry treatments, and toothbrushing may predispose people to recurrent aphthae. [1,29]

In the current study, 20 children (6.13%) reported that trauma caused by toothbrushing related to the onset of oral aphthae. Similarly, other studies have revealed that trauma to the oral mucosa due to toothbrush injury may be a predisposing factor for RAS development. Wray et al documented that mechanical injury to the oral soft tissues causes ulceration in people susceptible to RAS.[29]

In the present study, from 326 students with RAS, 96 individuals (29.4%) were affected by RAS on the labial mucosa, 62 (19.3%) were affected on the mandibular vestibule, and 41 (12.58%) were affected on the right buccal mucosa. This finding is in line with the study by Safadi on Jordanian dental patients, which revealed that the buccal mucosa and the lips were the most common sites for RAS.[17] Similar to the present study, the floor of the mouth was the lowest affected site by RAS in the study by Safadi (8%).[17] Only one-fifth of the participants in the study by Safadi had aphthae on the gingiva and the tongue. Similarly, in the current study, the tongue and the gingiva were rarely affected by RAS. [17]

In the current study, 9.8% of the RAS affected population suffered from drug or food allergy. Similarly, 11.8% of patients with RAS in the study by Ajmal et al had a food allergy.[24] In other studies, hypersensitivity and allergic factors have been postulated to be related to RAS.[2,14,30]

Although RAS prevalence in the present study was high compared to other similar studies, considering the limited duration of the research, the RAS prevalence rate may even be higher as some people with a history of RAS had no ulcer during the study.

Conclusion:

The prevalence of RAS among the students of Zahedan City was 40.7%, which is relatively high in comparison with other Iranian populations. Girls were more susceptible to RAS development, and the most influential factors were stress, trauma from toothbrushing, and a family history of RAS. The most common location of RAS development in the oral mucosa was the labial mucosa followed by the mandibular vestibule.

Acknowledgements:

We thank the Oral and Dental Diseases Research Center of Zahedan University of Medical Sciences, Zahedan, Iran, for their financial support. This article has been derived from student thesis No. 423.

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Please cite this paper as: shirzaiy M, Sarabadani J. Recurrent Aphthous Stomatitis and Related Factors Among 12-17-Year-Old Students in Zahedan, Iran. J Res Dentomaxillofac Sci. 2020; 5 (1) :34-39