Compendium of Oral Science Vol. 9 (2) 2022
Pg. 54-62
https://doi.org/10.24191/cos.v9i2.19233

Compendium of Oral Science Volume 9/2022 (2)
Original Article

Self-Reported Prevalence of Recurrent Aphthous Stomatitis among UiTM Dental Students

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Received: February 24, 2022
Accepted for publication: May 30, 2022.

ABSTRACT

Recurrent aphthous stomatitis (RAS) is a common mucosal disease characterized by multiple recurrent, small, round, or oval ulcers with circumscribed margins, erythematous haloes, and yellow grey base. Although the exact etiology is unknown, various factors can trigger RAS development. **Objectives:** *This study aims to determine the prevalence of self-reported RAS and to evaluate the associated risk factors of RAS among dental students.* **Material and methods:** *A set of validated questionnaires was distributed among the dental students in the Faculty of Dentistry, UiTM. The questionnaire comprises socio-demographic characteristics, nature of ulcers, risk factors, and treatment modalities. Data obtained from the questionnaire were analyzed using Chi-square statistical test SPSS version 27.* **Results:** *A total of 299 dental students participated in the questionnaire survey. The prevalence of RAS among dental students was 90.3 %. There was no significant relationship between the socio-demographic background of participants with self-reported RAS. The most common site affected was the buccal mucosa 64.1%, followed by the lips 55.2%. Risk factors frequently associated with RAS are injury (trauma) and stress 47.8% and 28.1%, respectively. Most dental students (69.3%) do not get any treatment to treat their ulcers, and only 1.5% seek treatment from the dentist.* **Conclusions:** *This study highlights the high prevalence of self-reported RAS among dental students and common risk factors reported associated with the occurrence of RAS. Therefore, this data assists the clinician in identifying common associated risk factors of RAS and subsequently improve management and efficient therapeutics.*

Keywords: *Recurrent Aphthous Stomatitis, prevalence, dental students, oral ulcer, risk factor.*

Abbreviations: *UiTM - Universiti Teknologi MARA, RAS- Recurrent Aphthous Stomatitis*

INTRODUCTION

Recurrent Aphthous Stomatitis (RAS) is defined as recurrent occurrences of oral ulceration where the ulcers heal spontaneously following recurrence (Chiang et al. 2019). RAS is the most common clinical presentation of a disease characterized by painful, small, round, well-defined oral ulcers (Sánchez, Conejero, and Conejero 2020). The prevalence of RAS in the general population varies from 5% to 66% among different nations (Chun-Pin Chiang et al. n.d.). In Malaysia, a study reported the prevalence of RAS was 0.5% (Zain 2000). Even though it can affect both genders equally, there were studies that reported females being more predominant than males in the prevalence of aphthous ulcers (Ajmal et al. 2018; Al-Johani 2019; Maheswaran et al. 2015). Approximately 80% of the individuals affected by the ulcers reported their first time under 30 years old.

The exact etiology of recurrent aphthous stomatitis is still unknown. Therefore, many factors have been linked to causing the development of the disease, including hormonal changes, infections, trauma, medications, tobacco smoking, food allergies, nutritional deficiency, stress, genetic predisposition, and immunological factors (Queiroz et al. 2018). About 40% of patients have been found with positive family history, and their tendency to develop ulcers at an early age has increased with greater severity (Queiroz et al. 2018). Nutritional deficiencies such as ferritin, folate, and vitamin B12 are reported among RAS patients (Bao et al. 2018). Serum ferritin deficiency is much higher among adolescent and young adult female patients. Both serum folate and vitamin B12 deficiencies are higher among young adult male patients, but further study is required (Wu et al. 2016).

Anxiety and stress are believed to be significantly related to the onset of RAS based on some reported studies (Ajmal et al. 2018; Al-Johani 2019). Increased salivary cortisol has also been linked with RAS development (Polat et al. 2018). Some studies suggested that the menstrual cycle could play an essential role in ulcers among female patients. However, there not enough reliable data on the association between RAS and the pre-menstrual period, pregnancy, or menopause has been made (Ajmal et al. 2018; Polat et al. 2018).

The clinical manifestation of RAS is categorized into three forms: minor RAS, major RAS, and herpetiform ulcerations. Minor RAS, also known as Mikulicz Aphthae, is the most common form of RAS, with approximately 80% of patients having lesions of this pattern (J. Sánchez-Bernal, C. Conejero, and y R. Conejero n.d.; Sharma, Gupta, and Singh 2017). The ulcers are superficial, usually less than 1 cm in diameter, and heal in 10 -14 days without scarring (Scully and Porter 2008). Meanwhile, major RAS is a severe form of RAS in which ulcers are larger than minor RAS, measuring more than 10 cm in diameter, and commonly occur on the labial, soft palate, and fauces (Sabrine et al. 2020). The number of ulcers per attack is 1-10, and it takes more than six weeks to heal due to the large size of ulcers (Rivera 2019; Sánchez, Conejero, and Conejero 2020). Lastly, herpetiform ulcerations (HU) are the least common type of RAS characterized as small, 1-2mm in diameter, and multiple ulcers per attack (5-100) may be present simultaneously (Tarakji et al. 2015).

RAS diagnosis is based on a thorough clinical history and a physical examination (Sánchez, Conejero, and Conejero 2020). Detailed patient history is crucial to identify whether other symptoms indicate possible underlying infection, a background of an autoimmune process, immunosuppression or the involvement of the gastrointestinal tract, or whether it is just a local problem (Tarakji et al. 2015). There is no specific laboratory test for diagnosing RAS. However, complementary tests such as complete blood count, dosage of inflammatory and hematological markers, and vitamins are essential to rule out any possible systemic conditions that can cause ulcerations (Queiroz et al. 2018). The treatment for RAS aims to relieve the symptoms, reduce ulcer number and size, and increase patient disease-free intervals (Tarakji et al. 2015). Topical corticosteroids are the first line in RAS treatment, limiting the inflammation that leads to the formation of the ulcer (Queiroz et al. 2018; Tarakji et al. 2015). The standard topical agents are orabase, fluocinonide, dexamethasone, and betamethasone dipropionate gel (Milia et al. 2022).

Prevalence studies are critical for practical reasons, such as determining the amount of morbidity and the "disease burden" of the population for a non-fatal ailment. However, to the best of our knowledge, there is a scarcity of information about RAS in the general population among young adolescents, particularly students at a specific institution. Thus, this study novelty mainly focuses on determining the prevalence of self-reported RAS and risk factors associated with RAS among dental students in the Faculty of Dentistry, UiTM.

MATERIALS AND METHODS

Study design and sample size

A cross-sectional survey was carried out among dental students at the Faculty of Dentistry, UiTM Sungai Buloh, between March 2021 and January 2022. The sample size was calculated using the sample size calculator Raosoft ® Inc. (www.raosoft.com) based on the total number of dental students (n=407) in the Faculty of Dentistry, UiTM. The validity of this research was set at 95% confidence level, with a margin error of 5%, giving a minimum sample of 198. A set of validated questionnaires was distributed via google form to all dental students (n=407) at the Faculty of Dentistry, UiTM. All participants were informed of the purpose of the research, their rights to withdraw at any time, and their responses would be anonymous and treated confidentially. The self-administered questionnaires consisted of three parts: socio-demographic information, characteristics of oral ulcers, and risk factors associated with oral ulcers . The research's ethics approval was obtained from the Research Ethics Committee (REC) Universiti Teknologi MARA REC/03/2020(UG/MR/101).

Statistical analysis

Statistical Package for Social Sciences (SPSS) software program version 26 (IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp) was used for data entry and analysis. Pearson Chi-Square test was used for categorical data. Statistical significance was set at $P < 0.05$.

RESULTS

Socio-demographic background of participants

The socio-demographic characteristics of respondents are summarized in Table 1. A total of 299 questionnaires were analyzed. There were 246 female respondents and 53 male respondents. 93.4% respondents were undergraduate students, and 6.6% were postgraduate students. 38 respondents reported of having a medical illness, and 21 respondents are currently under medication. For smoking habits, 99.0% of respondents are non-smokers.

Clinical features of self-reported RAS among dental students

Among all the participants, 270 dental students had experienced an episode of RAS in their life; Table 2 highlights the clinical features of RAS as reported by the dental students. The majority of respondents, 68.5%, reported that they suffer from oral ulcers every six to twelve months, and 22.2% of respondents said they suffer from oral ulcers every three months. Meanwhile, 236 respondents (87.4%) stated that the number of ulcers developed per episode is one ulcer. The most frequent anatomical site affected by ulcers is buccal mucosa with 64.1%, followed by the lip with 55.2%. Most of the respondents (83.7%) reported that the ulcer size is small, within 1 to 2 mm. 16.3% of respondents reported a medium size of the ulcer, which is less than 10 mm. 133 respondents said that the pain of the ulcer is a slight pain, 110 respondents reported the pain is moderate pain, and 13 respondents reported that the pain is severe pain. Most respondents (61.5%) reported that the ulcer interferes with their eating and swallowing. 73.7% of respondents stated that the ulcer duration was between two to five days.

Risk factors that are associated with self-reported RAS among dental students

Table 3 shows the risk factors associated with the self-reported RAS. 211 of the respondents know about the risk factors that may trigger the development of RAS. The most common risk factors are trauma; 76.3% and stress; 44.8%. There are 38 respondents reported to have a food allergy, and most of them have allergies to seafood (86.8%) and peanuts (10.5%). 70.4% of respondents reported regularly eating hot and spicy food.

Treatment used for RAS reported by dental students

Table 4 shows the self-reported treatment used by dental students to treat RAS. Most of the respondents (69.3%) reported not seeking treatment for their RAS. Meanwhile, the self-reported most used treatment was Bonjela (36.7%), followed by Gengigel (15.2%) and Oral Aid (9.6%). Only 1.5% of respondents seek treatment from the dentist to manage their oral ulcer.

Association between socio-demographic background and experience of the oral ulcer

A Chi-square analysis was conducted to determine whether socio-demographic data was associated with the prevalence of ulcers and summarized in Table 5. Fischer's Exact Test was used if the assumptions for the chi-square were violated. Based on the statistical analysis, there was no significant association between the prevalence of ulcers and the gender (p=0.943), year of study (p=0.612), and smoking habits (p=1.000).

Table 1: Socio-demographic characteristics of self-reported RAS of dental students (N=299)

Socio-demographic background	Total n (%)
Gender	
Male	53 (17.7)
Female	246 (82.3)
Year of studies	
1st year dental student	49 (16.4)
2nd year dental student	69 (23.1)
3rd year dental student	66 (22.1)
4th year dental student	50 (16.7)
5th year dental student	45 (15.1)
Postgraduate dental student	20 (6.7)
Past medical history	
Yes	38 (12.7)
No	261 (87.3)
Which of the following diseases?	
Gastrointestinal	6 (15.4)
Anemia	6 (15.4)
Hypertension	0 (0.0)
Hypothyroidism	0 (0.0)
Hyperthyroidism	1 (2.6)
Diabetes Mellitus	0 (0.0)
Asthma	26 (66.7)
Do you take any medication?	
Yes	21 (7.0)
No	278 (93.0)
Smoking habit	
Smoker 1-10 cig per day	0 (0.0)
Smoker 11-20	0 (0.0)
Smoker 20	0 (0.0)
Former smoker	1 (0.3)
Non-smoker	296 (99.0)
Vape	2 (0.7)

Note. Due to rounding errors, percentages may not equal 100%

Table 2: Characteristics of self-reported RAS of the dental students (N=270)

Socio-demographic background	Total n	Valid Percentage
How often do you suffer from oral ulcers?		
Every 2 weeks	0	0
Every month	25	9.3
Every 3 months	60	22.2
Every 6-12 months	185	68.5
Total	270	100.0
How many ulcers develop per episode?		
1 ulcer	236	87.4
2-4 ulcer	34	12.6
Multiple ulcers <5	0	0
Total	270	100.0
Site of the ulcer		
Lip	149	55.2
Buccal	173	64.1
FOM	20	7.4
Gingiva	58	21.5
Tongue	72	26.7
Others	10	3.7
Total	482	178.5
What is the size of the ulcers?		
Diameter 1-2 mm (small)	226	83.7
Diameter <10 mm (medium)	44	16.3
Diameter >10 mm (large)	0	0
Total	270	100.0
Are the ulcers painful?		
No pain	14	5.2
Slight pain	133	49.3
Moderate pain	110	40.7
Severe pain	13	4.8
Total	270	100.0
Do the ulcers cause interference with eating and swallowing?		
Yes	166	61.5
No	104	38.5
Total	270	100.0
Duration of the ulcers		
2-5 days	199	73.7
>5 days	59	21.9
>7 days	12	4.4
Total	270	100.0

Note. Due to rounding errors, percentages may not equal 100%

Table 3: Risk Factors RAS demographic of dental students (N= 270)

Socio-demographic background	Total n	Valid Percentage
Do you know any factors that cause RAS?		
Yes	211	78.1
No	59	21.9
Total	270	100.0
What are the risk factors?		
Stress	121	44.8
Injury	206	76.3
Spicy food consumption	40	14.8
Common cold/flu	9	3.3
Menstruation	11	4.1
Medication	8	3
Others	36	13.3
Family history		
Yes	60	22.2
No	210	77.8
Do you have any food allergy?		
Yes	38	15.6
No	232	84.4
What kinds of food allergy?		
Seafood	33	86.8
Peanuts	4	10.5
Beef	1	2.6
Lychee	1	2.6
Milk	1	2.6
Do you regularly eat this type of food?		
Hot and spicy food	190	70.4
Acidic food (orange, pickle)	67	24.8
Carbonated drinks	43	15.9
None of the above	70	25.9

Note. Due to rounding errors, percentages may not equal 100%

Table 4: Self-reported treatments used for RAS

Socio-demographic background	Total n	Valid Percentage
How do you treat?		
No treatment	187	69.3
LA (oral aid)	26	9.6
Bonjela	99	36.7
Gengigel	41	15.2
Topical steroid	8	3
Seek treatment from the dentist	4	1.5
Others	14	5.2
Total	379	140.4

Note. Due to rounding errors, percentages may not equal 100%

Table 5: Association between socio-demographic background and experience of the ulcer

Socio-demographic background	Have you experienced any ulcers in the mouth?		p-value
	Yes n (%)	No n (%)	
	270 (90.3%)	29 (9.7%)	
Gender			
Male	48 (90.6)	5 (9.4)	0.943
Female	222 (90.2)	24 (9.8)	
Year of study			
Year 1	47 (95.9)	2 (4.1)	
Year 2	62 (89.9)	7 (10.1)	
Year 3	57 (86.4)	9 (13.6)	0.692*
Year 4	45 (90.0)	5 (10.0)	
Year 5	41 (91.1)	4 (8.9)	
Postgraduates	18 (90.0)	2 (10.0)	
Year of study			
Undergraduates	252 (90.3)	27 (9.7)	1.000*
Postgraduates	18 (90.0)	2 (10.0)	
Year of study			
Preclinical	109 (92.4)	9 (7.6)	
Clinical	143 (88.8)	18 (11.2)	0.612
Postgraduates	18 (90.0)	2 (10.0)	
Smoking habits			
Smoker 1-10 cig per day	0 (0.0)	0 (0.0)	
Smoker 11-20	0 (0.0)	0 (0.0)	
Smoker 20	0 (0.0)	0 (0.0)	1.000*
Former smoker	1 (100.0)	0 (0.0)	
Non smoker	267 (90.2)	29 (9.8)	
Vape	2 (100.0)	0 (0.0)	

* Fischer's Exact Test was used as assumption of the Pearson Chi-square test was violated.

DISCUSSIONS

The prevalence of RAS self-reported by dental students in this study was 90.3%. This finding indicates that the prevalence of RAS among dental students is high because most respondents were female. Many studies have also reported that RAS is more common in women than men (Al-Johani 2019) (Sharma, Gupta, and Singh 2017).

RAS is characterized by a sudden self-limiting ulcer that can be single or multiple and generally affect the tongue, buccal mucosa, floor of the mouth, gingiva, and soft palate (Milia et al. 2022). Clinically, RAS manifested in three forms: minor, major, and herpetiform. The most common type is the minor RAS, which is less than 1 cm in diameter with numbers up to one to five ulcers appearing simultaneously. In our study, 78.9% reported that only one ulcer appeared per time. The buccal mucosa (64.1%) was reported as the most common site in this study, followed by the lip (55.2%). This is slight different from a study done by Al-Johani in which the most common sites reported were labial mucosa, followed by buccal mucosa (Al-Johani 2019). This is due to RAS's ability to form on loosely attached and non-keratinized mucosa such as buccal mucosa and labial mucosa (Queiroz et al. 2018). The common complaint of RAS patients are pain which directly could affect the oral health and quality of life of a patient (J. Sánchez-Bernal, C. Conejero, and y R. Conejero n.d.). In the present study, 133 of the 270 students with RAS reported mild pain, followed by moderate pain (110 students) and severe pain (13 students). In addition, 166 students reported ulcers interfering with eating and swallowing. As for the duration of the ulcers, the

most common reported by students were 2-5 days (199 students), followed by more than five days (59 students), and more than seven days (12 students).

Out of 270 students, 206 reported trauma as the risk factor associated with the occurrence of RAS. This was followed by risk factor related to stress in which 121 students reported. This is consistent with previous literature in which the most common predisposing factor of RAS is trauma to the oral mucosa, especially from mechanical injury, which includes toothbrushing, removable appliances, and dental procedures (Chiang et al. 2019; Tarakji et al. 2015). Aside from that, some suggestions are indicating that stress involving academic and clinical load could lead to a higher prevalence of RAS among dental students (Sharma, Gupta, and Singh 2017).

The RAS treatment aims to reduce pain, promote ulcer healing, and increase disease-free intervals for patients. In this study, 187 students had reported no treatment for ulcers, while the rest reported having treatment for ulcers or seeking treatment from dentists. No standard management protocol has been made and the treatment remains symptomatic because there is no available treatment that can prevent recurrence or shorten the duration of the ulcers as of current. The limitation of this study is the lack of clinical examination to confirm the diagnosis of the ulcers as the diagnosis is entirely based on self-reported by the respondents.

CONCLUSION

RAS is a common oral disease with unknown etiology. A thorough clinical examination is critical to establish the diagnosis of RAS. Early, proper and prompt diagnosis of the ulcers will help the dental practitioner in providing information to the patient, eventually educating the patient and assist in the management of the disease. Thus, existing data in this study contribute to further understanding and identifying RAS factors as well as improving the management control and efficient therapeutics.

REFERENCES

Ajmal, Muhammed, Lujain Ibrahim, Nada Mohammed, and Heba Al-Qarni. 2018. "Prevalence and Psychological Stress in Recurrent Aphthous Stomatitis among Female Dental Students in Saudi Arabia." *Clujul Medical* 91(2): 216–21.

Al-Johani, Khalid. 2019. "Prevalence of Recurrent Aphthous Stomatitis among Dental Students: A Cross Sectional Study." *Journal of Contemporary Dental Practice* 20(8): 893–95.

Bao, Zhe Xuan, Jing Shi, Xiao Wen Yang, and Li Xin Liu. 2018. "Hematinic Deficiencies in Patients with Recurrent Aphthous Stomatitis: Variations by Gender and Age." *Medicina Oral Patologia Oral y Cirugia Bucal* 23(2): e161–67.

Chiang, Chun Pin et al. 2019. "Recurrent Aphthous Stomatitis – Etiology, Serum Autoantibodies, Anemia, Hematinic Deficiencies, and Management." *Journal of the Formosan Medical Association* 118(9): 1279–89. https://doi.org/10.1016/j.jfma.2018.10.023.

Chun-Pin Chiang et al. "Recurrent Aphthous Stomatitis - Etiology, Serum Autoantibodies, Anemia, Hematinic Deficiencies, and Management | Elsevier Enhanced Reader.Pdf."

J. Sánchez-Bernal, C. Conejero, and y R. Conejero. “Aftosis Oral Recidivante.”

Maheswaran, Thangadurai et al. 2015. "Correlation between the Menstrual Cycle and the Onset of Recurrent Aphthous Stomatitis." *Journal of Indian Academy of Dental Specialist Researchers* 2(1): 25.

Milia, E. et al. 2022. "Recurrent Aphthous Stomatitis (RAS): Guideline for Differential Diagnosis and Management." *European Journal of Paediatric Dentistry* 23(1): 73–78.

Polat, Cahit et al. 2018. "Association Between Anxiety, Depression, and Salivary Cortisol Levels in Patients with Recurrent Aphthous Stomatitis Turkish Archives of Otorhinolaryngology." www.turkarchotolaryngol.net.

Queiroz, Salomão Israel Monteiro Lourenço et al. 2018. "Recurrent Aphthous Ulceration: An Epidemiological Study of Etiological Factors, Treatment and Differential Diagnosis." *Anais Brasileiros de Dermatologia* 93(3): 341–46.

Rivera, César. 2019. "Essentials of Recurrent Aphthous Stomatitis." *Biomedical Reports* 11(2): 47–50.

Sabrine, Maamouri et al. 2020. "A Pathologic Mandibular Fracture Revealing a Bifocal Location of Langerhans Cell Histiocytosis." *Annals of Medicine and Surgery* 56(May): 128–32. https://doi.org/10.1016/j.amsu.2020.06.019.

Sánchez, J., C. Conejero, and R. Conejero. 2020. "Recurrent Aphthous Stomatitis." *Actas Dermo-Sifiliográficas (English Edition)* 111(6): 471–80. https://linkinghub.elsevier.com/retrieve/pii/S1578219020301724 (July 1, 2022).

Scully, Crispian, and Stephen Porter. 2008. "Oral Mucosal Disease: Recurrent Aphthous Stomatitis." *British Journal of Oral and Maxillofacial Surgery* 46(3): 198–206.

Sharma, Mamta, Ritesh Gupta, and Satvinder Singh. 2017. "Correlation of Psychological Stress with Recurrent Aphthous Stomatitis among Dental Students in an Educational Institution." *~ 455 ~ International Journal of Applied Dental Sciences* 3(4): 455–58. www.oraljournal.com.

Tarakji, Bassel et al. 2015. "Guideline for the Diagnosis and Treatment of Recurrent Aphthous Stomatitis for Dental Practitioners." *Journal of international oral health : JIOH* 7(5): 74–80. http://www.ncbi.nlm.nih.gov/pubmed/26028911%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC4441245.

Wu, Yang Che et al. 2016. "Hematinic Deficiencies and Anemia Statuses in Recurrent Aphthous Stomatitis Patients with or without Atrophic Glossitis." *Journal of the Formosan Medical Association* 115(12): 1061–68. http://dx.doi.org/10.1016/j.jfma.2016.10.007.

Zain, R. B. 2000. "Oral Recurrent Aphthous Ulcers/Stomatitis: Prevalence in Malaysia and an Epidemiological Update." *Journal of oral science* 42(1): 15–19.