

Food Intake Of Patients With Recurrent Aphthous Stomatitis In Indian Population - A Case Control Study

Research Article

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Abstract

Recurrent aphthous stomatitis (RAS) is one of the common lesions in the oral mucosa. Its prevalence varies among different populations with most of the cases RAS reported in females as compared to males. It is often described as a recurrent ulcer which tends to reappear following its healing after a period of time. Dietary habits are often associated with the onset and trigger episodes of recurrent aphthous stomatitis (RAS). The aim of this study is to evaluate the food intake of patients with recurrent aphthous stomatitis (RAS) and its effects on the development of the lesion. It is a retrospective study conducted by reviewing 86,000 patient case records of the Saveetha Dental College and Hospital, Chennai, India. A total of 152 consecutive case records of patients for a period of June 2019 to March 2020 with signed informed consent and with complete records were retrieved and analysed. Patient's age, gender, diet and presence of recurrent aphthous stomatitis (RAS) were collected from the patient's case records. The obtained data was analyzed using the SPSS version 23.0. Descriptive analysis was done for the assessment of age, gender and types of diet involved. Chi square test was used to evaluate the association of recurrent aphthous stomatitis (RAS) with age, gender and types of diet. Recurrent aphthous stomatitis (RAS) was observed in 76 individuals of this study. Among the individuals with recurrent aphthous stomatitis (RAS), the majority of them were present with mixed diet (49.34%) while only a small portion of them consume vegetarian diet (0.66%). Most of the recurrent aphthous stomatitis (RAS) cases involved individuals within the 21-30 years age group (21.05%) and those within the 1-10 and 71-80 years age group were the least affected (1.32%). Higher prevalence of recurrent aphthous stomatitis (RAS) is seen in males (33.55%) as compared to females (16.45%). There is a statistical association between recurrent aphthous stomatitis (RAS) and age but no association with gender and diet. Our study concluded that recurrent aphthous stomatitis (RAS) exhibits higher prevalence in males as compared to females. Age group of 21-30 years exhibited the highest incidence of recurrent aphthous stomatitis (RAS). Statistically significant association is present between recurrent aphthous stomatitis (RAS) and age but not for gender and diet.

Keywords: Aphthous Ulcer; Allergy; Dietary Habits; Food; Recurrent.

Introduction

Ulcer is often described as a well-circumscribed lesion with an epithelial defect covered in fibrin clot which gives a yellow-white appearance [1, 11]. Recurrent aphthous stomatitis is one of the common lesions in the oral mucosa [59, 30]. Its prevalence varies between 5-66% among different populations with most of the cases of recurrent aphthous stomatitis (RAS) reported in females as compared to males [53, 45, 16, 52]. Recurrent aphthous stoma-

titis (RAS) is often described as a recurrent ulcer which tends to reappear following its healing after a period of time [1, 28].

Several studies have reported on the possible factors that may trigger the episodes of recurrent aphthous stomatitis (RAS) which can be in the form of local, hematological, genetic, immunologic, nutritional, psychological and medication with stress being considered as the major causative agent of recurrent aphthous stomatitis (RAS). A complex interaction between genetic,

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nutritional and hematologic factors is believed to be responsible for the etiopathogenesis of recurrent aphthous stomatitis (RAS) [46, 50, 32].

Recurrent aphthous stomatitis (RAS) is usually observed in stages which include the ulcerative stage, healing stage and remission stage. It begins with the ulcerative stage which usually lasts for 3 to 7 days followed by the healing stage which is characterized by sudden reduction in pain and presence of granulations with less surface exudate[4]. Absence of ulcer is observed in the remission stage which can be triggered by factors such as dietary habits and premenstrual stage resulting in the recurrent phase of the ulcer [1]. A study on the factors associated with recurrent aphthous stomatitis (RAS) revealed stress as the most common factor, followed by nutritional deficiency [37]. Exposure to certain foods such as milk, gluten, chocolate, flavouring agents and preservatives are often associated with the onset of ulcers as described in previous studies [52, 26].

Successful treatment of recurrent aphthous stomatitis (RAS) highly depends on the proper diagnosis and treatment planning based on the need of each individual with recurrent aphthous stomatitis (RAS) [56, 31]. Patient's compliance and acceptance of the nature of recurrent aphthous stomatitis (RAS) are said to be very helpful in ensuring the success of the treatment [57, 58, 63]. Previously our team has a rich experience in working on various research projects across multiple disciplines.[23, 13, 24, 15, 35, 42, 21, 62, 36, 34, 49, 33, 20, 8, 40].Now the growing trend in this area motivated us to pursue this project. This study was done to evaluate the prevalence of recurrent aphthous stomatitis (RAS) and its association with individual's dietary habits.

Materials and Methods

A retrospective study was conducted by reviewing 86,000 patient case records of the Saveetha Dental College and Hospital, Chennai, India. In the study, 152 consecutive case records of patients for a period of June 2019 to March 2020 with signed informed consent were sorted. A total of two examiners were involved in this study. An effort had been made to confirm that the sorted case

records contained information of dietary intake. Prior permission use of the case records analysis was obtained from the institutional review board with the ethical approval number of SDC/SIHEC/2020/DIASDATA/0619-0320. An effort had been taken to confirm the case records of patients with ulcers other than recurrent aphthous stomatitis (RAS) were excluded on subjecting to selection criteria. Information on age, gender, type of diet and presence of recurrent aphthous stomatitis (RAS) were collected from the patient's records. Age of the patients were categorized for statistical convenience as 11-20, 21-30, 31-40, 41-50, 51-60, 61-70 and 71-80 years. Data was entered in Excel and analyzed using SPSS software version 23.0. Descriptive analysis was done to assess the prevalence of recurrent aphthous stomatitis (RAS) in age groups and gender. Chi-square test was used to evaluate the association of plaque index with age and gender. Significant level test was set such that $p < 0.05$ is considered significant.

Results & Discussion

A total of 152 consecutive case records were evaluated in this study. Presence of recurrent aphthous stomatitis (RAS) was recorded in 76 individuals of this study. Our present study shows there is a statistically significant association between recurrent aphthous stomatitis (RAS) and age ($p < 0.05$) but no association with the type of diet and gender ($p > 0.05$).The frequency distribution of patients' age groups in the case records includes 1-10 years (1.97%), 11-20 years (9.21%), 21-30 years (29.61%), 31-40 years (28.95%), 41-50 years (11.18%), 51-60 years (12.50%), 61-70 years (4.61%), 71-80 years (1.32%) and 81-90 years (0.66%). [Figure 1] Frequency distribution of gender among the patients include 94 males (61.84%) and 58 females (38.16%). The frequency distribution of the type of diet consists of mixed diet (96.71%) and vegetarian diet (3.29%).[Figure 3].

Our present study shows there is a statistically significant association between recurrent aphthous stomatitis (RAS) and age ($p < 0.05$) but no association with the type of diet and gender ($p > 0.05$). Similarly, a study by Leonardo et al., found a significant difference between the episodes of recurrent aphthous stomatitis (RAS) and age ($p = 0.037$) but not for gender ($p = 0.263$) [26]. A

Figure 1: Bar graph showing the frequency distribution of different age groups. X axis represents the age groups. Y axis represents the number of patients in each age group . The age groups in this study mainly consist of 21-30 years (29.61%), followed by 31-40 years (28.95%), 51-60 years (12.50%), 41-50 years (11.18%), 11-20 years (9.21%), 61-70 years (4.61%), 1-10 years (1.97%), 71-80 years (1.32%) and 81-90 years (0.66%).

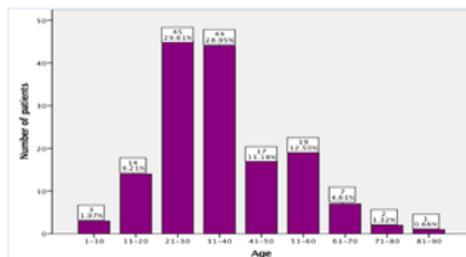


Figure 2: Bar graph showing the frequency distribution of genders. X axis represents genders. Y axis represents the number of patients of each gender with males (red) and females (Pink). Most of the patients in this study are males (61.84%) as compared to females (38.16%).

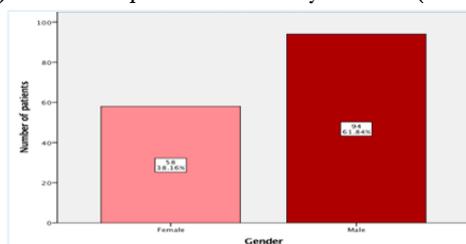


Table 1. Table representing association between recurrent aphthous stomatitis (RAS) based on diet, age group and gender.

Recurrent aphthous stomatitis (RAS)			
Variables	Present	Absent	Statistical value
	n (%)	n (%)	
Diet			Pearson Chi-Square = 1.861
Mixed	75 (49.34%)	72 (47.37%)	df = 1
Vegetarian	1 (0.66%)	4 (2.63%)	p-value = 0.172
Age			
1-Oct	2 (1.32%)	1 (0.66%)	Pearson Chi-Square = 20.707
Nov-20	9 (5.92%)	5 (3.29%)	df = 8
21-30	32 (21.05%)	13 (8.55%)	p-value = 0.008
31-40	16 (10.53%)	28 (18.42%)	
41-50	7 (4.61%)	10 (6.58%)	
51-60	5 (3.29%)	14 (9.21%)	
61-70	3 (1.97%)	4 (2.63%)	
71-80	2 (1.32%)	0 (0.00%)	
81-90	0 (0.00%)	1 (0.66%)	
Gender			Pearson Chi-Square = 1.784
Males	51 (33.55%)	43 (28.29%)	df = 1
Females	25 (16.45%)	33 (21.71%)	p-value = 0.182

Figure 3: Bar graph showing the frequency distribution of different types of diet. X axis represents types of diet. Y-axis represents the number of patients of each type of diet with a mixed diet (Brown) and vegetarian diet (Yellow). Majority of the patients in this study are present with a mixed diet (96.71%), followed by a vegetarian diet (3.29%).

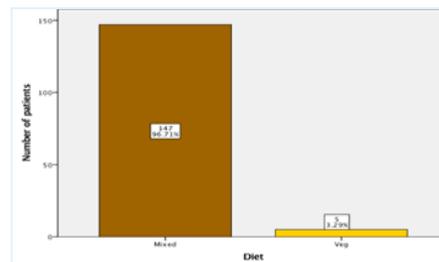


Figure 4: Bar graph showing the association between recurrent aphthous stomatitis (RAS) and its frequency among different types of diet. X axis represents the types of diet. Y axis represents the number of patients with recurrent aphthous stomatitis (Green) and without recurrent aphthous stomatitis (Blue). (Pearson Chi-Square value - 1.861; p= 0.172, p>0.05). There is no significant association between diet and recurrent aphthous stomatitis (RAS). Individuals with mixed diet (49.34%) are commonly affected by recurrent aphthous stomatitis (RAS) when compared to those with vegetarian diet (0.66%).

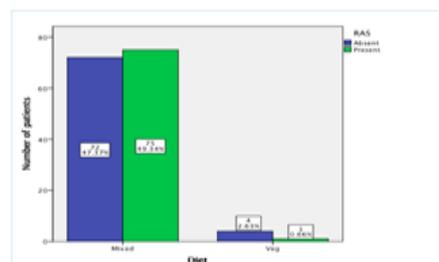


Figure 5: Bar graph showing the association between recurrent aphthous stomatitis (RAS) and its frequency among different age groups. X axis represents the age groups. Y axis represents the number of patients with recurrent aphthous stomatitis (Green) and without recurrent aphthous stomatitis (Blue). (Pearson Chi-Square value - 20.707; p= 0.008, p<0.05). There is a significant association between age and recurrent aphthous stomatitis (RAS). Most of the patients with recurrent aphthous stomatitis (RAS) are within the 21-30 years age group (21.05%).

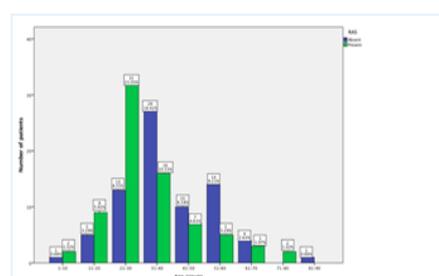
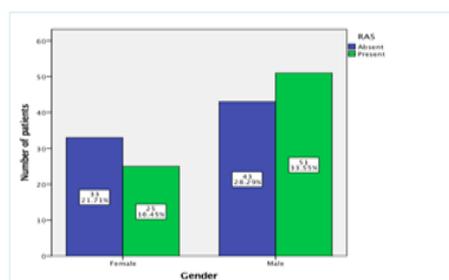


Figure 6: Bar graph showing the association between recurrent aphthous stomatitis (RAS) and its frequency among genders. X axis represents the genders. Y axis represents the number of patients with recurrent aphthous stomatitis (Green) and without recurrent aphthous stomatitis (Blue). (Pearson Chi-Square value - 1.784; $p=0.182$, $p>0.05$). There is no significant association between gender and recurrent aphthous stomatitis (RAS). Recurrent aphthous stomatitis (RAS) is commonly seen in males (33.55%) as compared to females (16.45%).



previous study also reported that there is no relation between recurrent aphthous stomatitis (RAS) and gender [6].

Among the individuals with recurrent aphthous stomatitis (RAS), the majority of them were present with mixed diet (49.34%) while only a small portion of them consume vegetarian diet (0.66%). [Figure 4] Based on a study by Leonardo et al., diet is the most frequently mentioned risk factor (28.2%), followed by injuries (19.2%) and stress (10.5%) [26]. A previous report stated that vegetables might prevent recurrent aphthous stomatitis (RAS) by increasing the serum levels of zinc (Zn) and selenium (Se), which are reported to be low in most patients and highly associated with immunity and oxidative stress [27]. In a case report, a patient with recurrent aphthous stomatitis (RAS) was advised to consume diet with green vegetables and non-spicy food [22]. A previous study specifically described that recurrent aphthous stomatitis (RAS) is triggered by consumption of gluten rich food (80%) and spicy foods (100%) in all the participants in their study [25]. Several studies mentioned that the remission of recurrent aphthous stomatitis (RAS) may occur with gluten-free diet with numerous studies suggesting that foods such as milk protein can increase the risk of recurrent aphthous stomatitis (RAS) while diet containing vitamin B12 and folic acid can reduce the occurrence of recurrent aphthous stomatitis (RAS) [19, 3]. Previous studies also reported high prevalence of recurrent aphthous stomatitis (RAS) in those with frequent consumption of sweet drinks, carbonated beverages and fried foods, in which intake of sweet and acidic substances leads to changes in pH of the mouth which triggers recurrent aphthous stomatitis (RAS) [12, 18]. It has been discussed that diet is the most frequently mentioned risk factor by the patients with acid foods being reported to be statistically significant for the development of the lesions and this finding is in line with the studies that found the presence of allergies or sensitivity to foods or tissue irritation from certain substances are closely related to the occurrence of recurrent aphthous stomatitis (RAS) [26, 47].

Most of the recurrent aphthous stomatitis (RAS) cases involved individuals within the 21-30 years age group (21.05%) and those within the 1-10 and 71-80 years age group were the least affected (1.32%). [Figure 5] A previous study by Rajmane et al., reported a high prevalence of recurrent aphthous stomatitis (RAS) in the second and third decades of life (56.9%) while the least number of recurrent aphthous stomatitis (RAS) cases is observed in the fifth and sixth decades of life (5.6%) with the peak age of onset usually in the second decade [1, 9]. The study also mentioned that the prevalence of recurrent aphthous stomatitis (RAS) decreases with the increase in age and this finding is in accordance with previous reports. [37, 10, 38]. Previously, it was reported that the

majority of recurrent aphthous stomatitis (RAS) patients are individuals within the 21-40 year-old group (59.3%) [26]. Studies have shown a general trend of low prevalence of recurrent aphthous stomatitis (RAS) in the first decade with an increase in its prevalence among individuals within the second and third decades. Previous studies have also reported on the tendency of recurrent aphthous stomatitis (RAS) incidence to decrease following the third decades of life [1]. A study by Chavan et al., stated that the peak onset of recurrent aphthous stomatitis (RAS) is between 10-19 years before becoming less frequent with advancing age [7].

Higher prevalence of recurrent aphthous stomatitis (RAS) is seen in males (33.55%) as compared to females (16.45%) among the affected patients. Similarly, several studies reported a high prevalence of recurrent aphthous stomatitis (RAS) among males without statistical significance [45]. However, a previous study revealed a higher prevalence of recurrent aphthous stomatitis (RAS) in females (62.5%) as compared to males (37.5%) [1]. A prospective study also stated that there is a higher prevalence of recurrent aphthous stomatitis (RAS) in females (56.3%) than males (43.7%) [37]. Similar findings are seen in other reports revealing a female predilection (57.2%) and Leonardo et al., which mentioned high prevalence of recurrent aphthous stomatitis (RAS) among females (53.3%) [26, 7]. Male predilection for recurrent aphthous stomatitis (RAS) can be associated with factors such as socioeconomic level, lifestyle and tobacco usage which tend to reduce their psychological stress [26, 63]. In relation to female predisposition to recurrent aphthous stomatitis (RAS), some studies have suggested that this association is related to the hormonal rates [54]. The incidence of recurrent aphthous stomatitis (RAS) is related to the luteal phase of the menstrual cycle and also a decrease in its incidence during pregnancy, thus relating the episodes of recurrent aphthous stomatitis (RAS) to progesterone levels [17, 2, 53]. Our institution is passionate about high quality evidence based research and has excelled in various fields [39, 4, 3, 61, 14, 41, 55, 60, 5, 29, 44, 48]. We hope this study adds to this rich legacy.

Limitations

The present study had few limitations of study design. Since it is a retrospective study, follow up of subjects was not possible to extrapolate the study results. This study also failed to assess the other confounding variables such as education, socioeconomic status and habits of the patients. Further prospective study including all possible factors for recurrent aphthous stomatitis (RAS) has to be investigated to prove the hypothesis.

Future Scope

Recurrent aphthous stomatitis (RAS) is a common inflammatory ulcerative lesion in the oral mucosa characterized by recurring painful, single or multiple, shallow and round ulcers in the oral mucosa. Further advancement in diagnosis and newer preventative measures are believed to be helpful in providing the basis for treatment of recurrent aphthous stomatitis (RAS) for clinical guidance.

Conclusion

Within the limits of the present study, recurrent aphthous stomatitis (RAS) exhibits higher prevalence in males as compared to females. Age group of 21-30 years exhibited the highest incidence of recurrent aphthous stomatitis (RAS). No association between age, gender, type of diet and prevalence of recurrent aphthous stomatitis (RAS).

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