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# Prevalence and Age Related Risk of Three Clinical Variants of Aphthous Stomatitis: a Retrospective Study

**Kethiswar Raj[1], Jayanth Kumar Vadivel[2], Vinay Sivaswamy[3]**

*[1]Research Associate, Dental Research Cell, [2]Reader, Department of Oral Medicine and Radiology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical & Technical Sciences, [3]Senior Lecturer, Department of Prosthodontics and Implantology*

## Abstract

Aphthous stomatitis is one of the most common conditions characterized by the repeated formation of benign and mouth ulcers (aphthae) in otherwise healthy individuals. The informal term canker sores is also used, mainly in North America, although this may also refer to any mouth ulcers. The case records of patients with aphthous stomatitis were assessed. The age, gender and the variant of aphthous stomatitis were recorded. The association between the gender and the variant of apthous stomatitis was assessed by chi-square test. Following the data tabulation in excel, the statistical analysis was done with SPSS.A total of 84 patients in the age range between 6 years to 73 years were recorded. From the collected data it was observed that 69% of the samples were males and 31% were females. The most common variant noted was the minor aphthous stomatitis. There was no association between the age and the occurrence of aphthous stomatitis($P>0.05$) but there was a positive correlation between the gender and clinical variant.($P<0.05$) Hence from the study it was concluded that age is not a risk factor for the development of aphthous stomatitis but males were more commonly affected.

***Keywords:*** *Aphthous stomatitis; Minor aphthous stomatitis; major aphthous stomatitis; herpetiform aphthous stomatitis; age; canker sores*

## Introduction

Aphthous stomatitis is one of the most common conditions characterized by the repeated formation of benign and mouth ulcers (aphthae) in otherwise healthy individuals. The informal term canker sores is also used, mainly in North America, although this may also refer to any mouth ulcers.[1]The etiology of the disease is not clearly understood, although an immune mediated response is seen. Among the several etiological factors pointed out a few that are well established are nutritional deficiencies, hormonal changes,allergies and a genetic predisposition. Invariably stress is implicated as a major trigger factor in the causation of aphthous stomatitis. There have been numerous cases where aphthous stomatitis has been recorded in patients during the time of examinations.[2]

These ulcers have an episodic pattern of occurrence, healing and recurring. Clinically the ulcers are classified into three major subtypes namely, minor, major and herpetiform. Irrespective of the types all the ulcers occur in the non-keratinised mucosa with the buccal and labial mucosa being the most commonest sites. The minor ulcers are small with size being less than 1 cm and heals without scarring in less than a week. The major ulcers are larger than 1 cm and heals with scarring in a span of 20 days. The herpetiform aphthous occurs in crops of ulcers and heals in a weeks time.[3]

Patients with aphthous stomatitis usually exhibit no systemic symptoms or signs.There may be prodromal

**Corresponding author**
**Jayanth Kumar Vadivel,**
Reader, Department of Oral Medicine and Radiology,
Saveetha Dental College and Hospitals,
Saveetha Institute of Medical & Technical Sciences,
Chennai, Tamil Nadu, India -600 077
E- mail: jayanthkumar@saveetha.com

symptoms such as burning, itching, or stinging,, which is often out of proportion to the extent of the ulceration. The pain with the ulceration may be worsened by physical contact, especially with certain foods and drinks. The pain is high in the initial days of formation of the ulcer and recedes as the ulcer heals. Lesions in the tongue have an impact on speaking and chewing which can be uncomfortable. The ulcers in the soft palate, back of the throat cause painful swallowing.[4]

The overall prevalence of the condition is 20% when compared to the general population with the onset in childhood or adolescence. The condition has a tendency to occur several times before gradually disappearing.. The ulcers typically begin as erythematous macules which develop into ulcers. The ulcers are covered with a yellow-grey fibrinous membrane that can be scraped away and surrounded by a reddish "halo". The size, number, location, healing time and periodicity between episodes of ulcer formation are dependent upon the subtype of aphthous stomatitis.[5]The treatment options have ranged from the use of topical anesthetics for the control of pain to corticosteroids.[6] Apparently corticosteroids are used in the management of several immune mediated conditions.[7,8]

Aphthous stomatitis has been associated with several other autoimmune diseases, namely systemic lupus erythematosus and inflammatory bowel diseases.[9] No clear reason could be established for this association.[5] Though the presence of ulcers in the oral cavity is a cause of concern, this ulcer has no malignant transformation potential. [10] Through genetic changes have been observed in the saliva of the patients, there is no malignant transformation potential.[11] Apparently aphthous ulcers are seen in patients with poor oral hygiene.[12,13] Several reports point to the fact of using nutritional supplements in the usage of management of aphthous stomatitis.[14]

The aim of this study is to assess the age and gender prevalence of apthous stomatitis.The objective of this study is to improve the evidence for improved understanding of the disease and plan further research and improve patient care.

## Materials and Methods

The archived patient records of the department of Oral Medicine and Radiology, Saveetha Dental College were collected and the data was assessed from the time period of June 2019 - April 2020. The total patients who had visited the Dental College during this time period was 86000 and cases of aphthous stomatitis were identified and segregated. Ethical clearance was obtained from the Institutional Ethics Committee of Saveetha Dental College. The main advantages of this study were that the data was all prevalidated and the main disadvantages were that it was an unicentric study and only a single ethnicity of the population was studied.

The patient data were picked up from the case sheets and the variables recorded were the age, gender and clinical variant of aphthous stomatitis. The case sheets were reviewed by two observers. The random case sheets were verified by telephonic conversations with the patient.

The internal validity of the study was established as the data was collected from a verifiable and standardised database. The external validity is established as the data is from a clinical setup which is duplicatable.

Finally, after gathering proper information about aphthous stomatitis, the data was tabulated in Microsoft excel sheet. During analysis of the collected data, the independent variables were age, gender and dependent variable was the variant of aphthous stomatitis. Data was analysed using SPSS version24 and chi square test was done to check the association and a p value $< 0.05$ was said to be significant.

## Results & Discussion

The study had a total of 86 patients with aphthous stomatitis were recorded during the aforementioned time period giving a prevalence percentage of 1.5% among the total case sheets reviewed. The case sheets of 2 patients had discrepancies and the case sheets were eliminated from the study and the final sample size was 84. The age range of the patients was from 6 to 73 years, with a mean age of 31.95 years. The graph in Fig1 shows the age distribution of patients, divided into smaller groups where 21-40 had the highest number of patients. A gender based distribution of the disease shows the males were most commonly affected.Fig 2. Analysing the age and the occurrence of apthous stomatitis it was found that minor was the predominant type in all age groups but it

was not statistically significant(P>0.05)Analysing the Clinical variants of aphthous stomatitis shows that the most common type of aphthous stomatitis was minor aphthous stomatitis 91.7%, followed by major aphthous stomatitis 7.1% and herpetiform 1.2%. An association between the gender and the clinical variant of apthous stomatitis reveals that in minor apthous 52 patients were males while only 25 were females. In the major variant 5 were males and 1 female patient was recorded. In herpetiform variant only 1 male patient was seen. A chi-square analysis reveals males were the most commonly affected gender.(P<0.05) Fig 4

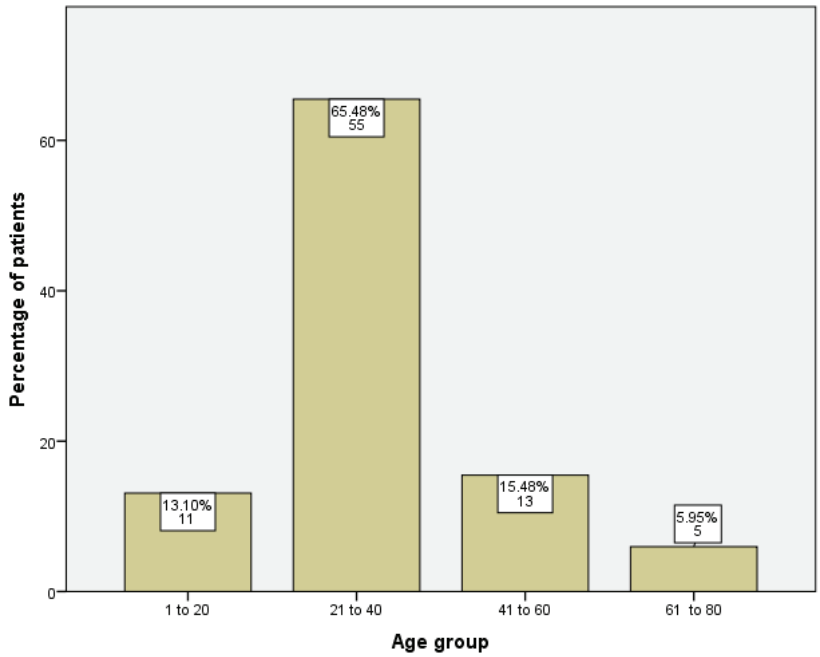


**Figure 1: Graph showing the age distribution of patients.x-axis gives the age and y-axis gives the percentage The maximum number of cases were seen in the age range of 21-40 years. The mean age of the sample was 31.95 years.**

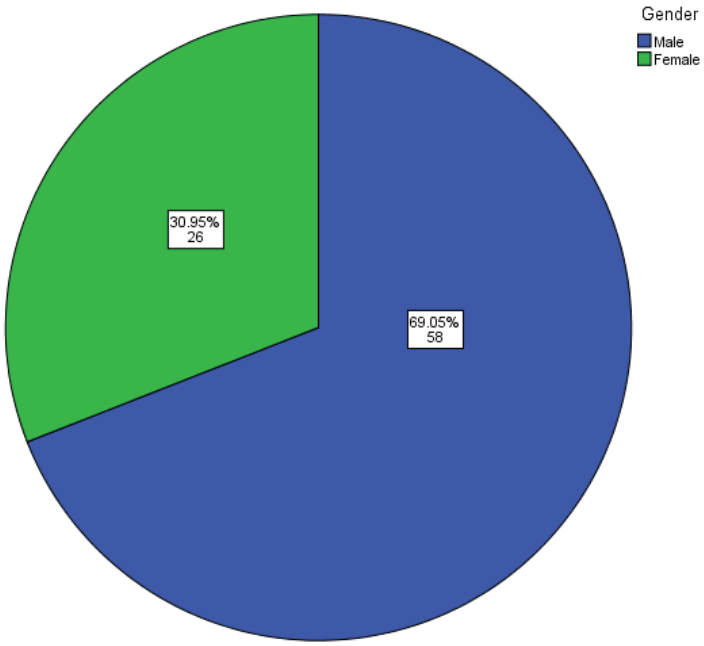


**Fig 2: Pie chart showing the gender distribution of patients. Blue colour represents the males and the group had 58 patients while green represents the females which contained 26 patients.**

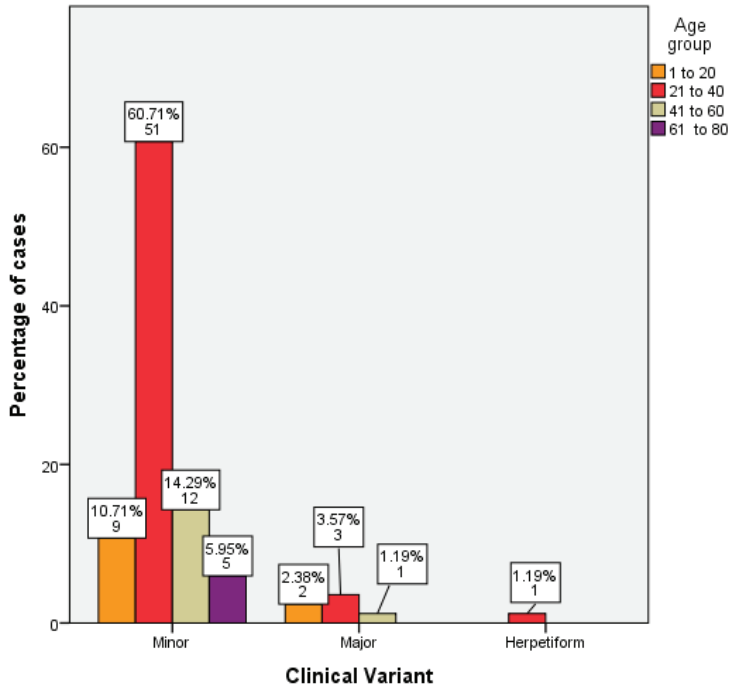


**Fig 3: This Clustered bar graph represents the association between the percentage of patients according to the clinical variant and the age group. X axis represents the variants and Y axis represents the percentage. The orange colour represents the age group 1-20, red colour represents 21-40, beige colour represents 41-60 and purple represents 61-80. The age group of 21-40 had the highest number of patients(55), in which 51 were minor apthous, 3 major apthous and 1 herpetiform apthae. When the association between the variants and the age group was assessed, (chi square -3.279 , df-6, p-0.07 (p>0.05)) implying the age was not associated with the development of apthous stomatitis**

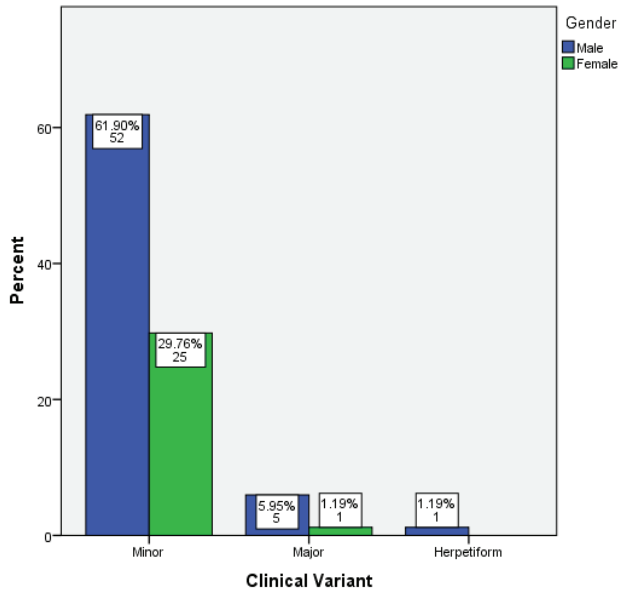


**Fig 4: This Clustered bar graph represents the association between the number of patients according to the clinical variant and the gender. X axis represents the variants and Y axis represents the percentage. The blue colour represents the males and green colour the females. The minor variant had a total of 77 patients, major had 6 patients, and1 patient with herpetiform variant. Chi square test was done and it was found to be statistically significant (chi square value- 1.104, df -2;p-0.034). Males had a higher prevalence of apthous stomatitis.**

Aphthous Stomatitis is the most common and painful ulcerative condition occurring in the oral cavity. The amount of pain as quantified by the pain measuring scales like visual analogue scale, numerical rating scale reveals that the intensity of pain is much higher compared to the size of the ulcer. Though clinically there are three types of ulcers, the most commonest presenting variant is the minor aphthous stomatitis also known as stress ulcers. [15] Our study also shows that minor aphthous stomatitis is the most commonest variant of apthous ulcer.

There are several episodes of ulcer occurring. With severe disease there is virtually constant ulceration and may cause debilitating chronic pain and interfere with comfortable eating. In severe cases, this prevents adequate nutrient intake leading to malnutrition and weight loss.[15,16]The reason is not fully clear, but it is thought to be multifactorial. Aphthous stomatitis is not a single entity but rather a group of conditions with various causes. There have been several attempts to identify the causative organisms but have gone in vain. But aphthous stomatitis appears to be non-contagious, non-infectious, and not sexually transmissible. The mucosal destruction is thought to be the result of a T cell mediated immune response which involves the generation of interleukins and tumor necrosis factor alpha. Mast cells and macrophages are also involved, secreting TNF-α along with the T cells. When early aphthous ulcers are biopsied, the histologic appearance shows a dense inflammatory infiltrate, 80% of which is made up of T cellsPersons with aphthous stomatitis also have circulating lymphocytes which react with peptides 91–105 of heat shock protein 65–60, and the ratio of CD4+ T cells to CD8+ T cells in the peripheral blood of individuals with aphthous stomatitis is decreased.[5]

In a study in the Swedish population, it was shown that aphthous ulcers commonly occurred in the high school and young college students which primarily means it is a disease seen in the second and third decade of life.However the study did not mention of the type of aphthous ulcers noted in the sample. The ulcers occurring in this age group self healed in about 5-8 days time which means that the ulcers belonged to the minor aphthous stomatitis.[17] The study findings are almost matching the results of our study were the minor variant of apthous seems to be the most common variant.

In an epidemiologic study analysing 20,333 people the incidence of aphthous stomatitis was 1.7%. [17] This study results are in line with the results obtained in our study. Further the study had also shown that there was a decrease in the incidence of aphthous ulcers in patients who were smokers. Our study results also seem to be matching the results of the study. The reason for the decrease in the incidence of aphthous stomatitis in smokers is due to the increased keratinization of the mucosa which renders the tissues more resilient to aphthous stomatitis.[18] There have been reports of aphthous ulcerations co-existing with other oral potentially malignant disorders.[19]

Gurkan et al. in 2015 had analysed case records from 2008 to 2019 of pediatric patients and had reported that 120 patients below the age of 18 years had developed the disease.The mean age in his exclusive pediatric study was 9.6 years. The mean duration of the disease as aphthous stomatitis has a tendency to occur, heal and recur was 3.6 years. His study also had shown that minor aphthous stomatitis was the most commonest variant. Their study had reported a significant association between aphthous stomatitis and some systemic problems. The most commonest treatment used in their study was the usage of topical anesthetics. Topical corticosteroids was the second most commonest drug used in the management of aphthous stomatitis.[20] The occurrence of minor aphthous as the commonest variant is relatable to our study where we have also arrived at the similar finding.

Most studies had reported that topical anesthetics were the commonest drugs used in the management of aphthous stomatitis, however topical steroids have been used in the management of major aphthous stomatitis. Nevertheless, corticosteroids are used in the management of immune mediated disorders to reduce the inflammation.[7,8] Apart from this several studies had pointed that the usage of nutritional supplements like Vitamin C and B complex also have a protective role in the management of aphthous stomatitis.[21] There have been no malignant transformations reported in aphthous.

Though this study is done from an Institutional database which may show that the data is from a single centre, there have been several case series and studies in the past published from this database which have proved the versatility and the high usefulness of the data set.[22–25]

## Conclusion

In conclusion it is established that aphthous ulcers are one of the most common ulcers of the oral cavity which do not have any malignant transformation potential.Further the most common variant of apthous ulcer is the minor variant of apthous ulcer. Though a majority of cases of aphthous ulcers are seen in the second and third decade of life, our study results as well as literature evidence are unable to predict any sort of an association between age and apthous ulcer. However significantly a higher prevalence of apthous ulcer were seen in the males. The need of the hour would be to develop newer drugs which could probably reduce the recurrence potential of the disease.

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