



Prevalence of Recurrent Aphthous Ulcer and Its Various Etiological Factors among Young Adults of Kerala

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ABSTRACT

AIM:To assess the prevalence of recurrent aphthous ulcer among young adults and the relation with stress as an etiological factor.

METHODOLOGY:A questionnaire based cross sectional survey was conducted among the young adults of Kerala. The survey was conducted online through the medium of Google forms. The data obtained were analysed using descriptive statistics and association among the variables were done using Chi square test.

RESULT:The life time prevalence of recurrent aphthous ulcer among the 211 adults of Kerala was found to be 89.1%. 37.9% had the cheek as the common site of occurrence of RAS .64.9% participants had a positive family history.

CONCLUSION:The prevalence of RAS was found to be 89.1% among the adults of Kerala. The most common site of occurrence of recurrent aphthous stomatitis (RAS) was cheek and there exist a correlation between family history and aphthous ulcer. We found that stress, habits, gastrointestinal diseases had no correlation with prevalence of RAS.

I. INTRODUCTION

Recurrent aphthous stomatitis is the most common ulcerative disease of oral mucosa, presenting as painful round, shallow ulcers with well-defined erythematous margin and yellowish – grey pseudomembranous center[1]. Stanley classified RAS into three types; minor, major and herpetiform ulcers. 80% of RAS are minor. Major aphthous ulcers [10-15% of RAS] are larger than minor ones [$>1\text{cm}$][2]. The etiology of RAS is uncertain, and both environmental and genetic factors are indicated. Precipitating factors include stress, physical or chemical trauma, infection, allergy, genetic predisposition or

nutritional deficiencies[3]. RAS is a frequent pathologic situation mainly differentiated by repetitive occurrence of benign and non-contagious oral ulceration[4]. A variety of studies had found a correlation between RAS - stress, gastrointestinal diseases and dietary habits[5,6,7]. Hence the present investigation intended to determine the prevalence of recurrent aphthous ulcers and its various etiological factors among young adults.

II. MATERIALS AND METHODOLOGY

This is a questionnaire based cross sectional study conducted during October 2022 to November 2022. The participants were selected using convenience sampling.

INCLUSION CRITERIA

The study was conducted among the young adults of Kerala, India. The questionnaire was sent to 211 young adults aged between 18-26 years.

EXCLUSION CRITERIA

Participants who did not consent to the survey were excluded from the survey

III. METHODOLOGY

A cross sectional survey was conducted among the selected study population. The survey was conducted online through the medium of Googleforms. "PREVALENCE OF RECURRENT APHTHOUS ULCER AND ITS VARIOUS ETIOLOGICAL FACTORS AMONG YOUNG ADULTS OF KERALA" (google.com). A questionnaire consisting of a total of 50 questions, including the demographic details as well as question pertaining to the knowledge and awareness about recurrent aphthous ulcer and its various etiological factors was prepared.



The questionnaire was distributed among the participants by means of email and various social media platforms including WhatsApp and Telegram. Informed consent was taken from all the participants at the beginning of the survey. The participants were asked to choose an appropriate response to each question from the set of options provided below. Data was collected from the recorded response.

IV. STATISTICAL ANALYSIS

Collected data was analysed using SPSS software version 25.0. The data was analysed using descriptive statistics and association among the variables were done using Chi square test.

V. RESULT

The study was completed with 211 responses, of which 93.45% responses were recorded from the age group 20-26 while 6.2% of people belong to 18-20 age groups as given in figure 1.

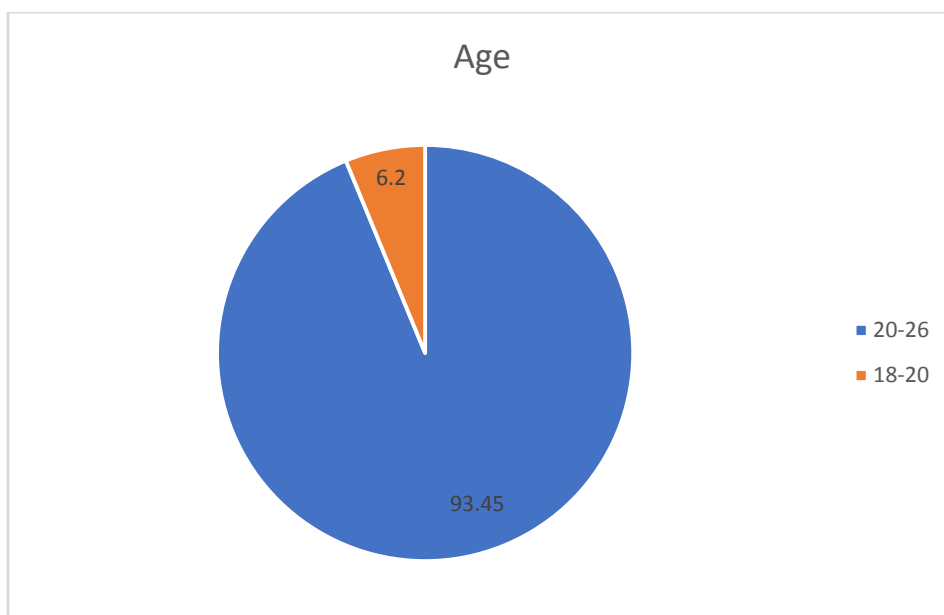


FIGURE 1: FREQUENCY OF AGE DISTRIBUTION

Figure 2 shows that 75.8% of respondents were female and 23.7% were male

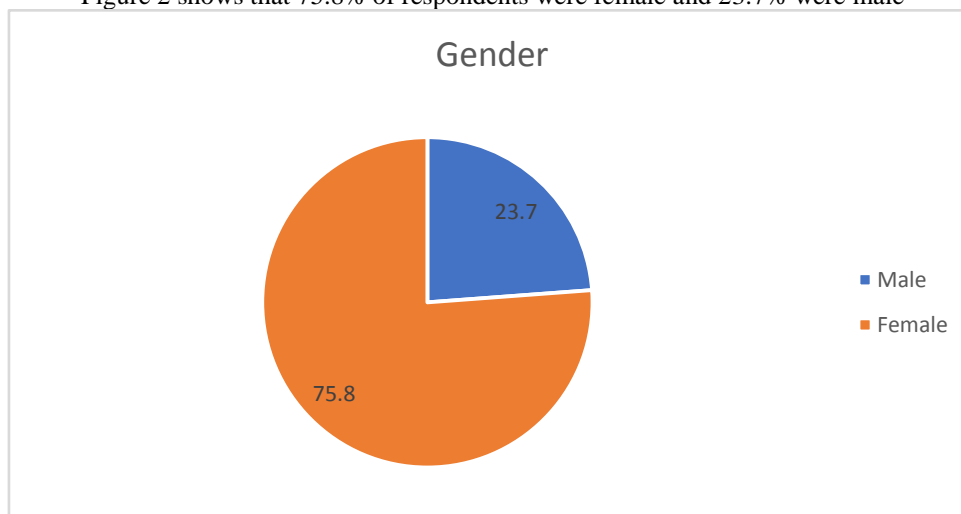


FIGURE 2: FREQUENCY OF GENDER DISTRIBUTION



Figure 3 shows that 73.5% were undergraduates (level 5 and 6), 15.6% were postgraduates (level 7), 10% were intermediates (level 3) and 0.5% represents others (level 4 and 5)[11]

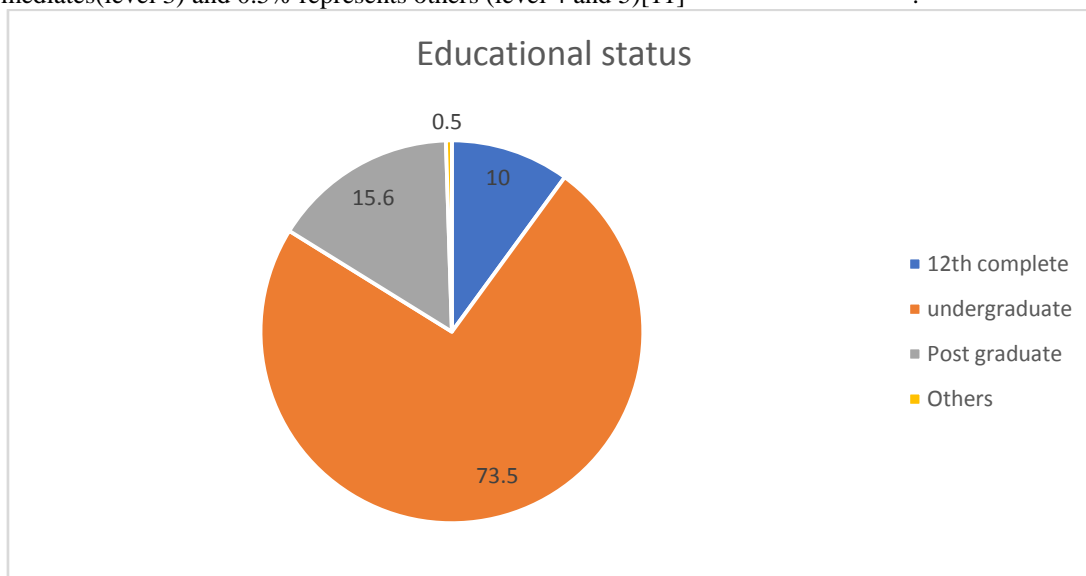


FIGURE 3: FREQUENCY OF EDUCATIONAL STATUS

SLNO			Frequency	Percentage
1	Have you ever experienced mouth ulcers?	No	22	10.4
		Yes	188	89.1
2	How frequently does the ulcer occur?	Rarely	120	56.9
		Occasionally	69	32.7
		Very often	21	10.0
3	Number of ulcers in each episode?	One	153	72.5
		Two	47	22.3
		More than two	10	4.7
4	How long does each episode of ulcer last?	Two days	49	23.2
		Four days	107	50.7
		One week	54	25.6
5	The common site where it occurs	Cheek	80	37.9
		Lower lip	71	33.6
		Base of the tongue	11	5.2
		Floor of the mouth	4	1.9



		Combined	44	20.9
6	Size of the ulcer	Less than 1cm	171	81
		1cm	37	17.5
		More than 1cm	2	0.9
7	Do you take treatment following an ulcer	No	126	59.7
		Yes	84	39.8
8	If yes, what is the mode of treatment	Topical gel	43	20.4
		Saline gargle	43	20.4
		Vitamin B12	32	15.2
		No treatment	92	43.6
9	The color of the ulcer	Red	88	41.7
		Pale pink	98	46.4
		Yellowish	24	11.4
10	Does your family members have similar experience	No	73	34.6
		Yes	137	64.9
11	Have you experienced any of the following during or prior to an episode	Infection	19	9
		Malodour	8	3.8
		Gastrointestinal problems	32	15.2
		Dental problems	32	15.2
		Not experienced	119	56.4
12	Are you suffering from any medical condition	No	191	90.5
		Yes	19	9
13	If yes, specify	No	192	91
		Yes	18	8.5



14	Are you taking any medication	No	194	92.4
		Yes	16	7.6
15	If yes specify	No	198	93.8
		Yes	11	5.2
16	Have you been diagnosed with gastrointestinal diseases such as gastritis, gastric ulcer and enteritis etc.	No	181	85.8
		Yes	29	13.7
17	Did you have a burning sensation in the mouth	No	187	88.6
		Yes	23	10.9
18	Have you experienced pain associated with the ulcer	No	66	31.3
		Yes	144	68.2
19	Do you have any kind of habits?	Tobacco chewing	0	0
		Smoking	6	2.8
		No habits	204	96.7
20	In your own situation, which food would trigger or aggravate the ulcers?	Spicy food	83	39.3
		Pickle	31	14.7
		Soft drinks	6	2.8
		Citrus fruits	11	5.2
		Brushing	37	17.5
		Others	42	19.9

TABLE 1: FREQUENCY AND VARIABLES

The study was conducted among 211 young adults of Kerala, India who had experienced oral ulcerations. Majority of the participants (56.9%) experienced ulcers rarely whereas only 10% of the participants experienced the ulcer very often. Ulcer was reported to be present for a duration of around 4 days by 50% participants. Predominant area of occurrence was cheek (37.9%) followed by lower lip, base of the tongue, floor of the mouth and a combination of these. Majority of the participants reported that the size of the ulcer

they experienced was of size less than 1 cm and was red in color. Most of them did not take any medications (59.7). A positive family history was given by 64.9% participants. More than half of them (56.4%) reported no signs of malodor, gastrointestinal problems or dental problems during or prior to the episode of an ulcer and History of any medical conditions were given only by around 10% participants. Pain (68.2%) was the main symptom reported by the them followed by burning sensation. Majority (96.7%) of them also responded



that they were not exposed to tobacco in any form.
Spicy food was considered as an aggravating factor

of ulcer by 39.3% participants.

TABLE 2: COMPARISON BETWEEN AGE AND APTHOUS ULCER

		AGE		P VALUE
		<20	>20	
Have you ever experienced mouth ulcers?	No	15.4%	84.6%	P=0.551
	Yes	10.2%	89.8%	
How frequently does the ulcer occur?	Very often	46.2%	57.9%	P= 0.262
	Occasionally	30.8%	33%	
	Rare	23.1%	9.1%	
Number of ulcers in each episode?	One	53.8%	74.1%	P=0.281
	Two	38.5%	21.3	
	More than two	7.7%	4.6%	
How long does each episode of ulcer last?	Two days	15.4	23.9	P=0.765
	Four days	53.8	50.8	
	One week	30.8	25.4	
The common site where it occurs	Cheek	30.8	38.6	p=0.007*
	Lower lip	23.1	34.5	
	Base of the tongue	7.7	5.1	
	Floor of the mouth	15.4	1.0	
	Combined	23.1	20.8	
Size of the ulcer	Less than 1cm	69.2	82.2	P=0.418
	1cm	30.8	16.8	
	More than 1cm	0.0	1.0	
Do you take treatment following an ulcer	No	53.8	60.4	P=0.640
	Yes	46.2	39.6	
If yes, what is the mode of treatment	Topical gel	38.5	19.3	P=0.218
	Saline gargle	23.1	20.3	
	Vitamin B12	0.00	16.2	
	No treatment	38.5	44.2	
The color of the ulcer	Red	30.8	42.6	P=0.539
	Pale pink	61.5	45.7	
	Yellowish	7.7	11.7	
Does your family members have similar experience	No	38.5	34.5	P=0.772
	Yes	61.5	65.5	
Have you experienced any of the following during or prior to an episode	Infection	0.0	9.6	P= 0.666
	Malodour	7.7	3.6	
	Gastrointestinal problems	23.1	14.7	
	Dental problems	15.4	15.2	
	Not experienced	53.8	56.9	
Are you suffering from any medical condition	No	100.0	90.4	P=0.240
	Yes	0.0	9.6	
If yes, specify	No	100.0	90.9	P=0.254



	Yes	0.0	9.1	
Are you taking any medication	No	100.0	91.9	P=0.285
	Yes	0.0	8.1	
If yes specify	No	100.0	94.4	P=0.380
	Yes	0.0	5.6	
Have you been diagnosed with gastrointestinal diseases such as gastritis, gastric ulcer and enteritis etc.	No	84.6	86.3	P=0.865
	Yes	15.4	13.7	
Did you have a burning sensation in the mouth	No	92.3	8.8	P=0.698
	Yes	7.7	11.2	
Have you experienced pain associated with the ulcer	No	38.5	31	P=0.573
	Yes	61.5	69	
Do you have any kind of habits?	Tobacco chewing	0.0	0	P= 0.523
	Smoking	0.0	3.0	
	No habits	100	97	
In your own situation, which food would trigger or aggravate the ulcers?	Spicy food	30.8	40.1	P=0.787
	Pickle	15.4	14.7	
	Soft drinks	0.0	3.0	
	Citrus fruits	0.0	5.6	
	Brushing	23.1	17.3	
	Others	30.8	19.3	

From the data, it is evident that participants within the age group 21-26(89.8%) experienced ulcers the most. 57.9% among them reported that they experienced ulcers very often. Predominant site of occurrence reported was cheek (38.6%) with a significant difference p= 0.007.

82.2% among them reported that they experienced ulcers which was less than 1 cm in size and 60.4% of them did not take any medications for the same. Positive family history was given by 69% participants in this age group. Pain being the

most common reported symptom by 69% participants was followed by burning sensation. Majority (86.3%) participants responded that they had no gastrointestinal diseases.40.1% participants reported that their ulcer aggravated on eating spicy food.

Within a age limit of 18-20, 53.8% participants experienced ulcers for a duration of four days.92.3% didn't experience any pain during the episodes and 100% participants responded that they don't have any smoking or tobacco chewing habits.

TABLE 3 SHOWS COMPARISON BETWEEN GENDER AND MOUTH ULCER.

		SEX		P value
		Male	Female	
Have you ever experienced mouth ulcers?	No	18.0	8.1	P=0.047
	Yes	82.0	91.9	



How frequently does the ulcer occur?	Very often	66.0	54.4	P=0.291
	Occasionally	24.0	35.6	
	Rare	10.0	10.0	
Number of ulcers in each episode?	One	82.0	70	P=0.235
	Two	14.0	25	
	More than two	4.0	5	
How long does each episode of ulcer last?	Two days	32.0	20.6	P=0.104
	Four days	52.0	50.6	
	One week	16.0	28.7	
The common site where it occurs	Cheek	38.0	38.1	P=0.157
	Lower lip	34.0	33.8	
	Base of the tongue	6.0	5.0	
	Floor of the mouth	6.0	0.6	
	Combined	16.0	22.5	
Size of the ulcer	Less than 1cm	92.0	78.1	P=0.001
	1cm	4.0	21.9	
	More than 1cm	4.0	0.0	
Do you take treatment following an ulcer	No	66.0	58.1	P=0.321
	Yes	34.0	41.9	
If yes, what is the mode of treatment	Topical gel	22.0	20.0	P=0.446
	Saline gargle	22.0	20.0	
	Vitamin B12	8.0	17.5	
	No treatment	48.0	42.5	
The color of the ulcer	Red	48.0	40.0	P=0.184
	Pale pink	36.0	50.0	
	Yellowish	16.0	10.0	
Does your family members have similar experience	No	50.0	30.0	P=0.010
	Yes	50.0	70.0	
Have you experienced any of the following	Infection	10.0	8.8	P=0.555
	Malodour	4.0	3.8	
	Gastrointestinal problems	14.0	15.6	



during or prior to an episode	Dental problems	8.0	17.5	
	Not experienced	64.0	54.4	
Are you suffering from any medical condition	No	96.0	89.4	P=0.154
	Yes	4.0	10.6	
If yes, specify	No	98.0	89.4	P=0.057
	Yes	2.0	10.6	
Are you taking any medication	No	94.0	91.9	P=0.621
	Yes	6.0	8.1	
If yes specify	No	98.0	93.7	P=0.236
	Yes	2.0	6.3	
Have you been diagnosed with gastrointestinal diseases such as gastritis, gastric ulcer and enteritis etc.	No	94.0	83.8	P=0.067
	Yes	6.0	16.3	
Did you have a burning sensation in the mouth	No	92.0	88.1	P=0.444
	Yes	8.0	11.9	
Have you experienced pain associated with the ulcer	No	38.0	29.4	P=0.251
	Yes	62.0	70.6	
Do you have any kind of habits?	Tobacco chewing	0.0	0.0	P=0.001
	Smoking	10.0	0.6	
	No habits	90.0	99.4	
In your own situation, which food would trigger or aggravate the ulcers?	Spicy food	26.0	43.8	P=0.163
	Pickle	16.0	14.4	
	Soft drinks	6.0	1.9	
	Citrus fruits	4.0	5.6	
	Brushing	20.0	16.9	
	Others	28.0	17.5	

When gender and incidence of Mouth ulcer were compared, we observed a significant association between the fact of being a female and frequency of occurrence with $p=0.047$. Data also indicated a positive family history by females (70%) with a significant p value= 0.010. 92% male

participants reported that they experienced ulcers of size less than 1 cm with a significant p value= 0.001. Majority of the participants reported that they are not exposed to any form of tobacco. This accounts for a significant difference in p value= 0.001.



TABLE 4: COMPARISON BETWEEN EDUCATIONAL STATUS AND APHTHOUS ULCER

		EDUCATIONAL STATUS				P Value
		12 th complete	Undergraduate	Post graduate	others	
Have you ever experienced mouth ulcers?	No	0.0	9.0	24.2	0.0	P=0.022
	Yes	100.0	91.0	75.8	100.0	
How frequently does the ulcer occur?	Very often	47.6	60.6	45.5	100.0	P=0.136
	Occasionally	33.3	29.0	51.5	0.0	
	Rare	19.0	10.3	3.0	0.0	
Number of ulcers in each episode?	One	61.9	76.8	60.6	100	P=0.427
	Two	33.3	19.4	30.3	0.0	
	More than two	4.8	3.9	9.1	0.0	
How long does each episode of ulcer last?	Two days	19.0	23.2	24.2	100	P=0.543
	Four days	57.1	52.3	42.4	0.0	
	One week	23.8	24.5	33.3	0.0	
The common site where it occurs	Cheek	23.8	40.0	39.4	0.0	P=0.029
	Lower lip	33.3	33.5	36.4	0.0	
	Base of the tongue	9.5	4.5	3.0	100.0	
	Floor of the mouth	4.8	1.9	0.0	0.0	
	Combined	28.6	20.0	21.2	0.0	
Size of the ulcer	Less than 1cm	71.4	83.9	75.8	100.0	P=0.415
	1cm	23.8	15.5	24.2	0.0	
	More than 1cm	4.8	0.6	0.0	0.0	
Do you take treatment following an ulcer	No	61.9	54.2	84.8	100.0	P=0.010
	Yes	38.1	45.8	15.2	0.0	
If yes, what is the mode of treatment	Topical gel	23.8	21.9	12.1	0.0	P=0.409
	Saline gargle	19.0	22.6	12.1	0.0	
	Vitamin B12	4.8	16.8	16.2	0.0	
	No treatment	52.4	38.7	60.6	100.0	
The color of the ulcer	Red	52.4	41.9	36.4	0.0	P=0.777
	Pale pink	42.9	46.5	48.5	100.0	
	Yellowish	4.8	11.6	15.2	0.0	
Does your family members have similar experience	No	42.9	33.5	36.4	0.0	P=0.734
	Yes	57.1	66.5	63.6	100.0	
Have you experienced any of the following during or prior to an episode	Infection	4.8	9.0	12.1	0.0	P=0.902
	Malodour	0.0	3.9	6.1	0.0	
	Gastrointestinal problems	23.8	16.1	6.1	0.0	
	Dental problems	19.0	14.2	18.2	0.0	
	Not experienced	52.4	56.8	57.6	100.0	
Are you suffering from any medical condition	No	90.5	89.7	97.0	100	P=0.601
	Yes	9.5	10.3	3.0	0.0	
If yes, specify	No	90.5	90.3	97.0	100.0	P=0.647
	Yes	9.5	9.7	3.0	0.0	
Are you taking	No	90.5	92.3	93.9	100.0	



any medication	Yes	9.5	7.7	6.1	0.0	P=0.959
If yes specify	No	90.5	94.2	100	100.0	P=0.431
	Yes	9.5	5.8	0.0	0.0	
Have you been diagnosed with gastrointestinal diseases such as gastritis, gastric ulcer and enteritis etc.	No	81.0	85.8	93.9	0.0	P=0.038
	Yes	19.0	14.2	6.1	100.0	
Did you have a burning sensation in the mouth	No	90.5	89.7	87.9	0.0	P=0.040
	Yes	9.5	10.3	12.1	100.0	
Have you experienced pain associated with the ulcer	No	23.8	29.7	45.5	0.0	P=0.235
	Yes	76.2	70.3	54.5	100.0	
Do you have any kind of habits?	Tobacco chewing	0.0	0.0	0.0	0.0	P=0.534
	Smoking	0.0	3.9	0.0	0.0	
	No habits	100.0	96.1	100.0	100.0	
In your own situation, which food would trigger or aggravate the ulcers?	Spicy food	42.9	41.9	27.3	0.0	P=0.814
	Pickle	14.3	14.2	18.2	0.0	
	Soft drinks	0.0	2.6	6.1	0.0	
	Citrus fruits	4.8	4.5	9.1	0.0	
	Brushing	23.8	16.1	21.2	0.0	
	Others	14.3	20.6	18.2	100.0	

91.0% undergraduates experienced mouth ulcers very often with a positive family history. Majority of them experienced single ulcer in each episode with cheek as the common site and size less than 1cm and was pale pink in color. Major proportion of them do not take any treatment following an ulcer and they do not experience

infection, malodor, gastrointestinal problems, dental problems or any other medical conditions during or prior to the episodes of ulcer. They did not experience any burning sensation in mouth. 96.1% of them do not have any habits and they also do not experience any triggering factor prior to ulcer.

TABLE 5: COMPARISON BETWEEN HADSCALE AND FREQUENCY OF OCCURRENCE OF APTHOUS ULCER

	How frequently does the ulcer occur?			P value
	Rarely	Occasionally	Very often	
Anxiety	51.4	33.3	15.3	P=0.158
No Anxiety	60.1	32.6	7.2	
Depression	55.4	30.8	13.8	P=0.456
No depression	57.9	33.8	8.3	



Table 5 shows the frequency distribution of Hospital anxiety depression scale of participants to frequency of occurrence of ulcer. 51.4% of participants with anxiety rarely experienced ulcer. Major proportion of respondents without anxiety rarely experienced ulcer. 55.4% participants with depression and 57.9% with no depression rarely

experienced mouth ulcer. From our study we concluded that there is no significant relationship between HAD scale and recurrent aphthous ulcer. From the data, statistical analysis did not show any significance between ulcer, anxiety (p=0.158) and depression (p=0.456).

TABLE 6: COMPARISON BETWEEN ETIOLOGICAL FACTORS AND FREQUENCY OF OCCURRENCE OF RAS

		How frequently does the ulcer occur?			P value
		Rarely	Occasionally	Very often	
Are you suffering from any medical condition?	No	57.1	33.5	9.4	P=0.614
	Yes	57.9	26.3	15.8	
Are you taking any medication?	No	57.2	33.0	9.8	P=0.940
	Yes	56.3	31.3	12.5	
Have you been diagnosed with gastrointestinal diseases such as gastritis, gastric ulcer, enteritis etc.	No	58.6	32.0	9.4	P= 0.546
	Yes	48.3	37.9	13.8	
Do you have any habits?	Smoking	33.3	66.7	0.0	P= 0.185
	No habits	57.8	31.9	10.3	

Table 6 shows the comparison between etiological factor and frequency of occurrence of aphthous ulcer. 57.9 % with medical condition reported occurrence of ulcer as rare, but majority of the participants in this study did not have any medical condition.

More than half of the participants whom are not under any medication reported fewer cases of ulcer.58.6% without any gastrointestinal diseases rarely experienced ulcer.Major proportion of the participants with smoking occasionally experienced mouth ulcer but majority of respondents were without any habits.

VI. DISCUSSION

Recurrent aphthous ulcer is a common ulcerative lesion found in the oral mucosa. It is frequently encountered in our daily practice which certainly affects the quality of the patient’s life. Etiological factor for its causation is still unclear, but it is believed to have multifactorial etiology.

The prevalence of RAS varies depending upon the method and group of population studied.[8] However, RAS is the most common oral ulcerative condition found in the clinical practice.[7] RAS is reported to be more common among the females, among third decade, and among the students. [10, 9].

From the analysis of results yielded from our study, etiology of RAS is still not clearly understood. From our study, 91.9% female participants experienced mouth ulcer. Though this is in accordance with study conducted by Patil S et al, Ganapathy D et al and Maheswaran T et al,our result is influenced by a bias of selection of sample.

37.9%participants reported the common site of occurrence as cheek. This is in accordance with study conducted by Ganapathy D et al.A study by Mahmoud et al. drew the conclusion that stress and anxiety has direct correlation with RAS. But our study contradicted these findings. Majority of



the participants did not experience anxiety and depression during or prior to the episodes of ulcer.

A good proportion of the participants did not take any medication during the course of ulceration. 96.7% participants do not have any habits which is in accordance with the study conducted by Ganapathy D et al, but most of our participants were females without any habits hence our result is influenced by a bias of selection of sample. 64.9% participants had positive family history, this was in accordance with the study conducted by Ganapathy D et al.

VII. CONCLUSION

From our study conducted among young adults of Kerala, we arrived at a conclusion that most common site of occurrence of recurrent aphthous stomatitis (RAS) was cheek and there exist a correlation between family history and aphthous ulcer. We found that stress, habits, gastrointestinal diseases had no correlation with prevalence of RAS.

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