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RESEARCH ARTICLE

AWARENESS OF RISK FACTORS OF RECURRENT APHTHOUS STOMATITIS AMONG DENTAL STUDENTS IN QASSIM PROVINCE, SAUDI ARABIA

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ABSTRACT

Background: Classic recurrent aphthous stomatitis is a localized condition representing a relatively simple disease, although a minority of patients may be predisposed to it by systemic conditions or diseases.
Aim of the study: To evaluate the level of basic awareness of various risk factors ofaphthous ulcer among dental students in Qassim Province.
Subjects and Methods: A cross-sectional qualitative study recruiting dental students from three dental colleges in Qassim province. A total of 190 dental students participated in the study. Each participant was given a self-administered questionnaire to solve on the spot. The questionnaire investigatedthe basic knowledge of recurrent aphthous stomatitis; the way of management and awareness of predisposing factor that may provoke the ulcer.Respondents were graded on a four-level scale as poor, fair, good and excellent.
Results: A total of 39 female respondents (40.6%) had excellent awareness, while males students only 11 (11.7%) were having same level of awareness regarding RAS. On the other hand the highest percentage of males 35(37.2%) had good awareness and for females 35(36.5%) had good awareness with highly significant difference between both groups ($p<0.001$).
Conclusion: The study showed that the female dental students have better level of awareness regarding RAS in than male dental students. The study also reveals that the higher academic years have higher degree of awareness regarding RAS.
questions for an assessment instrument and may serve as a basis for future studies on the topic.

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INTRODUCTION

Classic recurrent aphthous stomatitis is a localized condition representing a relatively simple disease, although a minority of patients may be predisposed to it by systemic conditions or diseases (Jurge and Kuffer, 2006). Recurrent aphthous stomatitis, also known as aphthae, aphthous ulcer or canker sores (Chattopadhyay, 2011). The etiology probably is multifactorial, with various predisposing factors such as: stress, hormonal imbalance, vitamin deficiencies, citrus or acidic fruits and vegetables, tobacco smoking and immunological changes provoked by a range of factors (Shapiro *et al*., 1970; Axell, 1985; McCartan, 1992; Eversole, 1982).

REVIEW OF LITERATURE

Recurring oral ulcers are among the most common problems seen by clinicians who manage diseases of the oral mucosa. There are several diseases that should be included in the differential diagnosis of a patient who presents with a history of recurring ulcers of the mouth, including recurrent aphthous stomatitis (RAS). RAS is a disorder characterized by recurring ulcers confined to the oral mucosa in patients with no other signs of disease. Many specialists and investigators in oral medicine no longer consider RAS to be a single disease but, rather, several pathologic states with similar clinical manifestations (Ship *et al*., 1961). RAS affects approximately 20% of the general population, but when specific ethnic or socioeconomic groups are studied, the incidence ranges from 5 to 50%. RAS is classified according to clinical characteristics: minor ulcers, major ulcers and herpetiform ulcers. Minor ulcers, which comprise over 80% of RAS cases, are less than 1 cm in diameter and heal without scars (Roger, 1997). Minor Aphthous can also occur as widespread lesions in association with systemic diseases including Behcet's syndrome, and gastrointestinal malabsorption disorders like Crohn's and Celiac diseases (Scully, 2003; Tilliss and McDowell, 2002; Rehberger *et al*., 1998). It is unclear whether these presentations are manifestations of the underlying disease

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or represent a separate oral disorder (Tilliss and McDowell, 2002). Major ulcers affects about 10–15% of patients. Ulcers exceed 1 cm in diameter and take longer to heal and often scar. Most common sites of involvement are lips and soft palate. (Roger, 1997) Herpetiform ulcers are considered a distinct clinical entity that manifests as recurrent crops of dozens of small ulcers throughout the oral mucosa (Lennette, 1973). They are are the least common variety and account for only 5-10% of cases (Scully and Felix, 2005). They appear on both non-keratinized and keratinized mucosa unlike aphthae minor and major which are limited to non-keratinized mucosa (Tilliss, 2002).

Risk (Predisposing) Factors

Gender: Most studies showed that RAS has predilection among women. A study conducted in 10291 patients in the city of Tehran, Iran showed a female predilection for RAS (56%) that may be attributed to hormonal changes (Davatchi *et al*., 2008). Women with RAS often present with cyclical oral ulcerations related to the luteal phase of the menstrual cycle (Field *et al*., 2003; Balan *et al*., 2008).

Age: RAS was most common in age group of 20-29 years, reported in a study conducted among 1100 patients in Sulaimani city, Iraq (Abdullah, 2013). Data analysis from the 3rdNational Health & Nutrition Examination survey, 1988-1994 reported adults younger than 40 years of age had almost twice the prevalence of those older than 40 years (Rivera-Hidalgo, 2004). They observed that RAS was more in the 2nd-5thdecade.

Stress: Early studies have documented an association between RAS and a variety of psychological factors including anxiety, repressed hostility, as well as job-related and other stress factors.Psychological stress may act as a trigger or modifying factor rather than an etiological factor in susceptible RAS patients (Camila *et al*., 1999; Laura *et al*., 2004).

Genetics: Patients with a positive family history of RAS suffer more frequent recurrences and more severe course of the disease comparing to those with a negative RAS family history (Almoznino *et al*., 2013).

Food allergy: The exposition to some food ingredients, e.g., chocolate, gluten, cow milk, preservatives, nuts and food coloring agents may induce the pro-inflammatory cascade in RAS (Natah *et al*., 2004; WardhanaDatau, 2010).

Drugs: Some medications can cause mouth ulcers, such as; nicorandil, anti-inflammatory medicines (e.g., ibuprofen) and oral nicotine replacement therapy (Scully, 1999).

Hormonal Changes: Conflicting reports exist regarding association of hormonal changes in women and RAU. Studies state association of oral ulceration with onset of menstruation or in the luteal phase of the menstrual cycle. Mc Carta*et al*.in 1992 established no association between apthous stomatitis and premenstrual period, pregnancy, or menopause (McCartan, 1992).

Trauma: Trauma to the oral mucosa due to local anesthetic injections, sharp tooth, dental treatments, and tooth brush injury may predispose to the development of recurrent aphthous ulceration (RAU) (Wray, 2009).

Sodium lauryl sulfate - containing toothpaste: An increased frequency in the occurrence of RAS has been reported on using sodium laurel sulfate (SLS)-containing tooth paste with some reduction in ulceration on use of SLS-free tooth paste. However, because of the widespread use of SLS-containing dentifrice, it has been proposed that this may not truly predispose to RAS (Jurge *et al*., 2006).

Effect of smoking: Several studies have reported cigarette smoking to have a beneficial protective effect on recurrent aphthous stomatitis (Grady *et al*., 1992; Faleh, 2010).

Gastrointestinal disorders: The association of RAS with coeliac disease is well established. A number of studies have suggested up to 5% of out-patients who initially present with RAS (Ferguson, 1980; Ferguson, 1976; Veloso, 1987) have gluten-sensitive enteropathy (GSE). RAS in patients with coeliac disease appears to remit completely on a gluten-free diet (Scully *et al*., 2003).

Oral ulceration in Behçet's disease: RAS is seen in all patients with Behçet's disease; it commonly precedes other systemic features and can be of major, minor or herpetiform types. Clinical observations in oral medicine clinics suggest that aphthous ulcers in patients with Behçet's disease appear to be associated with increased tissue oedema and appear to have an intensely erythematous border. The aphthae in Behçet's disease often occur in the soft palate and oropharynx and have been observed on the hard palate, which is an unusual site for RAS in patients without Behçet's disease (Main, 1992).

Nutritional deficiencies: Deficiencies of iron, vitamin B12, and folic acid predispose development of RAS. Deficiencies of these hematinics are twice more common in these individuals than controls. Contrary findings in various studies relating the association of hematinic deficiency and RAS have been explained as due to varying genetic backgrounds and dietary habits of the study population (Natah *et al*., 2004; Scully *et al*., 2008).

AIM OF THE STUDY

To evaluate the level of basic awareness of various risk (predisposing) factors regarding aphthous ulcer among dental students in Qassim Province.

SUBJECTSANDMETHODS

A cross-sectional survey was carried out in 3 dental colleges of Qassim province in Saudi Arabia. A total of 190 dental undergraduate students, age group 18–25 years of both genders (94 males and 96 females). The study sample comprised of students belonging to first year students (n=62), second year students (n=60) and third year students (n=68).The study was started in January 2015 and completed by April 2015. Each participant was given a self-administered close-ended questionnaire that requires 3–6 minutes to complete.

The questionnaire was developed to assess the level of awareness of undergraduate dental students regarding the predisposing factors of RAS. The prepared questionnaire was handed personally to the dental students. Thus, none of the students refused to participate in the study. The questionnaire had a total of 27 closed-ended questions relating to age, gender,

University and academic year and 2 closed-ended questions related to level of education after questionnaire completion. (Appindex1). In order to know the accurate awareness level, responses were graded from 1-27 based on the correct responses. The respondents securing 1-7, 8-13, 14-19 and 20-27 marks were graded as having awareness level as poor, fair, good and excellent, respectively. Results were expressed in terms of percentage and proportions.

Statisticalanalysis

The data were processed and analysed using the Statistical Package for Social Sciences software (SPSS, version 20). Frequency tables, percentages and cross-tables were generated. The chi-square test was used to identify significant relationships and differences between the level of awareness between both genders and between all three academic years. Statistical significance was based on $P < 0.05$.

RESULTS

A total of 190 dental students (studying in various phases of 1st 2nd, 3rd year) from three colleges (Qassim University, Qassim Private Colleges, Buraydah Private Colleges) were randomly included in the study.

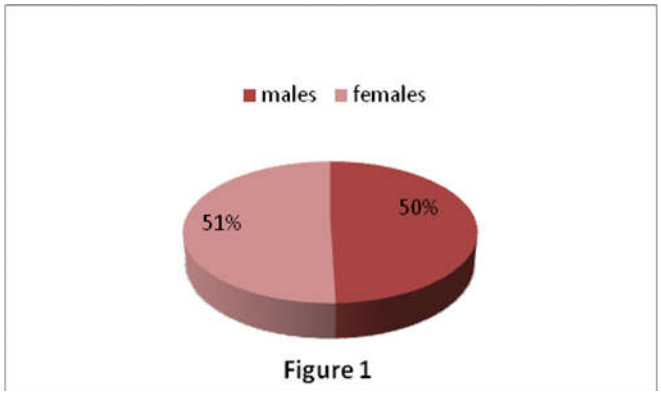


Figure 1

(Table 1) shows the descriptive statistics for the study groups which includes first year male student 34 (54.8%) and female student 28 (45.2%) total of 62 students. Second year male students consists of 24 (40%) and 36 of female students (60%). Third year male students consist of 36 (52.9%) and 32 of female students (47.1%).

Table 1. Descriptive Statistics for the study groups

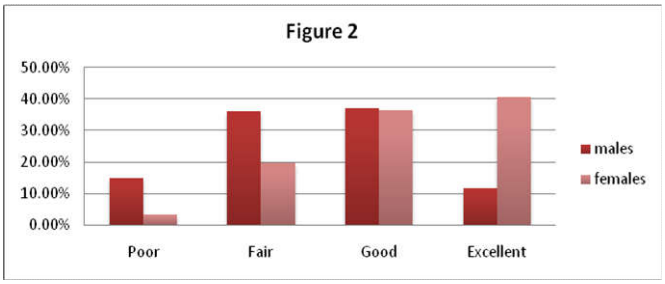
Year	Gender	No.	%
First Year	Male	34	54.8%
	Female	28	45.2%
	Total	62	100.0%
Second Year	Male	24	40.0%
	Female	36	60.0%
	Total	60	100.0%
Third Year	Male	36	52.9%
	Female	32	47.1%
	Total	68	100.0%

(Table 2) shows comparison between both genders according to their awareness towards aphthous ulcers. The highest percentage (40.6%) of female students had excellent awareness, while male students only (11.7%) were having same level of awareness. On the other hand the highest percentage of males had good awareness and for females (36.5%) having good awareness with highly significant difference between both groups ($p<0.001$).

Table 2. Comparison between levels of awareness among both genders of study Sample

Level of Awareness	Gender						P (x^2)
	Male		Female		Total		
	No	%	No	%	No	%	
Poor	14	14.9%	3	3.1%	17	8.9%	P<0.001*
Fair	34	36.2%	19	19.8%	53	27.9%	
Good	35	37.2%	35	36.5%	70	36.8%	
Excellent	11	11.7%	39	40.6%	50	26.3%	

*: significant at p<0.0



(Table 3) shows comparison between academic years according to their awareness towards aphthous ulcers. The highest percentage (47.1%) of third year students had good awareness, while 2nd year students only (33.3%) were having same level of good and fair awareness. On the other hand the highest percentage of 1st year had fair awareness with highly significant difference between the groups ($p<0.001$).

Table 3. Comparison between levels of awareness among different academic years of study Sample

Level of Awareness	Year								P (x^2)
	First Year		Second Year		Third Year		Total		
	No	%	No	%	No	%	No	%	
Poor	13	21.0%	3	5.0%	1	1.5%	17	8.9%	P<0.001*
Fair	20	32.3%	20	33.3%	13	19.1%	53	27.9%	
Good	18	29.0%	20	33.3%	32	47.1%	70	36.8%	
Excellent	11	17.7%	17	28.3%	22	32.4%	50	26.3%	

*: significant at p<0.05

(Table 4) shows the level of gained knowledge. By the end of the questionnaire all the academic three years had high level of knowledge about how to suspect and manage and apthous ulcer with no highly significant difference between them.

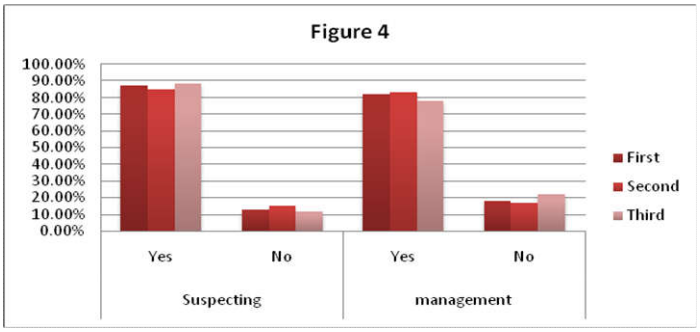
DISCUSSION

Recurrent Aphthous ulcer (RAU) is a common disease of the oral cavity, affecting about 20% of the world's population (Woo and Sonis, 1996).

Table 4. Level of Education after questionnaire completion

		Year								P (x^2)
		First Year		Second Year		Third Year		Total		
		No	%	No	%	No	%	No	%	
Suspecting	Yes	54	87.1%	51	85.0%	60	88.2%	165	86.8%	0..862
	No	8	12.9%	9	15.0%	8	11.8%	25	13.2%	
management	Yes	51	82.3%	50	83.3%	53	77.9%	154	81.1%	0.708
	No	11	17.7%	10	16.7%	15	22.1%	36	18.9%	

*: significant at p<0.05



Women are more affected than men, and in most cases it starts around the first decade of life. The recurrence rates at the interval of 3-month are as high as 50% (Casiglia, 2002). The results obtained from our study also showed higher occurrence in females during their second decade of life. RAU is characterized by recurrent bouts of solitary or multiple shallow painful ulcers, at intervals of few months to few days in patients who are otherwise well (Scully *et al*., 2003; Barrons, 2001; Scully, 2008). RAU has been described under three different clinical variants as classified by Stanley in 1972 (Stanley, 1972). The etiology of RAU still remains unclear, and the currently available therapy remains inadequate. On the other hand, many factors have already been implicated in the promotion and/or exacerbation of RAU; these include positive family history, local trauma, nutritional deficiency, food hypersensitivity, immune disturbance, smoking cessation, and psychological stress, among others (Woo, 1996; Casiglia, 2002; Scully *et al*., 2003; Barrons, 2001). Patterns of awareness, beliefs and attitude of dental students regarding oral health are important for their own health but also for future actions with their patients. Oral ulcers especially RAS awareness is an important but often neglected topic. Probably, this survey is the first of its kind that was carried out among undergraduate dental students of Qassim province.In this study, the sample included 190 participants of first, second, and thirdacademic years, dental students from both genders, to investigate the students' awareness of basic knowledge of RAS and of the predisposing; risk, factors that may provoke the ulcer.

It was found that the highest percentage of female students had excellent awareness, while male students only some of them were having same level of awareness. On the other hand the highest percentage of males had good awareness and more than half of females were having good awareness with highly significant difference between both groups. That means that the female dental students have better level of awareness regarding RAS in than male dental students. When we compared the level of awareness according to the academic year we found that the highest percentage of third year students had good awareness , while second year students were having same level of good and fair awareness. On the other hand the highest percentage of first year had fair awareness with highly significant difference between the groups which reveals that the higher academic years have higher degree of awareness regarding RAS

ArpitaGur *et al*. (2010) had investigated the awareness regarding the systemic effect of periodontal diseases. They had found that a total of 67 respondents (47%) had fair; 60(42%), poor; and 18(11%), good level of awareness regarding the systemic effects of periodontal disease. Only 23(16%), 17(12%), 12(8%), 6(4%) and 4(3%) respondents were aware that the periodontal disease may be the possible risk factor for other systemic diseases. However, the present study sample was better informed than the findings of that study. In the study of Ramaswamy *et al*. (2014), a significantly greater number of third year students (50 %) identified ulcerative/ proliferative or red and white lesion as changes within the mouth associated with oral cancer but 32 % described it as ulcerative/proliferative only. Those results are similar to the result of the current study, where the majority of the third year dental students were having higher level of awareness than their younger colleagues.

Conclusion

Undergraduate female dental students had better level of awareness regarding the RAS than male dental students.The study also revealed that the higher academic years have higher degree of awareness regarding RAS. The questionnaire we used was simple and the information reached all the targeted students

Recommendation

In this context, the recommendations could be considered for improving the oral diseases awareness for Qassim province dental students; these recommendations are:

- As RAS could be a clinical manifestation of various systemic problems, the awareness about the underlying risk factors by all faculties, and referrals should be undertaken for some cases.
- The study highlights the need to improve the education of undergraduate dental students regarding RAS.
- As a future dentist, the RAS shouldn't be underestimated during regular check-up visits to avoid further complications.
- Solid Awareness about the RAS might help dental practitioner in reaching proper diagnosis of the oral ulcer and providing information to patient to enhance their awareness about the condition.

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Appindex

No.	Questions	Yes	No
1	Are you familiar with recurrent aphthous ulcer?		
2	Have you ever experienced painful, single or multiple, recurring ulceration (recurrent aphthous ulcer; RAU)?		
3	Are you aware of the fact that females are more affected by RAU than males; i.e. RAU may start in females at an earlier age and persist for longer duration than males?		
4	Do you think that smokers are less prone to develop aphthous ulcer?		
5	Do you know that RAU may start in childhood but more frequently starts in adulthood??		
6	Do you believe that the primary cause of RAU is unknown?		
7	Do you think RAU can be attributed to certain etiologic factors?		
8	Do you believe RAU occurs more frequently in related persons; i.e. genetics play a role in the development of aphthous ulcer? ?		
9	Do you know that several immunological mechanisms might be involved in the development of RAU?		
10	Do you believe that RAU may be associated with deficiency of folate, vit B12, zinc, or iron???		
11	Do you think that RAU could reflect deficiency of circulating neutrophils e.g. cyclic neutropenia??		
12	Do you believe that RAU may be associated with gastrointestinal diseases e.g. coeliac disease or ulcerative colitis?		
13	Do you know that RAU could be related to allergic factors e.g. cinnamon-flavored chewing gum or toothpaste containing sodium lauryl sulphate??		
14	Do you know that a mucocutaneous syndrome named Behcet's syndrome manifests intraorally with classical aphthous ulceration?		
15	Do you believe that RAU may be associated with AIDS?		
16	Do you think that trauma such as lip biting, cheek biting, or trauma caused by dental procedures may induce recurrence of the aphthous ulcer?		
17	Do you know that aggressive teeth cleaning could also be the risk factor of aphthous ulcer?		
18	Do you know that eating highly spiced food increase the frequency of recurrence of RAU?		
19	Do you think that hormonal changes premenstrually, during pregnancy, and menopause take part in the recurrence of aphthous ulcer?		
20	Do you think that emotional factor and stress may be responsible for recurrence of the aphthous ulcer in students during exams?		
21	Are you aware of the most common sites of aphthous ulcer (mainly the non-keratinized mucosa as buccal& labial mucosa)?		
22	Do you know that aphthous ulcer had been classified into; Minor- Major- Herpitoform ulcers?		
23	Do you know that the ulcer is superficial erosions covered by greyish-white membrane surrounded by erythematous (red) halo?		
24	Do you know that large aphthous ulcer may be associated with lymph node enlargement or fever?		
25	Do you know that the ulcer could persist for 7-14 days and it may resolve spontaneously??		
26	Do you think that home remedies such as; baking soda, garlic or alum powder can be used to manage aphthous ulcer?		
27	Do you know that the Chlorohexidine mouthwash may ease the symptoms?		
28	Do you know that topical corticosteroids can often control aphthous ulcer?		
29	Do you know that there is no definitive treatment of aphthous ulcer?		

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