

## ORIGINAL RESEARCH

# Anxiety, Depression and Quality of Life among Patients with Recurrent Aphthous Ulcers

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## ABSTRACT

**Background:** Recurrent aphthous ulcers (RAUs) are of the most painful and common oral mucosal diseases with uncertain etiology including trauma, genetics, stress, immune dysfunction, and vitamin deficiencies. The aim of this study was to investigate the relationship between oral health impacts, patients' oral health-related quality of life and anxiety and depression in patients with recurrent aphthous ulcers.

**Subjects and methods:** Sixty patients were diagnosed RAU (30 men and 30 women, mean age:  $29.5 \pm 9.6$  years) and sixty controls, who matched the patients with age and gender, participated in this study. Participants completed hospital anxiety and depression (HAD) scale, oral health impact profile (OHIP-14), and United Kingdom oral health related quality of life measure (OHQoL-UK). The statistically significance levels were set at  $p \leq 0.05$ .

**Results:** Both patients and controls reported comparable depression and anxiety scores ( $p > 0.05$ ). Ulcer patients reported worse oral health impacts and inferior quality of life in comparison to controls ( $p < 0.001$ ). Among both groups, no relationships were detected between HAD scores on one hand and OHIP and/or OHQoL-UK on the other hand ( $p > 0.05$ ).

**Conclusions:** Recurrent aphthous ulcers increase the negative oral health impacts on patients and consequently cause inferior quality of life. Stressful situations and conditions (including anxiety and depression) were not related to oral health impacts and quality of life in patients with RAUs.

**Keywords:** HAD scale, OHIP-14, OHQoL-UK, Recurrent aphthous ulcers.

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## INTRODUCTION

Recurrent aphthous stomatitis is a widespread oral mucosal condition that has uncertain multifactorial pathogenesis.<sup>1-4</sup>

Oral ulcers cause pain that interferes speaking, eating, drinking, and attending daily activities.<sup>5-9</sup> Therefore, patients' daily life is directly affected by the disabling nature of oral ulcers.

Some researchers suggested that acute psychological disorders (stress and anxiety) were involved in the etiology of recurrent aphthous ulcers (RAUs).<sup>9-11</sup> Stress was associated with transitory raise in salivary cortisol<sup>10</sup> and/or provoked immunoregulatory activity by increasing the quantity of leukocytes at sites of inflammation.<sup>12,13</sup> In addition, patients with RAU were found more anxious when compared to healthy controls.<sup>11,14-18</sup>

On the contrary, other researchers found no association between psychological life stress and recurrent aphthous ulcers.<sup>6,19,20</sup> Some studies reported no significant differences in anxiety trait and state scores as well as depression scores when patients with RAU were compared to control groups.<sup>19,21</sup>

Moreover, some researchers suggested that RAU is not caused by anxiety but rather anxiety is a result of RAU due to effects of ulcers on patients' ability to eat and drink.<sup>21,22</sup>

In addition to the above conflicting evidence regarding the role of psychological stress in the etiology of RAU; few studies investigated the oral health impacts of oral mucosal diseases on quality of life.<sup>7,23</sup> Moreover, the literature lacks valid and reliable studies on the relationship between stress, oral health impacts and quality of life among patients with recurrent aphthous ulcers. Further scientific based evidence is still required in this regard.

This study investigates the relationships between oral health impacts, quality of life, and psychological factors (anxiety and depression) among patients with RAU, and compares this to healthy controls using valid and reliable socio-dental and psychological measures. The null hypothesis would be that there are relationships between oral health impacts of recurrent aphthous ulcers, patients' oral health-related quality of life, and anxiety and depression.

## METHODS

### Participants

Sixty consecutive patients (30 men and 30 women) aged between 18 and 53 years old (mean age: 29.5 years, SD:  $\pm 9.6$  years), who were diagnosed with recurrent oral ulcers

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and were seeking treatment at Dental Health Teaching Center, Al Jouf University, Sakaka, Saudi Arabia, were recruited into this study. The clinical procedures in this study were ethically approved by the Deanship of Research, Al Jouf University.

To be included in the study, recruited patients had to be 18 years of age or older in order to understand and score the questionnaires, and had no medical disease (including mental problems and psychological disorders) that might affect their ability to understand and/or to score the questionnaires. Also, patients should not be affected by any systemic disease(s) including hormonal conditions, hematinic deficiencies, metabolic conditions, diabetes, hypertension, renal, cardiovascular, gastrointestinal, and liver disease.

Patients were excluded if affected by other mucosal or skin disease (e.g. Behcet's disease) which may be associated with oral lesions. Patients with habits of tobacco chewing, Narghile smoking, and cigarette smoking were also excluded from the study.

According to previous literature,<sup>1-4,9</sup> the patients were exposed to an extensive full medical assessment including detailed history, full examination and haematological laboratory tests; and were only recruited to the study if they met the inclusion criteria of having recurrent aphthous ulcers and no other systemic disease.

Ulcers were considered as RAU when it were yellowish white or grey in color, enclosed by an erythematous area, recurrent, painful, and does not associate systemic disease (including haematinic deficiencies, hormonal and metabolic conditions), allergic condition, and drug intake (e.g. corticosteroids and oral contraceptives). The ulcers had to be present at the moment of the clinical examination. Ulcerations that did not follow the above criteria were excluded.

Patients had to have stable periodontal health with no prosthetic rehabilitation as this might have affected the results.

Sixty controls (30 men and 30 women) who matched the patients by age and gender were also recruited into the study. Controls' age ranged between 18 and 53 years (mean age: 30.5 years, SD:  $\pm$  9.1 years). They were recruited from a Saudi population, including university students and employees, following appropriate announcement. Dental students and employees were excluded from the study to avoid any effect of their dental background on the results. The controls should have never experienced recurrent aphthous ulcers, received no prosthetic rehabilitations, and received no dental treatment other than routine dental care (e.g. check ups, simple scaling and polishing, simple restorations and fluoride application). To be included; pain or prosthetic/restorative drives should

have not been the cause for the controls dental visits to exclude any psychological effects of pain or having lost teeth on the results. They were all clinically assessed to rule out the presence of prosthetic rehabilitations, edentulous areas and oral ulcers. In addition, control's should have no systemic disease, allergic condition, and/or undesirable habits related to tobacco and smoking, or taking drugs. Detailed medical history as well as extensive review of the controls medical records was used for this purpose. Only those who fulfilled the above requirements were recruited into the control group.

Each participant was invited to participate in the study and was given full explanation of the study. An informed consent was obtained from each participant before being recruited into the study.

## Methods

Patients' assessment included evaluation of patients dental and medical histories, complaints, and personal information regarding name, age, gender, education, occupation, address and marital status. Each patient received a thorough clinical assessment to record the status, duration, frequency, size, number and position of ulcers. A visual analog scale graded from 0 to 10 was used to record patients' pain experience caused by ulcers; all patients reported intense pain (8-10 score) due to ulcers.

All clinical examinations were conducted by one investigator (Dr Zwiri) in the oral diagnosis clinic, Dental Health Teaching Center, Al Jouf University. Intra examiner reliability was performed on five duplicate clinical examinations using Kappa statistics. Kappa was 0.97 indicating considerable agreement as examination criteria were very clear and simple.

Each patient completed the hospital anxiety and depression scale (HAD),<sup>24</sup> the oral health impact profile (OHIP-14),<sup>25</sup> and the United Kingdom oral health related quality of life measure (OHQoL-UK)<sup>26</sup> on the day of clinical examination. HAD, OHIP and OHQoL-UK questionnaires were also completed by the controls.

The HAD scale quickly spots mood disorders in non-psychiatric hospital clinics, assesses and separates anxiety and depression, and excludes symptoms caused by physical illness to avoid their effect on the scores.<sup>24,27</sup> Furthermore, it is short, easy to answer and was used with RAU patients.<sup>9</sup> Although it is not comprehensive for personality evaluation; it offers an idea about mild levels of mood disorders.

The OHIP-14 is valid and reliable tool for the assessment of oral health impacts.<sup>25,28-31</sup> Also, it was found sensitive and reliable in detecting impacts of recurrent oral ulcers on patients.<sup>32</sup>

**Table 1:** Mean, standard deviation, maximum and minimum values for OHIP and OHQoL-UK scores among the study population (n = 60 patients and 60 controls)

	OHIP scores			OHQoL-UK scores		
	Patients	Controls	p*	Patients	Controls	p*
Mean score	26.4	9.7	0.000	39.7	64.1	0.000
Standard deviation	9.8	7.6		8.2	9.6	
Minimum score	9	0		19	42	
Maximum score	45	27		65	80	

\*p-value of the relation between patients and controls using analysis of variance test (detailed in Table 3)

**Table 2:** Correlations between HAD scores and each of OHIP and OHQoL-UK scores among the study population (n = 60 patients and 60 controls)

	OHIP scores		OHQoL-UK scores	
	Patients	Controls	Patients	Controls
HAD depression scores				
R	0.167	0.174	-0.104	0.0021
P (2-tailed t-test)	0.202	0.183	0.429	0.876
HAD anxiety scores				
R	0.146	0.198	-0.103	-0.180
P (2-tailed t-test)	0.267	0.130	0.435	0.170

R = Pearson's correlation coefficient

The OHQoL-UK measures additional positive and negative aspects of individuals' perception of oral health.<sup>26,33,34</sup> It is valid, reliable and sensitive instrument to assess oral health related quality of life.<sup>26,30,31,33</sup>

Each participant was provided with a full explanation of the dimensions as well as the methods of scoring each questionnaire, and the process of completing the questionnaires was supervised by the investigator.

Ten participants answered the questionnaires twice with one week interval. Reliability test was carried out on all questions using correlation coefficient. The correlation coefficients were high and ranged from 0.78 to 0.95.

## Statistical Analysis

The data were analyzed using the SPSS (Statistical Package for the Social Sciences, version 11.0, SPSS Inc., Chicago, IL, USA). The association between the variables was analyzed using the Pearson correlation test. Patient and control groups differences were assessed using ANOVA test. For all statistical analysis, the significance level was set at  $p \leq 0.05$ . The sample size was set to be  $\geq 50$  participants in order to conduct the study with 80% power and an odds ratio of 2.5 at 5% significance level.

## RESULTS

The study sample consisted of 60 participants with recurrent ulcers (30 men and 30 women) aged between 18 and 53 years old (mean age =  $29.5 \pm 9.6$  year).

Regarding reported pain due to ulcers; all patients reported intense pain (8-10 score on VAS scale) due to

ulcers. The ulcers were distributed over multiple sites, some patients had ulcers on more than one location, tongue mucosa was involved in 13 patients, floor of the mouth mucosa in nine patients, buccal mucosa in 24 patients, and labial mucosa in 57 patients. Also, 41 patients had recurrent ulcers on irregular basis while 19 patients had recurrent ulcers on regular basis. In addition, 10 patients suffered ulcer duration of less than 7 days, while 48 patients suffered ulcers for 7 to 14 days and two patients reported ulcers that persist for more than 14 days. Finally, solitary ulcers were reported in 35 patients while 25 patients had multiple ulcers.

Among RAU patients, HAD scores for each of anxiety and depression ranged from 0 to 18 (anxiety mean score =  $9.4 \pm 3.4$ , depression mean score =  $6.2 \pm 3.9$ ). Similarly, controls HAD scores for each of anxiety and depression ranged from 0 to 18 (anxiety mean score =  $9.8 \pm 3.9$ , depression mean score =  $7.0 \pm 4.4$ ).

Number, position, duration and frequency of ulcers, in addition to age, gender, and intensity of pain had no significant relationships with HAD scores among patients ( $p > 0.05$ ).

## Comparison of Groups

Table 1 summarizes the mean, standard deviation, maximum and minimum values for OHIP and OHQoL-UK scores among patients and controls. OHIP scores of patients' group (mean score =  $26.4 \pm 9.8$ ) were significantly higher ( $p < 0.001$ ) than those reported by controls (mean score =  $9.7 \pm 7.6$ ). Ulcer patients reported worse oral health impacts in comparison to controls. Also, OHQoL-UK scores were significantly lower ( $p < 0.001$ ) among patients (mean score =  $39.7 \pm 8.2$ ) in comparison to controls (mean score =  $63.2 \pm 9.4$ ). Ulcer patients reported worse effects on quality of life than controls.

Among both groups, no relationships were detected between HAD scores on one hand and OHIP and/or OHQoL-UK on the other hand ( $p > 0.05$ ) (Table 2).

Using ANOVA statistical test to compare patients and controls; age, gender, and HAD anxiety and depression scores among patients were not different from those reported by controls ( $p > 0.05$ ) (Table 3). Also, patients

**Table 3:** Analysis of variance statistical test to compare patients and controls in terms of age, gender, HAD anxiety and depression scores, OHIP scores and OHQoL-UK scores (n = 60 patients and 60 controls)

	Sum of squares	df	Mean square	F	Significance (p)
Age between groups	36.300	1	36.300	0.414	0.521
Within groups	10355.667	118	87.760		
Total	10391.967	119			
Gender between groups	0.000	1	0.000	0.000	1.000
Within groups	30.000	118	0.254		
Total	30.000	119			
HADD between groups	17.633	1	17.633	1.019	0.315
Within groups	2042.733	118	17.311		
Total	2060.367	119			
HADA between groups	4.408	1	4.408	0.336	0.563
Within groups	1549.183	118	13.129		
Total	1553.592	119			
OHIP between groups	8400.133	1	8400.133	109.263	0.000
Within groups	9071.833	118	76.880		
Total	17471.967	119			
OHQoL between groups	17739.008	1	17739.008	223.285	0.000
Within groups	9374.583	118	79.446		
Total	27113.592	119			

HADD: HAD score for depression; HADA: HAD score for anxiety; OHIP: Oral health impact profile scores; OHQoL: Oral health related quality of life-United Kingdom scores; F: F-Statistic; df: Degree of freedom; p: Probability value

reported worse oral health impacts (i.e. higher scores of OHIP) and inferior quality of life (i.e. lower OHQoL-UK scores) in comparison to controls ( $p < 0.001$ ).

## DISCUSSION

This study investigated the relationships between oral health impacts, quality of life, and psychological factors (anxiety and depression) among patients with RAU. No relationship was detected between oral health impacts of recurrent aphthous ulcers, patients' oral health-related quality of life, and anxiety and depression. Therefore, the null hypothesis was rejected.

The results demonstrated that depression scores were comparable between patients and controls and this concur the results of previous studies<sup>9,11</sup> that used HAD scale and found no relationship between depression and recurrent aphthous ulcers.

In addition, patients with recurrent aphthous ulcers reported similar levels of anxiety in comparison to controls, and this disagrees with previous studies<sup>8,10,11,14-18</sup> that reported higher levels of anxiety were associated with recurrent ulcers.

On the other hand, this result concur previous studies that could not identify a relationship between recurrent aphthous ulcers and anxiety or psychosocial life stress.<sup>6,19-21</sup>

The above differences could be due to cultural/religious backgrounds,<sup>9</sup> the use of very small sample sizes (e.g. studying five patients only in Andrews and Hall study,<sup>20</sup> or the use of incomprehensive and limited

psychological tests that measure psychology as a single vague general entity and does not measure stress, anxiety and depression as separate entities (e.g. using Social Readjustment Rating Scale<sup>35</sup> in Pedersen study,<sup>19</sup> General Health Questionnaire (GHQ-12)<sup>36</sup> in Tabolli et al study;<sup>8</sup> and Symptom Check List-Revised (SCL-90R)<sup>37</sup> in some studies.<sup>15,18</sup>

In this study, RAU patients reported higher negative oral health impacts of recurrent oral ulcers and inferior quality of life in comparison to controls. This could be mainly related to the painful lesions that interfere speaking, eating, drinking, and attending daily activities.<sup>5-7,11</sup> This coincided with the results of previous studies.<sup>5-9,32</sup>

However, previous studies used non specific questionnaires for assessment of oral health related quality of life.<sup>8</sup>

Nevertheless, oral health impacts were not related to anxiety or depression in this study. This disagrees with the results of previous studies.<sup>8,10,11,14,15</sup> This could be explained by that anxiety and depression resemble fluctuations in behavior and functioning over short time periods. Short time behavioral changes are less diagnostic of personality and psychology and do not necessarily mean that a patient has fundamental broad based changes in personality and psychology.<sup>38</sup> Stressful situations and conditions rather than personality profiles and stable psychological traits could be related to recurrent oral ulcers. Furthermore, some researchers suggested that stress might be a triggering or modifying factor rather than causative factor for recurrent ulcers.<sup>18</sup> Moreover, some researchers suggested that RAU is not caused by

anxiety but rather anxiety is a result of RAU due to effects of ulcers on patients' ability to eat and drink.<sup>21,22</sup>

Further investigations are needed on larger samples in addition to identify the potential effects of cultural and religious factors in this regard. The limitations of the current study incorporate the subjective report of patients' quality of life and oral health impacts and this is an inherent drawback in using self reported questionnaires. However, all possible efforts were carried out to provide the participants with full explanation of the used tests, and the examiner was ready to explain any issue for the participants.

## CONCLUSION

Recurrent oral ulcers enhance the negative oral health impacts on patients and thus cause inferior quality of life. No relationships were detected between oral health impacts of recurrent aphthous ulcers, patients' oral health-related quality of life and anxiety and depression.

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