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Original Article

Dentistry Section

Prevalence, Determinants, Clinical Manifestations and Management Strategies of Dentophobia in the Western Region of Saudi Arabia: A Cross-sectional Study

RAYAN B YAGHMOOR[1], MOHAMMED I ALSAIF[2], HASSAN H ALWAFI[3], NASHWA S ALQURASHI[4], ASAIYL M ALKHUZAI[5], WAEL E YAGHMOOR[6]

ABSTRACT

Introduction: Dental Fear and Anxiety (DFA) are major obstacles in receiving proper dental care around the world, often causing people to avoid treatment and resulting in poor oral health. Dentophobia is a severe form of this condition and involves an intense and irrational fear that is triggered by dental procedures. However, there is still limited region-specific information about the factors that influence dentophobia and how it is best managed.

Aim: To determine the prevalence of dentophobia and its associated clinical manifestations in the Western Region of Saudi Arabia.

Materials and Methods: The present study was a cross-sectional study conducted at the Dental Teaching Hospital at Umm Al-Qura University in Makkah in the Western Region of Saudi Arabia between May 2024 and September 2024. An online questionnaire was distributed through social media platforms using a convenience sampling approach. A total of 483 qualified adult participants were included. It was analysed through descriptive statistics and binary logistic regression. A p-value of <0.05 was considered statistically significant.

Results: The prevalence of dentophobia was 321(66.5%). Sound of dental drills 117 (24.2%) and previous painful experiences 102(21.1%) were the most frequent triggers. Individuals who had a bachelor degree were much more likely to be dentophobic (Odds Ratio (OR)=1.80, p=0.009). Good past dental experiences had high levels of protection (OR=0.13, p<0.001). Fear of dental treatment was identified to be the cause of avoidance in 151(31.3%) of the participants, whose fear towards invasive procedures (local anaesthetic injection, drilling, and extraction) was the greatest.

Conclusion: Dentophobia is very common in the Western Region of Saudi Arabia. To mitigate fear and enhance dental attendance and oral health outcomes, positive dental experiences and dentist-patient communication, as well as behavioural techniques, are required.

Keywords: Anxiety disorders, Dental anxiety, Fear, Phobic disorders

INTRODUCTION

The DFA affects many people globally, which leads them to avoid seeking dental care and results in negative oral health effects [1]. Patients in dental practices experience DFA as their most prevalent emotional state. The two terms have distinct definitions; however; professionals use them interchangeably [2]. The fear of dental situations or procedures is termed “Dentophobia,” “Dental Phobia,” or “Odontophobia.” It creates an unreasonable, irrationally excessive, and socially limiting phobia. Thereby making people avoid necessary dental care despite experiencing pain, leading to negative impacts on oral health [3]. For instance, drilling or injections can trigger Dental Fear (DF). “Dental Anxiety (DA)” describes how patients experience stress during dental therapy when the stimulus remains unknown, vague or absent [3]. DA affects both patients and dental healthcare providers [3].

People suffering from dentophobia avoid dental treatment until their pain exceeds their fear [4]. Effective communication between patient and dentist can reduce DA and mitigate DF [5]. Patients’ negative initial reaction to dental treatment creates DFA, potentially resulting in complications during and following treatment [2,6]. Some clinical symptoms of dentophobia may force patients to completely avoid dental treatment [7]. Factors affecting DF continue to be studied, aiming to have a better understanding of its mechanisms. A study by Carter AE et al., identified five primary methods by which individuals can develop DFA: cognitive conditioning from negative past experiences, exposure to information about dental procedures that triggers fear, watching others exhibit nervousness, verbal threats, and parental influence [8].

Understanding DA aetiology helps clinicians in delivering better oral healthcare and managing their conditions properly. Strategies of managing DA using pharmacological agents and behavioural stimulation methods have been implemented to reduce DF. The patient-dentist relationship could be negatively impacted by anxiety, leading to potential misdiagnosis [9].

Moderate to high dental anxiety has been reported in approximately 19% of patients in dental practice settings, with about 8.4% of individuals missing dental appointments due to anxiety [10]. Around 70% of the adults between the ages of 18 and 45-year-old in Saudi Arabia suffer from DA [11]. The frequency of DF in children varies greatly as it ranges from 3% to 43% [12,13]. DA has been found to have various negative effects on a person’s life, including painful oral conditions, social embarrassment, and reduced confidence in social interactions [14]. Additionally, DFA has been linked to a considerable avoidance of dental care [15]. This study aimed to assess the level of dentophobia in the western part of Saudi Arabia and to identify predictors of dentophobia.

MATERIALS AND METHODS

The present cross-sectional survey was conducted at the Dental Teaching Hospital at Umm Al-Qura University in Makkah, Saudi Arabia, between May 2024 and September 2024. The Biomedical Ethics Committee of Umm Al-Qura University (protocol no. HAO-

02-K-012-2023-05-1603; Date of approval was 1/5/2023) provided the ethical clearance. An online questionnaire was used to collect data, which was disseminated via various social media platforms, including WhatsApp and Telegram. This was done in compliance with the Declaration of Helsinki 1975 that was revised in 2013. The questionnaire had a digital consent form at the start, and only the participants who agreed to give consent were included in the study.

Sample size calculation: The required sample size was calculated using the formula for estimating a population proportion in a cross-sectional study:

$$n = \frac{z^2 * p(1-p)}{d^2}$$

Where, n is the sample size, *z* is the z-score for the desired confidence level (1.96 for 95%), p is the estimated prevalence of dental phobia p=0.364 based on a previous study in Saudi Arabia [16], and d is the margin of error (0.05).

Using these parameters, the minimum required sample size was 356 participants. A total of 501 responses were received through the online questionnaire; after applying the inclusion criteria, 483 complete responses were included in the statistical analysis.

Inclusion criteria: Individuals residing in the Western Region of Saudi Arabia who were not involved in the dental profession.

Exclusion criteria: Individuals residing outside the target region, those working in dentistry, those aged 65 or older, or those who declined to provide informed consent were excluded, and the participants with incomplete responses.

Study Procedure

The questionnaire was first developed in English and then translated into Arabic to ensure clarity for participants who were not proficient in English [3,17]. A pilot study was conducted to test item clarity and estimate completion time. Reliability was assessed through test-retest and internal consistency methods, while content validity was established through consultation with subject-matter experts. The alpha coefficient for internal consistency was 0.601, which, although slightly below the conventional 0.70 threshold, is acceptable for exploratory research [18]. Test-retest reliability using the Intraclass Correlation Coefficient (ICC) yielded a value of 0.017, likely influenced by small sample size, variability, and measurement error [19].

The questionnaire comprised six sections: Demographics (age, gender, education, marital status, income, city of residence), dental visit habits and past experiences, causes and symptoms of dentophobia, awareness of dental phobia, opinions on treatment strategies, and worry levels in different dental scenarios. Duplicate entries were prevented by requiring unique email identification, while confidentiality was maintained since researchers did not access email details.

STATISTICAL ANALYSIS

Data were coded and analysed using Statistical Package for the Social Sciences (SPSS) version 29. After screening for completeness, 483 valid responses were retained. Descriptive statistics summarised demographics and survey results, with frequencies and percentages used for categorical variables. Binary logistic regression was applied to identify predictors of dentophobia, with dentophobia status as the dependent variable and demographic and dental visit factors as independent variables. Associations were expressed as ORs with 95% Confidence Intervals (CIs), and statistical significance was set at p-value of <0.05.

RESULTS

The study participants were predominantly young adults aged 18-44 years 411 (85.1%), female 330 (68.3%), and largely from Madina 201 (41.6%), Makkah 129 (26.7%), and Jeddah 101 (20.9%). More than half held a bachelor's degree 266 (55.1%), and the majority reported monthly income below 1500 Saudi Arabian Riyal (SAR) 264 (54.6%) [Table/Fig-1].

Variables	Category	n (%)
Age (in years)	Less than 18	11 (2.3)
	18-44	411 (85.1)
	45-64	61 (12.6)
Gender	Female	330 (68.3)
	Male	153 (31.7)
City	Madina	201 (41.6)
	Makkah	129 (26.7)
	Jeddah	101 (20.9)
	Yanbu	26 (5.4)
	Taif	25 (5.2)
	Bahra	1 (0.2)
Education level	High school or lower	123 (25.5)
	Diploma	69 (14.3)
	Bachelors	266 (55)
	Post-graduate	(25 (5.2)
Marital status	Widowed	6 (1.2)
	Single	339 (70.2)
	Married	123 (25.5)
	Divorced	15 (3.1)
Monthly income (in SAR)	Less than 1500	264 (54.6)
	1500-3000	67 (13.4)
	3000-4500	41 (8.5)
	4500-6000	23 (4.8)
	More than 6000	88 (18.2)

[Table/Fig-1]: Demographic variables of the participants.
SAR: Saudi Arabian Riyal

Dental attendance was irregular, with most visiting once every three years or more 157 (32.5%), while preventive check-ups were rare 3 (0.6%). The main reasons for visits were toothache/emergencies 121 (25.0%) and cleaning 108 (22.4%). Experiences were generally positive 386 (79.9%), though dental phobia was commonly linked to drill sounds 117 (24.2%) and pain during treatment 102 (21.1%). Over half 260 (53.8%) reported no clear symptoms, but abdominal pain 73 (15.1%) and increased heart rate/blood pressure 72 (14.9%) were noted among those affected [Table/Fig-2].

Two-thirds of participants 321 (66.5%) reported dental phobia, most often before treatment 202 (41.8%). Early onset before age 18 was common 131 (27.1%), though many were unsure when it began 267 (55.3%). Avoidance of treatment due to fear was reported by

Item	Response	n	%
Frequency of visits to the dentist	Once every 6 months	140	29.0%
	Once a year	109	22.6%
	Once every two years	49	10.1%
	Once every 3 years or more	157	32.5%
	Rarely/Never visited a dentist	28	5.8%
Date of the last visit to the dentist	6 Months Ago	215	44.5%
	6-12 months Ago	64	13.3%
	More than a year Ago	67	13.9%
	More than two year Ago	137	28.4%

Reason for visit	Check-up	3	0.6%
	Periodic follow-up	74	15.3%
	Cleaning treatment	108	22.4%
	Restorative treatment	93	19.3%
	Orthodontics	10	2.1%
	Periodontal problems	14	2.9%
	Toothache (Emergency)	121	25.0%
	Teeth extractions	32	6.6%
	Never visited a dentist	28	5.8%
If you have visited the dentist before, how would you describe your experience?	Good	386	79.9%
	Not good	69	14.3%
	Never visited a dentist	28	5.8%
What is the most common reason for your fear of going to the dentist?	Embarrassment/shame due to condition of teeth	27	5.6%
	The unpleasant smell of the dental clinic	8	1.7%
	The dentist may be unsympathetic, impolite, and/or untrustworthy	35	7.2%
	Anxiety from the sound of drilling or any other device	117	24.2%
	Pain during treatment	102	21.1%
	I'm not aware of the reason/No dental Phobia	174	36.0%
	I don't know what dental phobia is	20	4.1%
What are the most common symptoms related to your fear of visiting a dentist?	Abdominal pain	73	15.1%
	High blood pressure and increased heart rate	72	14.9%
	Insomnia	19	3.9%
	Illness	8	1.7%
	Headache	35	7.2%
	Loss of appetite	16	3.3%
	No dental phobia reported, or unable to identify specific triggers of fear.	260	53.8%

[Table/Fig-2]: Details concerning dental visits and participants' perceptions regarding causes and symptoms of dental phobia.

151 (31.3%), and more than half 277 (57.3%) indicated willingness to undergo non-clinical dental care, underscoring procedural invasiveness as a key anxiety trigger [Table/Fig-3].

Despite high prevalence, few sought professional help 13 (2.7%), and most had not disclosed their fear to dental staff 287 (59.4%). Coping strategies included anaesthesia 237 (49.1%), relaxation techniques 221 (45.8%), and positive reinforcement 207 (42.9%). Clear communication in 417 (86.3%) and good dentist-patient relationships by 435 (90.1%) were strongly endorsed as helpful [Table/Fig-4].

Anxiety levels varied by procedure; most were not worried about routine appointments 200 (41.4%) or cleaning 265 (54.9%), but worry increased sharply for invasive procedures such as injections

Item	Response	n	%
Do you suffer from dental phobia?	No	162	33.5%
	Yes	321	66.5%
When do you most often experience dental phobia?	Before treatment	202	41.8%
	During treatment	116	24.0%
	After treatment	3	0.6%
	I do not suffer from dental phobia	162	33.5%
How long have you suffered from dental phobia?	Since age 18 years or older	85	17.6%
	Since younger than 18 years of age	131	27.1%
	I am unsure when this fear began/ Never suffered	267	55.3%
Please rate the severity of your dentophobia from zero to ten where zero is (no phobia at all/Unable to rate the dental phobia) and ten is (extreme phobia or avoidance of the procedure)	0	188	38.9%
	1	45	9.3%
	2	32	6.6%
	3	32	6.6%
	4	28	5.8%
	5	50	10.4%
	6	24	5.0%
	7	24	5.0%
	8	27	5.6%
	9	11	2.3%
	10	22	4.6%
Have you ever avoided dental treatment due to dental phobia?	No	332	68.7%
	Yes	151	31.3%
Would you get dental treatment if no clinical procedures were involved?	Yes	277	57.3%
	No	206	42.7%

[Table/Fig-3]: Identifying dental phobia.

Item	Response	n	%
Have you ever sought help to get rid of your dentophobia?	Yes - I have seen a personal therapist	13	2.7%
	Yes - I saw a remote handler (ex: video call, phone call or messages)	9	1.9%
	Yes - Self-help apps or online programs	2	0.4%
	No	459	95.0%
Have you shared your dental phobia with any of the dental staff listed below?	Another healthcare professional	17	3.5%
	Dentist	150	31.1%
	No	287	59.4%
	Dental assistant	29	6.0%
In your opinion, to overcome the fear of visiting the dentist is it helpful if the dentist were to explain the purpose of the procedure and what it will entail?	No	66	13.7%
	Yes	417	86.3%
Does building a good doctor-patient relationship go a long way in overcoming the fear of visiting the dentist's clinic?	No	48	9.9%
	Yes	435	90.1%
If you suffer from dental phobia, when do you overcome it and seek treatment?	When I see significant decay in one of my teeth	60	12.4%
	When I feel mild pain	48	10%
	When I feel bothersome pain	213	44.1%
	I do not suffer from dental phobia	162	33.5%
Please select all that apply from the following strategies: What is/ are the most effective strategy/ strategies for you when you are in the dental clinic?	Distraction (e.g., watching TV, virtual reality headsets)	169	35.0%
	Positive reinforcement	207	42.9%
	Use of anaesthesia	237	49.1%
	Education/explanation of how dental equipment works	129	26.7%
	Consulting with the dentist about the importance of the procedure/treatment	157	32.5%
	Seeing a therapist (e.g., cognitive behavioural therapy)	32	6.6%
	Relaxation techniques such as deep breathing or muscle relaxation	221	45.8%

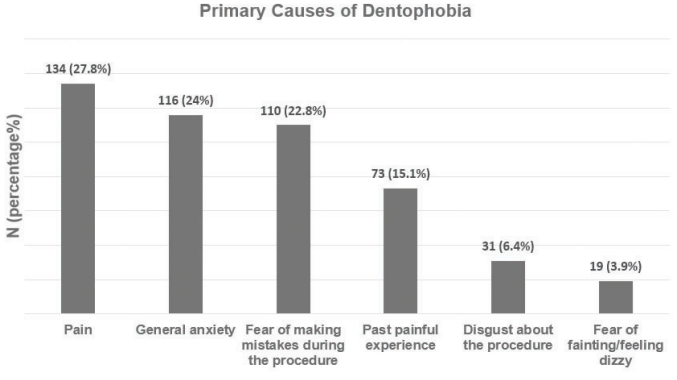
[Table/Fig-4]: Recognising strategies to reduce dentophobia and its complications.

157 (32.5%), drilling 172 (35.6%), and extractions 221 (45.8%) [Table/Fig-5].

Pain was the leading cause of dentophobia 134 (27.8%), followed by general anxiety 116 (24.0%) and fear of errors during treatment 110 (22.8%). Past painful experiences contributed in 73 (15.1%) cases [Table/Fig-6].

Item	Response	n	%
How do you feel if your dental appointment is tomorrow?	Not worried	200	41.4%
	A little worried	147	30.4%
	Somewhat worried	80	16.6%
	Very worried	56	11.6%
How would you feel if you were sitting in the waiting room (waiting for treatment)?	Not worried	198	41.0%
	A little worried	128	26.5%
	Somewhat worried	80	16.6%
	Very worried	77	15.9%
How would you feel if you were about to have your teeth cleaned and polished?	Not worried	265	54.9%
	A little worried	100	20.7%
	Somewhat worried	62	12.8%
	Very worried	56	11.6%
If you were about to receive a local anaesthetic injection in your gums for your upper back teeth, how would you feel?	Not worried	96	19.9%
	A little worried	149	30.8%
	Somewhat worried	81	16.8%
	Very worried	157	32.5%
How would you feel if you were about to have one of your teeth drilled?	Not worried	99	20.5%
	A little worried	129	26.7%
	Somewhat worried	83	17.2%
	Very worried	172	35.6%
How would you feel if you were about to have your tooth/teeth extracted?	Not worried	79	16.4%
	A little worried	102	21.1%
	Somewhat worried	81	16.8%
	Very worried	221	45.8%

[Table/Fig-5]: Assessment of dental anxiety.



[Table/Fig-6]: Primary causes of dentophobia among the study participants.

Regression analysis showed education level and prior dental experience was significant predictors. Those with a bachelor's degree had higher odds of phobia compared to high school (OR=1.80, p=0.009). Positive prior experiences (OR=0.13, p<0.001) and never having visited a dentist (OR=0.09, p<0.001) were protective factors. Gender, marital status, income, and time since last visit were not significant [Table/Fig-7].

Variables		OR (95%CI)	p-value
Gender	Female	**Reference**	
	Male	0.75 (0.50-1.12)	0.160
Education level	High school	**Reference**	
	Bachelor	1.80** (1.16-2.80)	0.009
	Post grad	2.45 (0.93-6.63)	0.071
	Diploma	1.79 (0.96-3.34)	0.068
Marital status	Single	**Reference**	
	Widowed	0.44 (0.09-2.26)	0.331
	Married	0.66 (0.43-1.02)	0.060
	Divorced	1.23 (0.38-4.01)	0.724
Income	Less than 1500	**Reference**	
	1500-3000	1.57 (0.86-2.88)	0.143
	3000-4500	1.29 (0.62-3.65)	0.484
	4500-6000	1.00 (0.41-2.45)	0.995
	Above 6000	0.91 (0.55-1.50)	0.704
Date of the last visit	6 months	**Reference**	
	6-12	0.86 (0.48-1.56)	0.629
	One year	1.23 (0.67-2.27)	0.504
	Two years	0.68 (0.44-1.06)	0.094
If you visit a dentist, how would you evaluate it?	Not good	**Reference**	
	Good	0.13*** (0.05-0.33)	<0.001
	Never went to dentist	0.09*** (0.03-0.30)	<0.001
	Constant	5.93 (2.01-17.52)	0.001

[Table/Fig-7]: Factors associated with prevalence of dental phobia.
Odds Ratio (OR) analysis; **p<0.01; ***p<0.001

DISCUSSION

The present study demonstrated a high prevalence of dentophobia in the Western Region of Saudi Arabia, with 321 (66.5%) participants reporting DF, which is substantially higher than the national estimate of 36.4% reported by Alyami Y et al., [16]. This discrepancy may be attributed to methodological differences, including the use of a convenience-based online sample, female overrepresentation (330, 68.3%), and predominance of younger adults aged 18-44 years (411, 85.1%). Furthermore, reliance on self-reported scales may have inflated prevalence, as subjective perceptions of fear are often exaggerated in survey-based research [16]. These methodological considerations should be acknowledged when interpreting the elevated prevalence observed.

A key finding was the strong influence of past dental experiences on dentophobia. Participants reporting positive prior dental experiences had markedly reduced odds of phobia (OR=0.13, p<0.001), while those who had never visited a dentist also showed protective effects (OR=0.09, p<0.001). This aligns with previous studies showing that negative or painful dental experiences significantly condition fear responses, whereas the absence of direct experiences may prevent fear acquisition [20,21]. Pain emerged as the most significant contributing factor, with 102 (21.1%) citing painful experiences and 117 (24.2%) reporting fear of dental instruments such as drilling. These findings are consistent with literature emphasising pain perception and sensory triggers as central determinants of dental anxiety [20].

Dentophobia in this population was also associated with physiological and psychological symptoms, including abdominal discomfort 73 (15.1%) and elevated heart rate/blood pressure 72 (14.9%), which are well-recognised anxiety manifestations [22]. Behaviourally, 151 (31.3%) participants reported avoiding dental treatment due to fear, and 38.9% sought care only when pain was present. Preventive dental visits were rare, with only 3 (0.6%) reporting routine check-ups and 121 (25.0%) attending due to emergency toothache. This reactive pattern reflects the "vicious cycle of DF," whereby avoidance leads to worsening oral conditions, necessitating more invasive treatments that further reinforce fear [20].

The study also highlighted the role of procedural invasiveness in shaping anxiety. While most respondents expressed little worry about non-invasive procedures such as cleaning 265 (54.9% not worried), anxiety escalated for invasive interventions, with 221

(45.8%) very worried about extractions, 172 (35.6%) about drilling, and 157 (32.5%) about local anaesthetic injections. These findings support earlier evidence that anticipatory fear is strongly linked to perceived pain and invasiveness [23].

Communication and dentist-patient relationships emerged as critical protective factors. Clear explanations of procedures and empathetic interactions were strongly endorsed 417 (86.3%; 435, 90.1%), consistent with prior studies emphasising patient-centered care as a means to enhance predictability, control, and treatment acceptance. Coping strategies such as anaesthesia 237 (49.1%), relaxation techniques 221 (45.8%), and positive reinforcement 207 (42.9%) were preferred, while psychological interventions such as therapy remained underutilised despite evidence supporting cognitive behavioural therapy in managing dental anxiety [24].

Interestingly, higher educational attainment was associated with increased dental anxiety, echoing previous findings that greater awareness of treatment risks and heightened recall of negative experiences may amplify fear. Overall, the results underscore the multidimensional nature of dentophobia, shaped by experiential, psychological, and procedural determinants. Its high prevalence and impact on healthcare-seeking behaviour highlight the need for targeted interventions, including fostering positive initial dental experiences, strengthening communication, and integrating behavioural management strategies into routine care.

Limitation(s)

The present study has several limitations. The convenience sampling strategy via online platforms introduces selection bias, as individuals more conscious of DF may have been more likely to participate, potentially inflating prevalence. The sample was also skewed toward females, young adults, single individuals, and lower-income earners, limiting generalisability to the broader Saudi population. Reliance on self-reported data may have introduced recall and social desirability biases, affecting the accuracy of reported experiences and fear levels. The cross-sectional design restricts causal inference, allowing only associations to be identified. The observed ICC value indicates limited reproducibility of the dentophobia measure in the present study. Therefore, the prevalence estimates reported in the present study should be interpreted with caution, as measurement error may have influenced the classification of participants. Finally, exclusion of dental professionals and older adults narrows the scope and applicability of findings to these groups.

CONCLUSION(S)

Dentophobia was found to be highly prevalent in the Western Region of Saudi Arabia, affecting nearly two-thirds of adults. Pain and invasive procedures were the most common triggers, and many participants reported avoiding treatment, reflecting a reactive rather than preventive approach to oral health. Effective dentist-patient communication, patient education, and supportive measures such as anaesthesia, relaxation techniques, and positive reinforcement are essential to reduce fear and encourage timely dental care. Since dentophobia influences both patient comfort and service utilisation, future research should employ stronger sampling methods, balanced representation, and longitudinal designs to enhance validity and generalisability. Moreover, future investigations should assess convergent validity through direct comparison with established measures such as the Modified Dental Anxiety Scale (MDAS) and other validated dental anxiety instruments in larger and more heterogeneous populations.

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PARTICULARS OF CONTRIBUTORS:
1. Assistant Professor, Department of Restorative Dentistry, Umm Al-Qura University, Makkah, Saudi Arabia.
2. Assistant Professor, Department of Periodontics and Community Dentistry, King Saud University, Riyadh, Saudi Arabia.
3. Assistant Professor, Department of Pharmacology and Toxicology, Umm Al-Qura University, Makkah, Saudi Arabia.
4. Undergraduate Dental Student, Umm Al-Qura University Makkah, Saudi Arabia.
5. Undergraduate Dental Student, Umm Al-Qura University Makkah, Saudi Arabia.
6. Assistant Professor, Department of Basic and Clinical Oral Sciences, Umm Al-Qura University, Makkah, Saudi Arabia.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Rayan B Yaghmoor,
Assistant Professor, Department of Restorative Dentistry, Umm Al-Qura University
Makkah-24381, Saudi Arabia.
E-mail: rbyaghmoor@uqu.edu.sa

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