


Prevalence of burnout and practice-related risk factors among Saudi Board dental residents using the Copenhagen Burnout Inventory

A survey-based cross-sectional study

Saeed M. Alqahtani, BDS, MSc^a, Saurabh Chaturvedi, BDS, MDS, PhD^{a,*} , Asma Ali Hezam, BDS^b, Ahmed Alshahrani, BDS^c, Mohammed Alkhurays, BDS, MSc^d, Mohammed M. Al Moaleem, BDS, MCS, PhD^{e,f}, Rahaf Ali Mohammad Alqhtani, BDS^g, Bashayer Mohammed Ali Asiri, BDS^g, Sarah Ebrahim Ali Zahir, BDS^g

Abstract

Occupational burnout is a chronic psychological problem affecting professionals. The aim of this study was to assess the types and categories of burnout among Saudi Dental board residents at different levels of residency in different provinces of Saudi Arabia, using the Copenhagen Burnout Inventory. Questionnaires were sent to 170 Saudi Dental board residents via Email and WhatsApp, at various training centers in Saudi Arabia, in May 2022. A part of the questionnaire covered the socio-demographic characteristics of the participants such as gender, training level or center, number of working sessions or hours per week and day, dental speciality, and marital status. The second part consisted of the Copenhagen Burnout Inventory survey with 21 questions. Only 110 participants returned the answered questions. The overall significant type of burnout was present in 46.3% of the respondents while 53.7%, were for free or minimal burnout. Personal, work-related, and patient-related burnout recorded 62%/38%; 40% to 60%, and 60%:40% for free or minimal to significant burnout. The overall burnout types of values were equal in both gender as well as training levels with no significant differences and P -values $\leq .05$. Burnout values were close to each other among the participants in different specialties, except for orthodontics residents which were the least. Analysis of variance, followed by chi-square tests showed a significant difference among participants in different specialties in type and categories of burnout with P -values between .002 to .029. Finally, the burnout value was higher among married participants. Overall burnout types were marginally similar between genders and training levels, while the significant was slightly higher in females, married, highest training level, restorative, and prosthodontic speciality participants.

Abbreviation: CBI = Copenhagen Burnout Inventory.

Keywords: burnout, Copenhagen Burnout Inventory, dental residents, Saudi Arabia, Saudi Board residency training

1. Introduction

According to the World Health Organization, occupational burnout is a chronic psychological syndrome caused by exposure to chronic emotional and interpersonal stress caused by work or the workplace.^[1] It was first described by American psychologist Herbert Freudenberg.^[2] Dentistry is a profession that requires physical and mental effort. It requires an enormous

number of poised social, cognitive, psychological, and emotional interactions to emerge as a successful dental professional, so dentistry involves a high degree of burnout.^[3]

Burnout among dentists has negative effects that can be very serious.^[4] It can lead to early retirement and indifference to treatment outcomes and patients' conditions or needs.^[5] This can ultimately lead these professionals to engage in unhealthy practices such as poor eating habits, smoking, uncontrollable

Informed consent was obtained from all subjects involved in the study.

The authors have no funding and conflicts of interest to disclose.

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of the Institute at College of Dentistry, King Khalid University, Abha, SA on September 18/2022 under # IRB/KKUCOD/ETH/2022-2023/001.

^a Department of Prosthetic Dentistry, College of Dentistry, King Khalid University, Abha, Saudi Arabia, ^b Saudi Board of Oral and Maxillofacial Surgery, College of Dentistry, Jazan University, Jazan, Saudi Arabia, ^c Division of Endodontics, Khamis Mushait Dental Center, Ministry of Health, Aseer, Saudi Arabia, ^d Department of Prosthetic Dental Sciences, Abha Dental Speciality Centre, Ministry of Health, Aseer, Saudi Arabia, ^e Department of Prosthetic Dental Science, College of Dentistry, Jazan University, Jazan, Saudi Arabia, ^f Faculty of Dentistry, University of Ibn al-Nafis for Medical Sciences, Sana'a, Yemen, ^g Dental Intern, College of Dentistry, King Khalid University, Abha, Saudi Arabia.

* Correspondence: Saurabh Chaturvedi, Department of Prosthetic Dentistry, College of Dentistry, King Khalid University, Abha 62529, Saudi Arabia (e-mail: survedi@kku.edu.sa).

Copyright © 2023 the Author(s). Published by Wolters Kluwer Health, Inc. This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial License 4.0 (CCBY-NC), where it is permissible to download, share, remix, transform, and buildup the work provided it is properly cited. The work cannot be used commercially without permission from the journal.

How to cite this article: Alqahtani SM, Chaturvedi S, Hezam AA, Alshahrani A, Alkhurays M, Al Moaleem MM, Alqhtani RAM, Asiri BMA, Zahir SEA. Prevalence of burnout and practice-related risk factors among Saudi Board dental residents using the Copenhagen Burnout Inventory: A survey-based cross-sectional study. *Medicine* 2023;102:43(e35528).

Received: 12 March 2023 / Received in final form: 10 August 2023 / Accepted: 15 September 2023

<http://dx.doi.org/10.1097/MD.00000000000035528>

Key point

- To assess the types and categories of burnout among the residents so that due care and support can be provided to them. This will ensure professional and individual health and ultimately good patient care.

drinking, and insomnia, and can also lead to stress-related systemic diseases such as diabetes, high blood pressure, and cardiovascular disease.^[6,7]

There are several assessment tools, scales, and questionnaires for measuring burnout.^[8] Among them, MBI is the most widely used tool in the medical literature to identify and measure burnout.^[9,10] MBI HSS has been widely criticized by researchers for several reasons, such as an unclear relationship between the tool and the concept of burnout, as it uses questions mainly related to American culture and is likely not to be generalized in the same direction as other populations. For this reason, Kristensen et al developed “The Copenhagen Burnout Questionnaire (CBI),” which measures 3 factors: personal burnout, work-related burnout, and client-related burnout.^[10] It has been reported that CBI tools are more commonly used to measure burnout in employees working in complex medical settings.^[11] Recently, a review published by Alahmari et al, 2022, stated that Copenhagen Burnout Questionnaire is usually used for the measurement of burnout among samples with the same category of speciality, as well as for small sample size studies.^[12]

The prevalence of burnout syndrome in dentists has been thoroughly studied.^[13] A recent systematic review found that dentists face a higher level of burnout compared to students from other professions.^[14] Gorter and Freeman reported that more than 26% of dental staff are at increased risk of burnout.^[15] A study of dentistry students at 3 German universities showed that burnout rates were high regardless of the education system used.^[4] While higher percentage burnout was recorded among dentists in Greek during COVID-19.^[16] In Saudi Arabia, studies have shown that the prevalence of burnout among undergraduates has increased from 55% to 62%.^[17,18] A single research reported that almost 70% of the sample was suffering from professional or significant burnout.^[19] Also, marginal similar values and percentages of burnout, when they assessed burnout among different medical specialities in different cities in SA.^[20–23]

In Saudi Arabia, many training programs have been created over the past 30 years in a variety of health-related disciplines. Among those specialties were dental training programs, those started by some restorative and endodontic, as well as prosthetic training residencies. Later on, those programs were increased in numbers to cover most of the dental specialties, and in parallel with this, an increase in the training centers was also obvious and distributed in all provinces of SA. Although studies have been conducted to assess stress and burnout among dentists in Saudi Arabia, to our knowledge, the prevalence of burnout and its associated risk factors among residents of the Saudi Dental Board has not yet been studied. So, the aim of the study is to estimate the prevalence of Burnout among Saudi Dental Board residents of all dental specialties at all levels of residency in different provinces of Saudi Arabia. Also, to identify factors that increase burnout and practice-related risk factors among Saudi Board dental residents, using the English version of the Copenhagen Burnout Inventory.

2. Materials and methods**2.1. Study design**

A survey-based cross-sectional study was used to collect information on our variables. This survey conforms to the standards

of the World Medical Association’s Declaration of Helsinki.^[24] Ethical approval was granted by the evidence-based research committee, at the College of Dentistry, King Khalid University, Abha, SA on September 18/2022 under # IRB/KKUCOD/ETH/2022-2023/001. In addition, an informed consent form was signed by the participants.

2.2. Study samples and criteria

The simple random sampling method was used for the selection of participants based on exclusive inclusion criteria of being Saudi board residents in any Saudi Arabia dental institute, of different specializations and programs ranging from endodontics, prosthodontics, restorative dentistry, oral surgery, orthodontics, periodontics, pedodontics, etc. The subject size of 110 participants was then verified based on the G * Power software with self-assurance amount altered at 85%, power adjusted at 80%, and a reasonable outcome amount. The criteria for inclusion were participants from both genders, involved in any dental specialty under the Saudi Board Program at any training center all around the kingdom, and participants were regular residents at the time of the study (May 2022).

2.3. Participants’ grouping and data collection

Self-administered questionnaires were sent by email and WhatsApp to all group leaders in different training centers in the SA, to include all potential participants and informed them of the aims, methods, and objectives of the study. They were asked to complete the entire box of questionnaires. The term “burnout syndrome” was not directly mentioned to avoid the risk of framing. Questionnaires were sent to 110 participants.

2.4. Questionnaire parts

An English version of an online two-part self-administrated questionnaire was distributed. The online form of the questionnaire consists of a brief explanation of the purpose of the study and the method of data collection and 2 groups of close-ended questions.

The first part of the questionnaire covered the socio-demographic characteristics of the participants; like gender (males and females), marital status (single, married, divorced), dental specialty (restorative dentistry, prosthodontics, endodontics, periodontics, orthodontics, surgery, oral medicine), training level (R1, R2, R3), training center included (central, northern, southern eastern, western), number of working sessions per week (up to 6, between 7–8, between 9–10 session), and working hours per day (2–4 days).

The second part of the questionnaire consists of the Copenhagen Burnout Inventory survey,^[10] a new tool for burnout assessment. The same inventory was used in studies conducted among dentists and dental students in Greek by Antoniadou,^[16] India by Kulkarni et al,^[2] and Saudi Arabia by Chalikkandy et al 2022.^[19] However, it was also applied in different specialties other than dentistry in Saudi Arabia, these include the following studies; among healthcare workers by Alsulimani et al,^[20] Medical students with Mahfouz et al,^[21] Urology residents by Aljuhayman et al,^[22] and postgraduate doctors by Fernando and Samaranayake.^[25] CBI comprises 3 main domains for burnout measurement, and it contains 21 items, and consisted of;

- Personal Burnout consisted of 6 questions, and relation to personal burnout are phrased in such a way that all humans can answer them (a general scale).^[10]
 1. How often do you feel tired?
 2. How often are you physically exhausted?

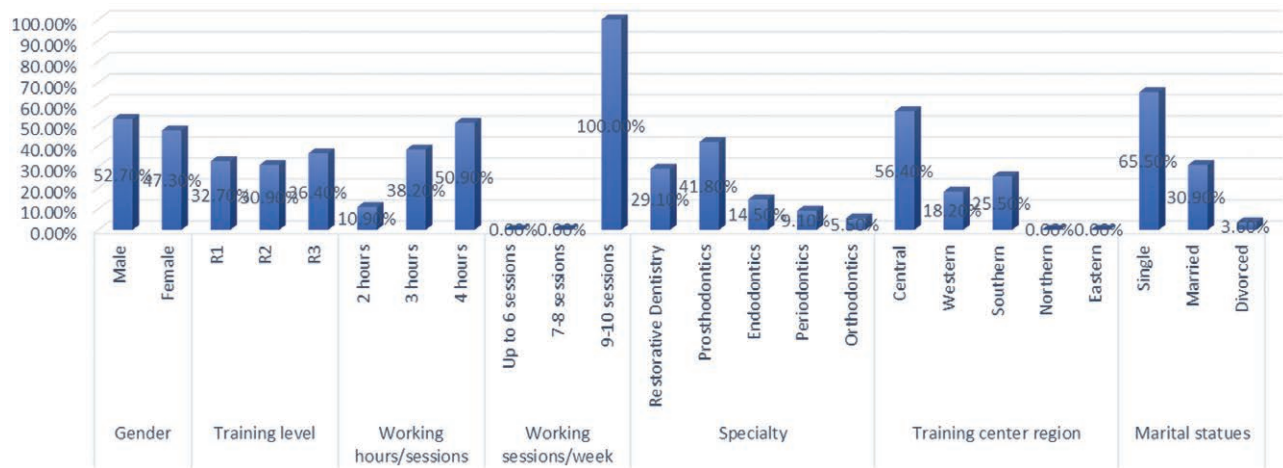


Figure 1. Descriptive statistics of demographic data of the participants (n = 110).

Table 1
Results of the Cronbach alpha for the questionnaire dimensions.

| Dimension | Alpha |
|---|-------|
| Personal burnout | 0.888 |
| Work-related burnout | 0.729 |
| Patient-related burnout | 0.872 |
| Personal, work-related, patient-related burnout | 0.931 |

- How often are you emotionally exhausted?
 - How often do you think "I can't take it anymore?"
 - How often do you feel worn out?
 - How often do you feel weak and susceptible to illness?
- Work-related Burnout consisted of 7 questions, and it is related to burnout at work suggesting that respondents did paid work.^[10]
 - Is your work emotionally exhausting?
 - Do you feel burnt out because of your work?
 - Does your work frustrate you?
 - Do you feel worn out at the end of the working day?
 - Are you exhausted in the morning at the thought of another day at work?
 - Do you feel that every working hour is tiring for you?
 - Do you have enough energy for family and friends during leisure time?
 - Patient-related Burnout, and it consisted of 6 questions. Questions about client-related burnout include the term "client" or similar term where appropriate such as patient, student, or prisoner.^[10]
 - Do you find it hard to work with clients?
 - Do you find it frustrating to work with clients?
 - Does it drain your energy to work with clients?
 - Do you feel that you give more than you get back when you work with clients?
 - Are you tired of working with clients?
 - Do you sometimes wonder how long will you be able to continue working with clients?

Every question had 5 possible answers and was given in the following categories: always, often, sometimes, seldom, and never; with a corresponding score for each category are 100, 75, 50, 25, and 0, respectively. For each domain of the burnout type (personal, work-related, and patient-related), the average score was

calculated. The free or minimal burnout category is defined as average total scores ≤ 50 , and high or significant burnout value is > 50 .

The instructions were explained completely by the researchers to the students. The responses were completely anonymous to ensure confidentiality. Participants were also asked to double-check their answers to ensure complete responses. To avoid stereotyped response patterns from participants, CBI items were not delivered in the same order in the questionnaire.

2.5. Data analysis

Data from 110 participants were collected and summarized in an SPSS sheet on a computer. The results of the descriptive statistical analysis were presented as mean, frequency, percentages, and standard deviation using Statistical Package for Social Science software program version 25.0 (Chicago, IL). Cronbach coefficients were calculated to assess the internal reliability of each domain of the questionnaire. The associations between the dependent which was burnout and independent factors such as gender, marital status, dental specialty, training level number of working sessions and hours per week and day were assessed using analysis of variance and Student *t* test, followed by Tukey HSD posthoc test with *P*-value kept at $\leq .05$ for significance. Pearson correlation was computed to estimate the direct or indirect association between the variables.

3. Results

Out of 172 questionnaires sent to the participants, only 110 were received back with a response rate of 64%. Figure 1 represents the descriptive and demographic data of the 110 participants. Males were marginally higher in the percentage, residence at the third year was higher than other levels, almost half numbers of the respondents were practising duties for 4 hours per session, 42% were involved in a prosthodontic specialty, where 2/3 of the participants were singles. Cronbach for internal reliability of the 3 domains were high as seen in Table 1. The effect of demographic factors on the 3 dimensions of the Copenhagen Burnout Inventory is presented in Table 2. There is a significant difference among gender, marital status, and speciality, while no significant differences among other parameters. Table 3 shows the analysis of variance test for the effect of work factors on the 3 dimensions of the Copenhagen Burnout Inventory in relation to the total number of working hours per week or session. The Spearman correlations between the 3 dimensions of the

Copenhagen Burnout Inventory and work factors are presented in Table 4.

4. Discussion

To the best of our knowledge, this is the first study to deal with burnout syndrome among dental residents of the Saudi Dental Board. So, this study aimed to determine the prevalence of Burnout among Saudi dental board residents of all dental specialties at all levels of residency in different provinces of Saudi Arabia. In the present study, the overall prevalence of burnout was 46.3%. This rate was lower than the prevalence of burnout in India, United States, Pakistan, Korea, Netherlands, and Brazil,^[2,4,15,25–28] but higher than that in South Africa by Stein et al^[29] Also, this value was marginal with values counted in studies carried out in SA among non-dental students.^[17,18,20,21]

More specifically, the prevalence of free/minimal burnout was 53.7%, and the significant burnout prevalence was 46.3%. It was highly challenging to directly compare our study's findings about the prevalence of burnout with other research since most studies just presented the overall prevalence of burnout rather than being more precise in their illustration of burnout values as minimal and maximal levels. Only one study conducted by Abdoalshamat et al, however, followed the same representation of burnout prevalence as our analysis, in which the prevalence of normal or low burnout was 32.1% and the prevalence of high or significant burnout was 67.9%. Similar values were reported in different intranational medical studies.^[18,20,21]

Unlike many previous studies on burnout, this study utilized the Copenhagen Burnout Inventory (CBI), which is a new tool for the assessment of burnout based on the evaluation of 3 domains; personal-related, work-related, and patient-related burnout. For each domain of burnout (personal, work-related, and patient-related), the average score was calculated, and subsequently, different results occurred. This scale was employed because CBI was determined to have excellent validity and reliability, and nonresponse rates were low since CBI questions are more straightforward than MBI HSS questions heavily which mostly focused on American culture and were not likely to apply to other populations.^[10,30]

In our study, the 3 burnout domains with the highest frequency were work-related (60.0%), then patient-related

(40.0%), and personal (38.2%). These findings are fairly similar to those presented by other investigators.^[25,30] According to Altam et al among medical students in Egypt, work-related burnout had the highest prevalence (60%), followed by personal burnout (56.8%), and finally patient-related burnout (28.9%).^[30] However, some research contradicts our findings about which factors contribute to the highest amount of burnout.^[10,30] A study by Fernando and Samaranayake among post-graduate doctors, showed that personal burnout accounts for the highest prevalence of burnout (41.60%), then work-related (30.6%), and patient-related (8.9%).^[25] According to another research by Chin et al, among medical students in China, personal burnout accounted for 81.6% of all cases, followed by work-related 73.7%, and patient-related 68.6%.^[31] Another research among Saudi Arabian Urology residents revealed that personal burnout was the highest, followed by work-related burnout and patient-related burnout, which was the lowest.^[22]

The present study has incorporated a wide range of factors, including (gender, marital status, dental specialty, training level, and a number of working hours). In terms of gender, there was no discernible difference between males and females in the mean values of the various types of burnouts, including personal, work-related, and patient-related burnout. However, the frequency of burnout was shown to differ between the 2 genders in several research.^[21,25] Research published by Mahfouz et al, among medical students in Saudi Arabia, found that burnout was most common among females.^[21] Similar results were found in another study conducted in Sri Lanka by Fernando and Fernando BM, Samaranayake, where females accounted for the highest level of burnout. This may be explained by the fact that both males and females in the Saudi dental board residents had the same duties, a similar workload, and the same level of pressure from their working environment.^[25] No different between gender because they work in the same organization under the same regulations and work hours. Females are more affected by their working environments in comparison to males, and this could be related to genetic factors,^[32,33] Other social habits may associate with increasing those stresses.^[34]

Regarding the training levels, our study included all the different Saudi dental board training levels: R1 and R2 (junior level), and R3 (Senior level). The R2 level was the highest in terms of personal, work-related, and patient-related burnout with the prevalence of (64.7%), and (70.6%), (41.2%), respectively. Comparably, Aboalshamat et al found in a study of medical and

Table 2

Analysis for the effect of demographic factor on the 3 dimensions of the Copenhagen Burnout Inventory.

| Variables | | Personal burnout | | Work-related burnout | | Patient-related burnout | |
|--------------------------------|-----------------------|------------------|----------|----------------------|----------|-------------------------|----------|
| | | Mean (SD) | P values | Mean (SD) | P values | Mean (SD) | P values |
| Gender | Male | 55.1 (23.3) | .07 | 54.9 (19.3) | .05* | 48.9 (24.7) | .05* |
| | Female | 61.4 (16.4) | | 61.6 (13.4) | | 51.3 (16.4) | |
| Marital status | Single | 57.3 (19.6) | .2 | 57.1 (14.7) | .1 | 49.3 (17.9) | .008* |
| | Married | 60.1 (22.3) | | 62.1 (21.2) | | 52.3 (27.4) | |
| | Divorced | 45.8 (0.0) | | 46.4 (0.0) | | 50.0 (0.0) | |
| | | 63.7 (8.9) | .000* | 67.8 (0.0) | .000* | 67.3 (4.4) | .001* |
| Specialty | Endodontics | 63.7 (8.9) | .000* | 67.8 (0.0) | .000* | 67.3 (4.4) | .001* |
| | Prosthodontics | 59.3 (14.2) | | 58.7 (14.1) | | 52.7 (18.1) | |
| | Restorative dentistry | 53.6 (26.9) | | 56.7 (22.0) | | 49.2 (26.6) | |
| | Orthodontics | 39.8 (14.7) | | 42.5 (5.4) | | 26.5 (9.3) | |
| | Periodontics | 75.0 (0.0) | | 71.4 (0.0) | | 54.2 (0.0) | |
| | Family dentistry | 95.8 (0.0) | | 82.1 (0.0) | | 54.2 (0.0) | |
| Training level | R1 | 59.2 (12.3)2 | .4 | 63.4 (13.7) | .05* | 55.5 (12.9) | .1 |
| | R2 | 60.6 (20.1) | | 58.3 (16.7) | | 46.7 (20.6) | |
| | R3 | 54.8 (25.3) | | 54.1 (18.4) | | 48.1 (25.5) | |
| Region of your training center | Central | 61.4 (21.3)2 | .05* | 59.4 (17.5) | .6 | 52.9 (22.6) | .2 |
| | Western | 48.3 (22.2) | | 54.5 (19.0) | | 44.8 (26.7) | |
| | Southern | 53.7 (14.5) | | 57.4 (14.3) | | 45.9 (10.9) | |

*Significant difference at P-value ≤ .05.

Table 3**ANOVA test for the effect of work factors on the 3 dimensions of the Copenhagen Burnout Inventory.**

| Dimensions of the Copenhagen Burnout Inventory. | Total number of working and scientific sessions/week | | Number of hours/sessions | |
|---|--|--------------------------|--------------------------|---------------------------|
| | Sessions/week | Mean (SD) | Hours/session | Mean (SD) |
| Personal burnout | 6 or < 6 sessions/week | 51.9 (10.6) ^A | 2 hours/session | 58.9 (6.9) ^{ab} |
| | 7–8 sessions/week | 54.8 (22.7) ^A | 3 hours/session | 66.1 (17.2) ^a |
| | 9–10 sessions/week | 69.9 (18.9) ^B | 4 hours/session | 53.0 (22.3) ^b |
| | <i>P</i> -value | .001* | <i>P</i> -value | .009* |
| Work-related burnout | 6 or < 6 sessions/week | 53.2 (9.2) ^A | 2 hours/session | 55.5 (8.1) ^{ab} |
| | 7–8 sessions/week | 55.2 (18.7) ^A | 3 hours/session | 65.4 (13.2) ^a |
| | 9–10 sessions/week | 69.6 (14.4) ^B | 4 hours/session | 54.9 (18.8) ^b |
| | <i>P</i> -value | .000* | <i>P</i> -value | .01* |
| Patient-related burnout | 6 or < 6 sessions/week | 42.1 (12.9) ^A | 2 hours/session | 49.0 (16.6) ^{ab} |
| | 7–8 sessions/week | 48.1 (22.3) ^A | 3 hours/session | 58.9 (21.2) ^a |
| | 9–10 sessions/week | 62.6 (19.9) ^B | 4 hours/session | 45.4 (20.0) ^b |
| | <i>P</i> -value | .000* | <i>P</i> -value | .008* |

Means with a different superscript capital letter are statistically significant with Tukey HSD at $P \leq .05$.Means with a different superscript small letter are statistically significant with Tukey HSD at $P \leq .05$.*Significant difference at P -value $\leq .05$.**Table 4****Spearman correlations between the 3 dimensions of the Copenhagen Burnout Inventory and work factors.**

| Variables | Number of sessions/weeks | Number of hours/sessions | Personal burnout | Work-related burnout | Patient-related burnout |
|--------------------------|--------------------------|--------------------------|------------------|----------------------|-------------------------|
| <i>Spearman rho</i> | | | | | |
| Number of sessions/weeks | Correlation coefficient | – | 0.142 | 0.321** | 0.359** |
| | Sig. (2-tailed) | | 0.140 | 0.001 | 0.000 |
| Number of hours/sessions | Correlation coefficient | – | -0.204* | -0.136 | -0.175 |
| | Sig. (2-tailed) | | 0.033 | 0.160 | 0.069 |
| Personal burnout | Correlation coefficient | | – | 0.887** | 0.711** |
| | Sig. (2-tailed) | | | 0.000 | 0.000 |
| Work-related burnout | Correlation coefficient | | | – | 0.727** |
| | Sig. (2-tailed) | | | | 0.000 |

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

dentistry students in Saudi Arabia that the prevalence of burnout rises with the level of study, with those in the last years of studies experiencing significant levels of burnout.^[23] Similarly, research done among medical students in Egypt found that as clinical level of study increases, so does the prevalence of burnout increase.^[30]

Taking the number of working hours into account, there is a substantial statistical difference among participants in work-related burnout. In contrast to those who worked for 4 hours, who had just (46.4%), those who worked for 3 hours experienced (76.2%) work-related burnout. According to research done by Alsulimani et al^[20] in Saudi Arabia among healthcare professionals, the more hours the doctor works, the greater the likelihood of burnout is.^[20] It further supported the substantial link between the number of hours worked and burnout levels. This may be explained by the fact that neither dentistry nor medical students had any clinical encounters with patients during their initial years of study, however, in later years the growing integration of students into clinical practice with various sessions and more clinical hours completely raises the overload on the students and thus increases the levels of burnout.

Our study covered 6 dental specialties from a total of 110 individuals (32 restorative dentistry, 46 prosthodontics, 16 endodontics, 10 periodontics, and 6 orthodontics). The greatest mean levels of burnout were reported by endodontists and periodontists (62.04 and 60.52), respectively. This result was undoubtedly original and challenging compared to any previous research. The fact, among dental residents in Saudi Arabia or

even those in other countries, our study was the first of its kind. While, according to the present results, in relation to marital status can be a risk factor for burnout since married individuals had higher levels of burnout than single participants on all 3 of the study's scales: personal, work-related, and patient-related. Contrarily, Aboalshamat et al^[23] demonstrated that marital status did not significantly affect levels of burnout.^[23]

There is a significant prevalence of burnout during the COVID-19 pandemic among health workers such as doctors and support staff as well as students with different types and levels of studies as demonstrated by studies published in different countries.^[16,20,35–37]

Our study has a few limitations, such as; not all specialized training centers are included, not all of Saudi Arabia's cities were engaged, in comparison to previous global research, the sample size was smaller, and other factors that may have an impact on burnout were not addressed, such as residence with family, participants' health state, history of chronic illnesses, and family monthly income. The strength of this study is that the included number of participants are covering most of the dental speciality in the Saudi Board Program, and the samples were from different training centers in the country.

5. Conclusions

From this cross-sectional survey study, the following conclusions were drawn. The burnout can be considered as high with no difference in the level of burnout in relation to the training

center, and it was slightly higher in females without any significance. Also, types of burnout were marginally similar between training levels, while the significant category was slightly higher in R3 without any significance. In relation to different specialties, all types of burnouts were high and each other with significant categories among restorative and prosthodontic speciality participants. Among marital status, all types of burnout were higher among married with significant category than among married participants. More studies, including a larger number of participants should be conducted.

Acknowledgements

None.

Author contributions

Conceptualization: Saeed M. Alqahtani, Saurabh Chaturvedi, Asma Ali Hezam, Ahmed Alshahrani, Mohammed Alkhurays, Mohammed M. Al Moaleem, Rahaf Ali Mohammad Alqhtani, Bashayer Mohammed Ali Asiri.

Data curation: Saeed M. Alqahtani, Saurabh Chaturvedi, Asma Ali Hezam, Ahmed Alshahrani, Mohammed Alkhurays, Mohammed M. Al Moaleem, Rahaf Ali Mohammad Alqhtani, Bashayer Mohammed Ali Asiri, Sarah Ebrahim Ali Zahir.

Formal analysis: Saeed M. Alqahtani, Saurabh Chaturvedi, Asma Ali Hezam, Ahmed Alshahrani, Mohammed Alkhurays, Mohammed M. Al Moaleem, Rahaf Ali Mohammad Alqhtani, Bashayer Mohammed Ali Asiri, Sarah Ebrahim Ali Zahir.

Funding acquisition: Saeed M. Alqahtani, Saurabh Chaturvedi, Asma Ali Hezam, Ahmed Alshahrani, Mohammed Alkhurays, Mohammed M. Al Moaleem, Rahaf Ali Mohammad Alqhtani, Bashayer Mohammed Ali Asiri, Sarah Ebrahim Ali Zahir.

Investigation: Saeed M. Alqahtani, Saurabh Chaturvedi, Asma Ali Hezam, Mohammed Alkhurays, Mohammed M. Al Moaleem, Rahaf Ali Mohammad Alqhtani, Bashayer Mohammed Ali Asiri, Sarah Ebrahim Ali Zahir.

Methodology: Saeed M. Alqahtani, Saurabh Chaturvedi, Asma Ali Hezam, Mohammed M. Al Moaleem, Rahaf Ali Mohammad Alqhtani, Bashayer Mohammed Ali Asiri, Sarah Ebrahim Ali Zahir.

Project administration: Saeed M. Alqahtani, Saurabh Chaturvedi, Asma Ali Hezam, Rahaf Ali Mohammad Alqhtani, Bashayer Mohammed Ali Asiri, Sarah Ebrahim Ali Zahir.

Resources: Saeed M. Alqahtani, Saurabh Chaturvedi, Asma Ali Hezam, Rahaf Ali Mohammad Alqhtani.

Software: Saeed M. Alqahtani, Saurabh Chaturvedi, Asma Ali Hezam.

Supervision: Saeed M. Alqahtani, Saurabh Chaturvedi, Asma Ali Hezam.

Validation: Saeed M. Alqahtani, Saurabh Chaturvedi, Asma Ali Hezam, Ahmed Alshahrani.

Visualization: Saeed M. Alqahtani, Saurabh Chaturvedi, Asma Ali Hezam, Ahmed Alshahrani.

Writing – original draft: Saeed M. Alqahtani, Saurabh Chaturvedi, Asma Ali Hezam, Sarah Ebrahim Ali Zahir.

Writing – review & editing: Saeed M. Alqahtani, Saurabh Chaturvedi, Asma Ali Hezam, Ahmed Alshahrani, Mohammed Alkhurays, Mohammed M. Al Moaleem, Rahaf Ali Mohammad Alqhtani, Bashayer Mohammed Ali Asiri, Sarah Ebrahim Ali Zahir.

References

[1] World Health Organization. Burn-out an “occupational phenomenon”: International Classification of Diseases. Geneva, Switzerland: World Health Organization; 2019. Available at: <https://www.who.int/news/item/28-05-2019-burn-out-an-occupational-phenomenon-international-classification-of-diseases> [access date March 10, 2023].

[2] Kulkarni S, Dagli N, Duraiswamy P, et al. Stress and professional burnout among newly graduated dentists. *J Int Soc Prev Community Dent.* 2016;6:535–41.

[3] Khanagar SB, Al-Ehaideb A, Jamleh A, et al. Psychological distress among undergraduate dental students in Saudi Arabia and its coping strategies—a systematic review. *Healthcare (Basel).* 2021;9:429.

[4] Pöhlmann K, Jonas I, Ruf S, et al. Stress, burnout and health in the clinical period of dental education. *Eur J Dent Educ.* 2005;9:78–84.

[5] Rada RE, Johnson-Leong C. Stress, burnout, anxiety and depression among dentists. *J Am Dent Assoc.* 2004;135:788–94.

[6] Awa WL, Plaumann M, Walter U. Burnout prevention: a review of intervention programs. *Patient Educ Couns.* 2010;78:184–90.

[7] Singh P, Aulak DS, Mangat SS, et al. Systematic review: factors contributing to burnout in dentistry. *Occup Med (Oxf).* 2016;66:27–31.

[8] Maslach C, Jackson SE, Leiter MP. Maslach Burnout Inventory. In: *Evaluating Stress: A Book of Resources.* 3rd ed. Lanham: Scarecrow Education; 1997: 191–218. Available at: [https://www.scirp.org/\(S\(i43dyn45teexjx455qlt3d2q\)\)/reference/ReferencesPapers.aspx?ReferenceID=1389595](https://www.scirp.org/(S(i43dyn45teexjx455qlt3d2q))/reference/ReferencesPapers.aspx?ReferenceID=1389595) [access date March 10, 2023].

[9] Kesarwani V, Husaain ZG, George J. Prevalence and factors associated with burnout among healthcare professionals in India: a systematic review and meta-analysis. *Indian J Psychol Med.* 2020;42:108–15.

[10] Kristensen TS, Borritz M, Villadsen E, et al. The Copenhagen Burnout Inventory: a new tool for the assessment of burnout. *Work Stress.* 2005;19:192–207.

[11] Tanner G, Bamberg E, Kozak A, et al. Hospital physicians’ work stressors in different medical specialties: a statistical group comparison. *J Occup Med Toxicol.* 2015;10:1–8.

[12] Alahmari MA, Al Moaleem MM, Hamdi BA, et al. Prevalence of burnout in healthcare specialties: a systematic review using Copenhagen and Maslach burnout inventories. *Med Sci Monit.* 2022;28:e938798.

[13] Denton DA, Newton JT, Bower EJ. Occupational burnout and work engagement: a national survey of dentists in the United Kingdom. *Br Dent J.* 2008;205:E13; discussion 382–3.

[14] Santabárbara J, Ozamiz-Etxebarria N, Idoiaga N, et al. Meta-analysis of prevalence of depression in dental students during COVID-19 pandemic. *Medicina (Kaunas).* 2021;57:1278.

[15] Gorter RC, Freeman R. Burnout and engagement in relation with job demands and resources among dental staff in Northern Ireland. *Community Dent Oral Epidemiol.* 2011;39:87–95.

[16] Antoniadou M. Estimation of factors affecting burnout in Greek dentists before and during the COVID-19 pandemic. *Dent J (Basel).* 2022;10:108.

[17] Al-Jehani YM, Althwanay AM, Buainain HM, et al. Burnout prevalence and associated stressors in medical students of traditional and problem-based learning curricula in a Saudi University. *Saudi J Med Sci.* 2020;8:125–32.

[18] Almalki SA, Almojali AI, Althman AS, et al. “Burnout and its association with extracurricular activities among medical students in Saudi Arabia”. *Int J Med Educ.* 2017;8:144–50.

[19] Chalikkandy S, Alhifzi RS, Asiri MA, et al. Burnout and its relation to emotion dysregulation and social cognition among female interns and undergraduate dental students at King Khalid University. *Appl Sci.* 2022;12:1588.

[20] Alsulimani LK, Farhat AM, Borah RA, et al. Health care worker burnout during the COVID-19 pandemic: a cross-sectional survey study in Saudi Arabia. *Saudi Med J.* 2021;42:306–14.

[21] Mahfouz MS, Ali SA, Alqahtani HA, et al. Burnout and its associated factors among medical students of Jazan University, Jazan, Saudi Arabia. *Ment Illn.* 2020;12:35–42.

[22] Aljuhayman AM, Alkhamees MA, Alkanhal HF, et al. Assessment of burnout among urology residents in KSA: a cross-sectional study. *J Taibah Univ Med Sci.* 2021;16:29–33.

[23] Aboalshamat K, Alzahrani M, Rabie N, et al. The relationship between burnout and perfectionism in medical and dental students in Saudi Arabia. *J Dent Specialties.* 2017;5:122–7.

[24] Ploicy WMA. WMA declaration of Helsinki – ethical principles for medical research involving human subjects Brazil: World Medical Association; 2013. Available at: <https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/> [access date March 10, 2023].

[25] Fernando BM, Samaranyake DL. Burnout among postgraduate doctors in Colombo: prevalence, associated factors and association with self-reported patient care. *BMC Med Educ.* 2019;19:1–9.

[26] Muzafar Y, Khan HH, Ashraf H, et al. Burnout and its associated factors in medical students of Lahore, Pakistan. *Cureus.* 2015;7:e390.

- [27] Dyrbye LN, Massie FS, Eacker A, et al. Relationship between burnout and professional conduct and attitudes among US medical students. *JAMA*. 2010;304:1173–80.
- [28] Wolf MR, Rosenstock JB. Inadequate sleep and exercise associated with burnout and depression among medical students. *Acad Psychiatry*. 2017;41:174–9.
- [29] Stein C, Sibanda T. Burnout among paramedic students at a university in Johannesburg, South Africa. *Afr J Health Prof Educ*. 2016;8:193–5.
- [30] Atlam SA. Burnout syndrome: determinants and predictors among medical students of Tanta University, Egypt. *Egypt J Community Med*. 2018;36:61–73.
- [31] Chin RW, Chua YY, Chu MN, et al. Prevalence of burnout among Universiti Sains Malaysia medical students. *Educ Med J*. 2016;8:61–74.
- [32] Alyousefy MA, Shaiban AS, Alaajam WH, et al. Questionnaire-based study on the prevalence, awareness, and preventive measures of occupational hazards among dental professionals. *Med Sci Monit*. 2022;28:e938084.
- [33] AlDhelai TA, Al-Ahmari MM, Adawi HA, et al. Dental anxiety and fear among patients in Jazan, Kingdom of Saudi Arabia: a cross-sectional study. *J Contemp Dent Pract*. 2021;22:549–56.
- [34] Jumaymi AK, Faqehi WH, Hamdi SA, et al. Level of dental anxiety and its relation to Khat Chewing in Jazan population: a cross-sectional study. *J Contemp Dent Pract*. 2020;21:253–60.
- [35] Khasne RW, Dhakulkar BS, Mahajan HC, et al. Burnout among health-care workers during COVID-19 pandemic in India: results of a questionnaire-based survey. *Indian J Crit Care Med*. 2020;24:664–71.
- [36] Al Moaleem MM. Anxiety during COVID-19 among Saudi Arabian population: a systematic review. *World J Dent*. 2022;13:87–94.
- [37] Oprisan A, Baettig-Arriagada E, Baeza-Delgado C, et al. Prevalence of burnout syndrome during the COVID-19 pandemic and associated factors. *Radiologia*. 2022;64:119–27.