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## ORIGINAL ARTICLE

# Dental faculty well-being amid COVID-19 in fall 2020: A multi-site measure of burnout, loneliness, and resilience

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#Sophia Saeed was at UTHHealth School of Dentistry at the time data were collected and analyzed.

## Abstract

**Purpose/objectives:** This study aimed to understand the impact of the COVID-19 pandemic on dental school faculty's self-reported burnout, loneliness, and resilience.

**Methods:** A 34-item questionnaire composed of three previously validated scales – adapted Copenhagen Burnout Inventory, the brief resilience scale, and a short loneliness scale – and demographic information was sent by email to dental school faculty in four dental schools across the US during the sixth and seventh months of the COVID-19 pandemic.

**Results:** Two-hundred sixteen (19.63%) of faculty invited to participate completed the survey. On a scale of five, with five indicating extreme burnout and one indicating no burnout, the average personal burnout was 2.7 (SD = 0.83), and work-related burnout (WRB) was 2.8 (SD = 0.83). Personal and WRB decreased with increasing age. WRB was significantly higher among full-time faculty, females, and those living alone. Faculty who lived alone experienced more loneliness than those who lived with others. Resilience was not a statistically significant difference across demographic groups. Regarding the impact of COVID-19 pandemic on their burnout, loneliness, and resilience on a scale ranging from “Never” (scored as 1) to “A great deal” (scored as 5), the average response for burnout was 3.3 (SD = 1.01), loneliness was 2.6 (SD = 1.10), and resilience was 2.8 (SD = 0.99).

**Conclusion(s):** While self-reported burnout and resilience scores did not show a significant increase during the pandemic, the rates of burnout and loneliness remain higher than the public. Dental education has real challenges and opportunities to explore individual and organizational interventions to combat burnout and loneliness and enhance resilience among faculty.

## KEYWORDS

burnout, faculty development, loneliness, organizational culture, resilience, well-being

## 1 | INTRODUCTION

Surveys have been used to measure burnout rates among oral health providers, including new dentists, students (pre- and post-graduate), practicing dentists, and dental school faculty in the US.<sup>1-4</sup> Research demonstrates that approximately one in eight clinical dentists suffer from burnout.<sup>3</sup> Dental educators, like other health professions educators, have responsibilities in addition to patient care, such as scholarship, teaching, administration, advising and mentoring, committee service, and advocacy; these added responsibilities may increase their risk for burnout. In addition to workload, health professionals experience a number of other stressors that can impact professional practice such as adverse events, bullying, abuse and violence, imposed organizational change, and the lack of supportive relationships.<sup>5,6</sup> Clinicians and educators who identify as minorities, whether by race, gender identity, sexual orientation, religion, ability, or otherwise, may experience even higher rates of burnout because of the extra energy expended on code-switching and combating microaggressions.

Another growing public health issue is loneliness and the adverse health effects associated with it.<sup>7,8</sup> Loneliness is increasingly characterized as an epidemic and often a silent one.<sup>9-12</sup> Loneliness is defined by a gap between the social connectedness one *wants* and what one feels they *actually have*. This is often discussed together with social isolation, which is distinct from loneliness and is defined by numbers – contact frequency relative to social network size. The frequency of feeling left out, feeling isolated, and feeling a lack of companionship each factor into this characterization of loneliness.<sup>13</sup> Both loneliness and social isolation are linked to poorer physical and mental health as well as decreased longevity.<sup>7,8</sup>

Complicating matters was the onset of the COVID-19 pandemic. As an emerging infectious disease with rapid spread, many parts of the world mandated self-isolation, followed by phased re-openings; social distancing remained in effect in many parts of the US at the time of publication, amplifying concerns of loneliness. Many people, however, were able to find other ways to connect. While essential, increased use of video communication technologies brought frustrations, fatigue, adaptation, and an appreciation for communication skills in a variety of formats and modalities. The depersonalization and disembodiment of video and audio interfaces challenged our innate desire to connect with others. The turbulence and ambiguity of the COVID-19 pandemic created circumstances ripe for burnout and loneliness; individuals and dental schools tried to counteract these forces by focusing on resilience.

Resilience is a complex and multi-faceted construct.<sup>14</sup> A wide range of definitions can be found in the literature, but most reflect the ability to "recover" from adversity, react appropriately, or "bounce back" when life presents challenges. Resilience allows individuals to adapt positively to stressful working conditions, manage emotional demands, foster effective coping strategies, improve well-being, and enhance professional growth.<sup>15</sup> In Great Britain, self-guided professional development packages have been shown to reduce symptoms of burnout, anxiety, stress, and depression by providing dentists with coping tools, mechanisms, and resilience training.<sup>16</sup> Demographic factors are a key aspect of resilience research. Some studies have found males exhibiting higher levels of resilience, while some have found females to be more resilient, and others have found no gender difference.<sup>17</sup> Different results across these studies are thought to be a cultural dimension of resilience conceptually. For this reason, investigating different sample populations has been encouraged.<sup>17</sup>

Limited research measuring resilience in dental faculty has been conducted. One study examined happiness and satisfaction across a school of dentistry community including faculty, alumni, and students.<sup>18</sup> However, resilience among dental students is being explored, and studies have found that dental students demonstrated relatively high levels of resilience. Overall health ratings were significantly related to resilience, suggesting that perceived resilience in dental students may protect against negative health outcomes.<sup>19</sup> Studies specific to COVID-19 found that dental and dental hygiene students whose graduation plans had changed since the COVID-19 outbreak had lower resilience scores.<sup>20</sup> A helpful and hopeful aspect of resilience, particularly in respect to healthcare providers and educators, is that the research is unified in suggesting that resilience has the ability to be cultivated, honed, and taught.<sup>21</sup> It is not merely an innate quality, but one that educational programs and health systems ought to consider for inclusion in their programmatic efforts.

Many contributors of burnout existed before the COVID-19 pandemic. The effects of pandemics on dental faculty well-being highlight a significant research gap.<sup>22</sup> This study aimed to understand the impact of the COVID-19 pandemic on dental school faculty's self-reported burnout, loneliness, and resilience.

## 2 | METHODS AND MATERIALS

The institutional review boards (IRBs) at each institution approved this study as exempt – Virginia Commonwealth University (HM20019480), University of Minnesota (STUDY00010083), University of Texas Health Science

Houston (HSC-DB-20-0649), and Harvard University (MOD18-1287-02). Dental schools participating represented private (1) and public (3) institutions from four different states and regions of the US, namely Southern/East Coast, Southwest, Midwest, And Northeast.

All dental faculty at each participating school were invited by email to respond to a 34-item electronic survey in September and October 2020. The survey included validated instruments for burnout, resilience, and loneliness – the Copenhagen Burnout Inventory (CBI), the brief resilience scale (BRS), and the three-item loneliness scale; six demographic questions (school, age, gender, race/ethnicity, living arrangements, and employment status); and five questions specific to the impact of the COVID-19 pandemic.<sup>6,23,24</sup> The five questions specific to the impact of the COVID-19 pandemic refer to three summary questions and two questions regarding job joy and stress. The three summary questions (how has the COVID-19 pandemic affected overall burnout, resilience, and loneliness) were Likert scale from least to most. While stress and joy questions were close-ended, multiple choice, “during the COVID-19 pandemic, which of the following activities has resulted in the most stress?” Closed ended, multiple choice options included academic administrative responsibilities, research, and pursuit of grants and funding, clinical care, scholarly work and publication, teaching, and service. Participation was voluntary, and support resources were suggested for respondents in need. The survey was administered using research electronic data capture (REDCap) tools hosted at Virginia Commonwealth University. REDCap is a secure, web-based software platform designed to support data capture for research studies.<sup>25</sup>

All psychometric instruments were scored according to the instrument documentation. Item reliability was assessed for each of the validated instruments using Cronbach’s Alpha. CBI: personal burnout (PB) and CBI: work-related burnout (WRB) scores were calculated by averaging the responses to each item.<sup>23</sup> The three-item loneliness scale was the sum of the scores for the three items.<sup>13</sup> Additionally, participants were classified as “lonely” if their total loneliness score was 6 or above.<sup>26–28</sup> The BRS was scored by averaging the responses by the number of questions that were answered.<sup>24</sup> Multiple linear regression models were utilized to determine associations between faculty characteristics (age, gender, employment status, and living arrangements) and the various psychometric scores (PB, WRB, loneliness, and resilience). Post hoc pairwise comparisons were adjusted using Tukey’s adjustment. Logistic regression was used to determine the association between faculty characteristics and classification as “lonely.” Significance level was set at 0.05. SAS EG v.8.2 (SAS Institute, Cary, NC) was used for all analyses.

### 3 | RESULTS

A total of 216 faculty members from the four schools participated in the study. Study email invitations were sent via faculty listservs at participating institutions to a total 1100 prospective participants. Response rate across the schools was 19.63% and ranged from 9.74% (30/308) to 51.8% (47/92) per school. Gender was nearly evenly split with 51% male, 48% female, and two chose not to report. Racial and ethnic identities were White (77%), followed by Asian (11%), Hispanic (7%), Black or African American (4%), other (6%), and American Indian or Alaskan Native (1%). The majority were full-time faculty (73%), followed by part-time (21%), and unpaid (5%). Respondents could select all that apply in terms of living arrangements, and 15% reported living alone, 77% reported living with a spouse or significant other, 19% have children college or beyond, 12% live with children in high school, 15% have middle school-aged kids, and 13% have infants through kindergarteners. Others reported living with friends or roommates ( $n = 1$ , 0%) or other family members (7%). These living arrangements were categorized into the following categories: living alone (15%), with spouse or other adults (38%), older kids (22%), and young kids (25%). Complete demographics are given in Table 1.

All instruments demonstrated strong internal consistency of the items: loneliness ( $\alpha = 0.86$ ), CBI: PB ( $\alpha = 0.92$ ), CBI: WRB ( $\alpha = 0.90$ ), BRS ( $\alpha = 0.83$ ). A summary of the responses to the individual items on the CBI is presented in Table 2. Burnout, loneliness, and resilience scores were averaged across the respondents and are presented in Table 3.

#### 3.1 | Burnout: PB

CBI: PB was significantly associated with age ( $p$ -value = 0.0020) and with gender ( $p$ -value = 0.0407). PB was marginally associated with employment status ( $p$ -value = 0.0645). Specifically, as age increased, CBI: PB scores decreased by an average of 0.17 points per 10-year increase in age (95% CI: 0.06–0.28). Females on average had a higher PB than males (2.81 vs. 2.58,  $p$ -value = 0.0407). Although the differences were not statistically significant, those who lived alone had the highest PB (2.95, SE = 0.15) followed by those with younger kids (2.67, SE = 0.15), older kids (2.62, SE = 0.14), and those who lived with a spouse or other adults (2.54, SE = 0.11). In terms of employment status, paid full-time faculty had the highest PB (2.86, SE = 0.06) followed by unpaid faculty (2.68, SE = 0.24), and paid part-time (2.55, SE = 0.12). Results are given in Table 4. The average response for burnout was 3.3 (SD = 1.01),

**TABLE 1** Respondent demographics

	Mean	SD
Age	53.65	12.46
	<i>n</i>	%
School		
Harvard School of Dental Medicine	30	14%
University of Minnesota School of Dentistry	81	38%
UT Health School of Dentistry at Houston	57	26%
Virginia Commonwealth University School of Dentistry	47	22%
Did not report	1	0%
Gender		
Male	111	51%
Female	103	48%
Not reported	2	1%
Race/Ethnicity		
American Indian or Alaska Native	2	1%
Asian	24	11%
Black or African American	8	4%
White	167	77%
Other	12	6%
Hispanic	15	7%
Living arrangements		
Alone	32	15%
Friend(s) or roommate(s)	1	0%
Spouse/Significant other	166	77%
Child(ren): Infants through Kindergarten	29	13%
Child(ren): Elementary through Middle School	33	15%
Child(ren): High School	25	12%
Child(ren): College and Beyond	41	19%
Other family member(s)	16	7%
Employment status		
Paid full-time faculty	157	73%
Paid part-time faculty	46	21%
Unpaid faculty	11	5%

Abbreviation: SD, standard deviation.

loneliness was 2.6 (SD = 1.10), and resilience was 2.8 (SD = 0.99).

### 3.2 | Burnout: WRB

CBI: WRB was significantly associated with age ( $p$ -value = 0.0002), gender ( $p$ -value = 0.0206), employment status ( $p$ -value = 0.0134), and living arrangements ( $p$ -value = 0.0164). Similar to PB, WRB also decreased with age by an average of 0.21 points per 10-year increase in age (95% CI: 0.10–0.32). Females had significantly higher WRB than males (2.85 vs. 2.59). Full-time faculty members had

the highest average WRB with an average of 2.96, which was significantly higher than the average of 2.60 for part-time faculty, but not significantly different from unpaid part-time faculty, although they had the same average CBI: WRB score (2.60) due to decreased precision of the estimate (i.e., lower sample size). WRB was also highest for those living alone (3.05), which was significantly higher than those with younger kids (2.51) and those who live with a spouse or other adults (2.61). Results are given in Table 4.

### 3.3 | Burnout summary

The average CBI PB was 2.7 (SD = 0.83), and CBI WRB was 2.8 (SD = 0.83), both of a possible 5 points with higher scores indicating higher burnout.

### 3.4 | Loneliness

The three-item loneliness scale had an average loneliness of 4.8 (possible 9 points, SD = 1.98), and 31% ( $n = 68$ ) were considered “lonely” based on a score of 6 or higher. Loneliness according to the three-point loneliness scale was significantly associated with living arrangements ( $p$ -value < 0.0001), and marginally associated with employment status ( $p$ -value = 0.0838). Individuals who lived alone reported a significantly higher loneliness level than all other groups of respondents (7.05 vs. 4.74–5.25, adjusted  $p$ -value < 0.05). Estimated mean loneliness was higher by an average of 2.3 compared to those who lived with just a spouse or other adult (95% CI: 1.2–3.4), an average of 2.1 for those who lived with older kids (95% CI: 0.9–3.3), and 1.8 for those who lived with younger kids (95% CI: 0.6–3.0). There were no significant differences among the other three living arrangements. Complete results are given in Table 5.

### 3.5 | Brief resilience scale

The average BRS score was 3.6 (possible 5 points, SD = 0.73), with higher scores indicating increased resilience. Respondents were also asked about the impact of the COVID-19 pandemic on their burnout, loneliness, and resilience on a scale ranging from “Never” (scored as 1) to “A great deal” (scored as 5). Resilience was not statistically significantly related to any of the variables considered: age ( $p$ -value = 0.1180), gender ( $p$ -value = 0.1465), employment status ( $p$ -value = 0.2906), or living arrangements ( $p$ -value = 0.2655). Although not significant, females had slightly lower BRS scores than males (95% CI: –0.06–0.37) and individuals who lived alone or with young kids had lower average scores than those who

TABLE 2 Summary of responses to Copenhagen Burnout Inventory (CBI) for personal and work-related burnout

	Never (scoring 1)	Seldom (scoring 2)	Sometimes (scoring 3)	Often (scoring 4)	Always (scoring 5)	Mean (SD)
<b>CBI: Personal burnout (alpha = 0.9126)</b>						2.7 (0.83)
How often do you feel tired?	3%	18%	33%	40%	5%	3.3 (0.92)
How often are you physically exhausted?	11%	28%	36%	24%	2%	2.8 (0.99)
How often are you emotionally exhausted?	10%	23%	34%	29%	4%	2.9 (1.04)
How often do you think: "I can't take it anymore"?	34%	31%	25%	9%	1%	2.1 (1.03)
How often do you feel worn out?	9%	23%	36%	25%	7%	3.0 (1.06)
How often do you feel weak and susceptible to illness?	25%	41%	25%	7%	1%	2.2 (0.94)
<b>CBI: Work-related burnout (alpha = 0.9044)</b>						2.8 (0.83)
How often do you feel worn out at the end of the working day?	4%	13%	31%	38%	13%	3.4 (1.02)
How often are you exhausted in the morning at the thought of another day at work?	22%	25%	27%	24%	2%	2.6 (1.15)
How often do you feel that every working hour is tiring for you?	27%	29%	27%	16%	1%	2.3 (1.09)
How often do you have enough energy for family and friends during leisure time? (Reverse Scored)	3%	12%	32%	40%	13%	2.5 (0.97)
How often is your work emotionally exhausting?	9%	24%	38%	26%	4%	2.9 (1.00)
How often does your work frustrate you?	5%	22%	43%	24%	5%	3.0 (0.93)
How often do you feel burnt out because of your work?	15%	21%	31%	30%	3%	2.8 (1.10)

Abbreviation: SD, standard deviation.

TABLE 3 Average scores for loneliness, burnout, and resilience and impact of COVID-19

	Mean	SD	Minimum	Maximum
Copenhagen Burnout Inventory: Personal burnout	2.7	0.83	1	5
Copenhagen Burnout Inventory: Work-related burnout	2.8	0.83	1	5
Loneliness scale (3-Item)	4.8	1.98	3	9
Brief resilience scale	3.6	0.73	1.8	5
Covid impact on:				
Burnout	3.3	1.01	1 (Never)	5 (A great deal)
Loneliness	2.6	1.10	1 (Never)	5 (A great deal)
Resilience	2.8	0.99	1 (Never)	5 (A great deal)

Abbreviation: SD, standard deviation.

lived with a spouse or other adults and those with older kids. Results are given in Table 6.

### 3.6 | Joy and stress during the pandemic

Respondents were also asked to report on the aspect of their job that brought the most joy and the most stress during the pandemic. Looking at all respondents, the most stressful aspect was clinical care (36%) followed by administrative responsibilities (29%). The most joy came from teaching (43%). When looking at full-time faculty separately, most stress stemmed from administrative responsibilities (35%) followed by clinical care (30%) and most joy came from teaching (35%). For part-time and unpaid fac-

ulty, the most stressful was clinical care (52%), and most joy was from teaching (64%). Complete summary is provided in Supplemental Materials.

## 4 | DISCUSSION

In this study, dental school faculty from four US dental schools self-reported burnout, loneliness, and resilience during September and October 2020 of the COVID-19 pandemic. Throughout the pandemic, laws, scientific guidance, and regulations evolved on a regular basis, requiring constant adaptation. This directly impacted dental faculty in the areas of educational and assessment methods including new technologies, clinical care and associated

**TABLE 4** Associations between demographic characteristics and Copenhagen Burnout Inventory

	CBI: Personal burnout			CBI: Work-related burnout		
	$\beta$ , SE	Mean CBI-PB Score, SE	<i>p</i> -value	$\beta$ , SE	Mean CBI-WRB Score, SE	<i>p</i> -value
Age (10-year increase)	-0.17, 0.06		0.0020	-0.21, 0.05		0.0002
Gender			0.0407			0.0206
Male	Reference	2.58, 0.11	a	Ref	2.59, 0.11	a
Female	0.24, 0.11	2.81, 0.11	b	0.26, 0.11	2.85, 0.10	b
Employment Status			0.0645			0.0134
Paid full-time faculty	0.18, 0.25	2.86, 0.06	a	0.37, 0.25	2.96, 0.06	a
Paid part-time faculty	-0.13, 0.27	2.55, 0.12	a	0.01, 0.26	2.60, 0.12	b
Unpaid faculty	Reference	2.68, 0.24	a	Ref	2.60, 0.24	a, b
Living arrangements			0.1195			0.0164
Alone	0.28, 0.18	2.95, 0.15	a	0.54, 0.18	3.05, 0.15	a
Spouse or other adults (No kids)	-0.13, 0.17	2.54, 0.11	a	0.10, 0.16	2.61, 0.11	b
Older kids	-0.06, 0.18	2.62, 0.14	a	0.20, 0.18	2.71, 0.14	a, b
Younger kids	Reference	2.67, 0.15	a	Ref	2.51, 0.15	b

Abbreviations: CBI, Copenhagen Burnout Inventory; PB, personal burnout; WRB, work-related burnout; SD, standard deviation; SE, standard error.

\*For variables with statistically significant differences, levels connected by the same letter are not significantly different in Tukey's adjusted pairwise comparisons.

**TABLE 5** Associations between demographic characteristics and loneliness

Loneliness	$\beta$ , SE	Estimated mean loneliness score	SE	<i>p</i> -value
Age	0.02, 0.01			0.2576
Gender				0.2806
Male	Ref	5.35	0.28	
Female	0.30, 0.28	5.65	0.27	
Employment status				0.0838
Paid full-time faculty	-1.35, 0.64	5.11	0.16	
Paid part-time faculty	-1.51, 0.68	4.94	0.29	
Unpaid faculty	Ref	6.46	0.62	
Living arrangements				<0.0001
Alone	1.80, 0.46	7.05	0.39	a
Spouse or other adults (no kids)	-0.51, 0.41	4.74	0.28	b
Older kids	-0.27, 0.44	4.97	0.36	b
Younger kids	Ref	5.25	0.38	b

Abbreviations: SD, standard deviation; SE, standard error.

\*For variables with statistically significant differences, levels connected by the same letter are not significantly different in Tukey's adjusted pairwise comparisons.

personal protective equipment, interruption of research, and assuring student readiness for graduation.<sup>29–33</sup> Faculty may also have been impacted by social isolation, new or increased home care responsibilities, or financial hardship. Additionally, socialization with colleagues at holiday, retirement, and welcome celebrations were eliminated.

Prior to the COVID-19 pandemic, a study examining dental faculty burnout at US dental schools in the Northeast reported higher levels of WRB compared to PB, and the job-related responsibilities most commonly associated with burnout included academic administrative respon-

sibilities, pursuit of grants and funding, and research.<sup>4</sup> Results from the present study are consistent with previous studies showing WRB to be higher than PB. Surprisingly, the reported rates of burnout by dental faculty during the pandemic in the present study were lower than those reported by faculty in the Northeast prior to the pandemic. In both studies, PB was associated with gender and age; the older the respondent, the less likely they were to report burnout symptoms. The age demographic presents a curious opportunity: have older faculty apparently learned to use more adaptive processes to achieve and maintain

**TABLE 6** Associations between demographic characteristics and brief resilience scale scores

	$\beta$ , SE	Mean BRS score, SE	p-value
Age	0.01, 0.01		0.1180
Gender			0.1465
Male	Ref	3.6, 0.11	
Female	-0.16, 0.11	3.4, 0.10	
Employment status			0.2906
Paid full-time faculty	0.28, 0.23	3.5, 0.06	
Paid part-time faculty	0.39, 0.25	3.6, 0.11	
Unpaid faculty	Ref	3.3, 0.22	
Living arrangements			0.2655
Alone	-0.11, 0.17	3.3, 0.14	
Spouse or other adults (No kids)	0.19, 0.16	3.6, 0.11	
Older kids	0.14, 0.17	3.6, 0.14	
Younger kids	Ref	3.4, 0.14	

Abbreviations: BRS, brief resilience scale; SE, standard error.

well-being or are there generational aversions to the concept of self-identified burnout and any potential stigma associated therewith.<sup>18,34</sup>

Nearly one third (31%) of responding dental faculty were considered "lonely" by our measure, scoring 6 or greater, somewhat higher than reports from non-healthcare populations, before and during the pandemic. In a study of the public in April 2020, earlier in the pandemic than the present study was conducted, loneliness prevalence was reported at 23%.<sup>28</sup> It is unclear why the rates of loneliness among dental faculty would be higher than the public. It is feasible that some respondents in the present study who had non-clinical responsibilities were continuing to work from home and this isolation contributed to their feeling of loneliness. For those who had returned to work, there may have been limitations or restrictions on eating meals together, in-person meetings, and other forms of gathering.

Adding another layer of complexity, our results show that faculty living alone scored much higher on the loneliness scale (7.5 of 9) – nearly three points higher than the group mean (4.8). Loneliness is not just about being alone; loneliness is defined as a gap – between the interaction we want to have with others and the interaction we get. It is feasible that faculty who live alone depend more on the social interactions they have in the workplace than those who do not live alone. Interestingly, personal and WRB scores were also higher for faculty living alone, suggesting these individuals may be at greater psychological risk. Although faculties' perceived impact of the pandemic on loneliness was smaller than for resilience and burnout, it was not zero. As dental faculty become increasingly diverse in age, gender, race/ethnicity, and citizenship status, their

living arrangements and needed support systems may also be evolving. It behooves dental schools to make note of this so that faculty are provided the support they need for health and wellness. In doing so, dental schools will be helping faculty perform at their best, providing a better environment for their students, patients, and colleagues. Dental leaders and university cultures will have to adapt to provide the needed support for health and wellness.

While resilience was not statistically significant in relation to any of the variables considered in this study, the understanding of resilience as a protective factor in combating various mental health issues has been established. Even in COVID-19 patients, resilience has been shown as a protective factor for anxiety and depression.<sup>35</sup> One challenge in comparing and contrasting resilience literature is the wide variety of scales and measures used. Because resilience is such a multi-faceted construct, all resilience scales and measures are not investigating the same factors or attributes that contribute to resilience. As such, research shows no one specifically suggested scale but studies have compared various scales for consideration, with the Connor–Davidson resilience scale, the resilience scale for adults (RSA), and the BRS receiving the best psychometric ratings.<sup>24</sup> For the purpose of combating survey/item fatigue, our study utilized the BRS. Studies examining dental students have utilized various scales. One study examining the immediate impacts of COVID-19 on dental and dental hygiene students' readiness to enter clinical practice or residency and its association with well-being utilized the BRS and found lower resilience scores in females and those whose graduation plans had changed since the onset of COVID-19 outbreak. Another study, utilizing the RSA, a 33-item scale, found resilience to be significantly associated with gender (with females showing more resilience than males), race, overall health, and mental health.<sup>19</sup> Again, worth noting is the multifactorial nature of resilience. Tools such as the RSA reflect the availability of assets and resources that facilitate resilience, and as such may be more useful for measuring the process leading to a resilient outcome, or for clinicians and researchers who are interested in ascertaining the presence or absence of these resources.<sup>24</sup> The BRS states its aim is to assess resilience as an outcome.<sup>36</sup> Future studies may benefit from a more precise framing of what aspect of resilience is to be studied or cultivated, examining individual adaptability or more institutional culture and climate via available resources, or the lack thereof.

While much has been reported on potential negative aspects of the pandemic, there is established research across a myriad of disciplines pointing toward the positive outcomes of disruption and cultivation of innovation.<sup>37,38</sup> One study has even pronounced "silver linings" of the pandemic specific to dental education.<sup>33</sup> Our study provides



insight into both faculty stress and joy. The positive aspects of job roles and duties, even amid a pandemic, saw the most joy derived from teaching itself. This could prove beneficial as institutions and organizations across dental education look to cultivate the next generation of dental faculty and fine tune student/resident to faculty pipeline programs. Linkages of job satisfaction, specifically joy and happiness at work, have begun to be examined alongside both personal and organizational resilience.<sup>39</sup>

#### 4.1 | Limitations

In terms of limitations, study data were collected at a single point in time, and responses represent faculty experiences and perceptions at that moment. Any relationships identified are correlational only and are not to be interpreted as causal. Response rate varied across the schools (9.74%–51.85%). Schools with higher response rates may have better representation of the faculty. This limits generalizability; however even the school with lowest response rate appears to demonstrate a representative sample of faculty. The overall response rate (19.63%) is low yet is in keeping with expectations for electronic surveys.<sup>40–42</sup> Therefore, selection bias may be present. Likely responders could be faculty feeling stressed, burned out, or lonely. While non-responders could be faculty who were too stressed to respond.

An additional limitation may surround variations in faculty listservs organized. Some schools' listservs, such as Virginia Commonwealth only included full time, whereas others such as the University of Minnesota, included full time, part time, adjunct and emeritus faculty. The survey question categorized faculty as full time, part time, and unpaid faculty, and participants were allowed to self-select their responses. Details of administrator, adjunct, pre-clinical, or clinical duties were not obtained, nor were details on school metrics for determining full time versus part time status.

#### 4.2 | Areas of future research

Future studies could explore factors that contribute to gender differences seen among female and male faculty. With regard to loneliness, there is a general dearth of knowledge in this area as it relates to academic dentistry; studies over time that evaluate different demographic factors will be useful to track trends. In particular, studying dental faculty who live alone, as compared to those who live with others, will be useful for dental schools in designing their support systems and wellness programs as faculty become increasingly diverse. Research on resilience would greatly

benefit from standardizing the construct, so that data can be compared across institutions and over time. Faculty designation such as full time versus part time or even job role responsibilities (administrator, pre-clinical, clinical, adjunct, or external site) could be further explored as each job role may have its own unique stressors or opportunities for fulfilment.


Finally, further evaluation of the job aspects that bring the greatest joy and cause the most stress will be useful for academic dentistry in recruiting and retaining faculty. As burnout, loneliness, and resilience are further studied, natural next steps for dental education should include addressing personal well-being as well as organization/systems well-being with intention. Individualized efforts for well-being betterment will be null and void if the systems in which individuals operate remain rigid, toxic, or lacking in innovation, without prioritizing organizational well-being and agility.

### 5 | CONCLUSION

While self-reported burnout and resilience scores among dental faculty in this study did not show a significant increase during the pandemic, the rates of burnout and loneliness remain higher than the general public. Additionally, a recent increase in COVID-19 cases in all 50 states makes it unclear how long this pandemic will last. Whether because of the ongoing pandemic, or the host of other extra-organizational factors that impact dental education, uncertain times remain. Considering strategies for the future, dental schools must continue to provide education, training, and incentives for individual behaviors that reduce burnout and increase resilience. Dental schools must also evaluate organizational structures and systems to improve the leadership, culture, and processes to reduce burnout and increase engagement and productivity at work.

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## SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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