

Compassion Fatigue, Compassion Satisfaction, Burnout and Alcohol Use Among Dental Hygienists

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Abstract

Aims: The purpose of this study was to investigate the relationship between demographics, compassion fatigue (CF), compassion satisfaction (CS), burnout (BO) and alcohol use among dental hygienists (DHs).

Methods: The web-based survey consisting of two validated instruments [Alcohol Use Disorders Identification Test (AUDIT) and Professional Quality of Life] to measure alcohol use, CF, CS and BO was conducted with a convenience sample of DHs ($n = 963$).

Results: The completion rate was 81.6% ($n = 786$). Nearly one in five DHs (19.1%) reported having their alcohol consumption influenced by the Coronavirus disease 2019 pandemic at least moderately. The number of hours worked per week (x) and AUDIT scores (y) were fully mediated by BO (m) ($P < 0.001$); the average number of hours worked per week (x) and AUDIT scores (y) were fully mediated by CF (m) ($P < 0.001$); the average number of patients seen per day (x) was a predictor of AUDIT scores (y) when partially mediated by BO (m) ($P < 0.001$); and age (x) was a predictor of AUDIT scores (y), mediated by CS (m). Results showed that one in four DHs could qualify for binge drinking (25.6%, $n = 177$) and 15.1% experienced blackout drinking episodes within the past year ($n = 118$).

Conclusion: Mediating relationships exist between demographics, CF, CS, BO and alcohol use among DHs. More research needs to be conducted on alcohol use and CF among DHs and protective factors that may reduce the risk of BO, CF or alcohol use.

INTRODUCTION

On a global scale, research has shown that healthcare providers (HCPs) experience high levels of burnout (BO) and compassion fatigue (CF) (Sorenson *et al.*, 2016; Lemaire and Wallace, 2017; Dugani *et al.*, 2018). BO is a state of emotional and physical exhaustion caused by chronic job stress resulting in emotional exhaustion, feelings of job detachment and/or feelings of incompetence or lack of achievement (Maslach and Leiter, 2016). CF is described as emotional and physical exhaustion. When seen among healthcare workers, it is due to the continual use of empathy and emotional energy from repeated exposure to patients' emotional or physical suffering, as well as from the knowledge of patients' traumatic experiences (Cavanagh *et al.*, 2020). HCPs who experience CF often experience negative consequences from a diminished ability to properly care for their patients (Cavanagh *et al.*, 2020). Factors such as healthcare specialty, practice setting, gender and career length can impact the degree to which BO and CF manifest (Lemaire and Wallace, 2017; Cavanagh *et al.*, 2020). BO and CF are related, as they often have a synergistic effect on one another (Potter *et al.*, 2010; Cocker and Joss, 2016). Some studies have also found BO to be a pre-condition of CF (van Mol *et al.*, 2015). Although both conditions are a response to the stress experienced at work, the onset of BO is usually longer when compared with CF (Cocker and Joss, 2016; Cavanagh *et al.*, 2020). BO and CF can interfere with many aspects of an HCP's personal and professional well-being (Lemaire and Wallace, 2017; Cavanagh *et al.*, 2020).

Those in the dental field, particularly dental hygienists (DHs), are at risk for BO due to the number of hours worked,

lack of autonomy and physical demands of providing care (Lopresti, 2014; Torabi Parizi *et al.*, 2015; Meyerson *et al.*, 2020). Although the body of research on CF among dental providers is small, the relationship between CF and BO suggests that a sizable portion of dental providers may also experience CF (Winwood *et al.*, 2003; Cavanagh *et al.*, 2020).

Globally, alcohol misuse is widely prevalent and affects many populations (World Health Organization, 2011). Research has shown individuals who experience BO are likely to drink more alcohol (Alexandrova-Karamanova *et al.*, 2016; Williams *et al.*, 2020). In addition, certain medical professions have a higher rate of hazardous alcohol use when compared with the general public (Romero-Rodríguez *et al.*, 2019). Hazardous alcohol consumption is characterized by a volume of alcohol or pattern of alcohol use that results in an increased risk for harmful health consequences (Effertz, 2017).

Research has shown DHs are at higher risk for BO (Malcolm *et al.*, 2020). BO is associated with alcohol use; hence, it would be reasonable to suggest BO may be a risk factor for alcohol use among DHs (Obadeji *et al.*, 2015; Alexandrova-Karamanova *et al.*, 2016). Furthermore, since there is a strong correlation between BO and CF, it is also appropriate to explore the role of CF as a risk factor for alcohol use among DHs.

Although prevalence and risk factors of maladaptive alcohol use among dentists have been widely studied, the prevalence and risk factors are unknown for DHs. The levels of CF, BO and alcohol use experienced among DHs and any relationships between them are unknown. It is also unknown if and to what degree associations may exist between work

characteristics and demographics of DHs and CF, BO, and alcohol use. Since hygienists are at a higher risk for BO, they may also be at risk for alcohol misuse (Obadeji *et al.*, 2015; Alexandrova-Karamanova *et al.*, 2016). Dentists experience negative consequences of alcohol use and have several support programs, the same consideration may be taken with other dental professionals such as DHs if such relationships are found (Kenna and Wood, 2004; Medical Professionals Help Program, n.d.).

Furthermore, since there is a strong correlation between BO and CF, it is also appropriate to explore the role of CF as a risk factor for alcohol use among DHs. Without this study, alcohol use among DHs remains speculative. Similarly, without the findings generated from this research, CF would remain largely unknown among DHs.

This study aimed (1) to determine the mediating or moderating relationship between age and work characteristics on alcohol use, BO, CF and compassion satisfaction (CS); (2) to investigate potential mediating or moderating relationships of Alcohol Use Disorders Identification Test (AUDIT) scores on CF and BO, and measure the levels of CF, BO and alcohol use among DHs. Researchers examined CF, or how exposure to traumatized patients affected DHs.

METHODS

Procedure and samples

A non-probability sample of DHs was used to conduct a web-based cross-sectional survey on alcohol use's mediating and moderating variables. The data collection took place between May 19, 2021 and June 9, 2021. The University's Institutional Review Board reviewed and approved (protocol number, IRB042921G) the study.

Using a medium effects size of $f = 0.25$, $\alpha = 0.05$ and an 80% recommended power, yielded a minimum sample size of $n = 257$. Participants were recruited through various dental/oral healthcare Facebook groups. To qualify, participants had to be 18 years or older, hold an active dental hygiene license with at least 1 year of experience and currently provide patient care at least 1 day a week. The survey was promulgated via a link through various dental hygiene-related Facebook pages, including state dental hygiene associations, local dental hygiene groups, and dental hygiene support and resource pages. Similar Facebook pages in other countries such as Canada and Ireland were also contacted. Participants clicking on the link were brought to the consent to participate page on Qualtrics® before taking the survey. If consent was not provided and/or participants did not meet the inclusion criteria, they were not granted access to participate in the survey. No incentives were provided to participants completing the study.

Measures

The survey instrument contained a total of 54 items. The survey consisted of demographics, the Professional Quality of Life scale (ProQoL) and the AUDIT. Demographics (14 items) included age, education, race, ethnicity, practice setting and specialty, years practicing, the average number of hours and patients seen, and one question regarding the Coronavirus disease 2019 (COVID-19) pandemic and alcohol consumption. The survey used a combination of text-entry or drop-down response options.

Table 1.

| | Risk |
|-------------|----------------------------------------------------|
| AUDIT score | Risk Level |
| 0–7 | Low risk |
| 8–15 | Risky or hazardous level. Moderate risk of harm |
| 16–19 | High risk or harmful level |
| 20 or more | High-risk. Dependence likely. |

The ProQoL Version 5 is a 30-item validated survey used to assess the level of CF, CS and BO among healthcare workers (Stamm, 2005). The ProQoL is a widely used instrument with over 200 studies demonstrating its validity (Geoffrion *et al.*, 2019). The subscales for ProQoL demonstrate good internal consistency for Cronbach's Alpha values of 0.88 for CS, 0.81 for CF and 0.75 for BO (Geoffrion *et al.*, 2019).

The AUDIT is a 10-item validated survey used to assess alcohol use (three items), alcohol dependence (four items) and alcohol use-related problems or consequences (three items). Developed by the World Health Organization in 1993, the AUDIT measurement has demonstrated a high level of internal consistency, high reliability and validity by numerous studies (Bohn *et al.*, 1995; Moussas *et al.*, 2009; Babor *et al.*, n.d.). With a cut-off point set at 10 points, the AUDIT test demonstrates high sensitivity and specificity (Moussas *et al.*, 2009). Each item of the AUDIT scale contains a set of possible responses. Each response has a score ranging from 0 to 4 for items 1 through 8 and 0, 2 or 4 for items 9 and 10. Scores from all the AUDIT items are then added together and compared with cut-off scores provided to assess whether or not the participant qualifies for hazardous, harmful or alcohol dependence. These cut-off scores can be seen in Table 1.

Statistical analysis

This study explored BO from work stress associated with emotional exhaustion, depersonalization and low personal achievement (Gorter, 2005). Both BO and CF are subscales of the ProQoL scale. Researchers used moderating and mediating variables, including demographics, alcohol use, BO, CS and CF. The moderator and the mediator model were used to predict the effects of the mediator on the outcome variables based on previous studies (Baron and Kenny, 1986; Labrague and de Los Santos, 2021). A moderating variable (or moderator) explains if a relationship between two variables (X and Y) is influenced by a third variable. A mediating variable (or mediator) seeks to explain or identify what two variables are related (MacKinnon, 2011). This study assessed the relationships between demographic variables, CF/satisfaction, alcohol use and BO to predict the cause, level, direction, or presence of a relationship were explored. Mediating and moderating variables were analysed against predictor and outcome variables. In addition, researchers explored how work characteristics and demographic variables mediate and/or moderate the relationships between aspects of alcohol use (AUDIT) and BO.

A power analysis using G*Power was conducted to determine the minimum sample size of $n = 257$ needed to identify an effect with the desired power. Cumulative frequencies were calculated for the categorical demographic data, whereas variance and central tendency measures were used for all ordinal and continuous demographic data. Each statistic was reported with its 95% confidence interval for the proportions

Table 2. Age and Work Characteristics

| | Median | Mean | SD | 95% Lower CL | 95% Upper CL |
|-----------------------------------------------------------------------------------------|--------|-------|-------|--------------|--------------|
| What is your age in years? | 43.00 | 43.77 | 11.85 | 42.91 | 44.63 |
| How many years have you been in practice? | 17.00 | 18.91 | 17.50 | 17.69 | 20.14 |
| Average number of hours per work week in the last three months | 32.00 | 31.59 | 25.15 | 29.82 | 33.35 |
| On average, how many patients do you see in a typical workday in the last three months? | 8.00 | 10.02 | 12.13 | 9.17 | 10.87 |

and mean. The statistical significance of indirect effects for all moderating and mediating models was tested using bootstrapping procedures. Unstandardized indirect effects were computed for each of 10,000 bootstrapped samples, and the 95% confidence interval was computed by determining the indirect effects at the 2.5th and 97.5th percentiles. Moderators and independent variables were mean-centered to clarify the interpretation of the results. Conceptual frameworks were generated on the potential mediating effect of several variables. Subgroup analyses were also performed to test moderating effects among simple paths in the multiple-mediation model. A difference in the path coefficient along with statistical significance among two groups of variables was regarded as evidence that the moderation effect of a path existed (Wang *et al.*, 2020). Subgrouping analyses were used when researchers needed to know which path the moderator affected. Therefore, the moderating and mediating estimated parameters (indirect and direct effects) were performed by combining moderation and mediation methods. Interpretation of the interaction plots was evaluated with a simple slope analysis.

RESULTS

A total of 963 respondents yielded a usable sample size of $n = 786$, resulting in a completion rate of 81.6%. In addition to participants living in the USA, participants from the UK ($n = 180$), South Africa ($n = 32$), Ireland ($n = 53$) and Canada ($n = 101$) were included in this study. Participants from the west, south, midwest and northeast USA were equally represented in this study ($n = 97$ [24%], 85 [21%], 110 [27.2%] and 112 [27.7], respectively). The majority of participants were White (94.2%) and identified as women (98.6%). Age and work characteristics are shown in Table 2. Entry-level dental hygiene degrees consisted of 31.3% with a certificate ($n = 243$), 44.8% with an associate degree ($n = 348$) and 23.9% with a bachelor's degree (Table 4). Approximately one in five participants stated that their highest level of education was at the graduate level ($n = 155$, 20.6%). Nearly one in five DHs (19.1%) reported having their alcohol consumption influenced by the COVID-19 pandemic at least moderately.

ProQoL

Significant findings from the ProQoL revealed over half (55%, $n = 431$) of DHs felt worn out because of their work (selecting the option 'often' or 'very often'), 35% ($n = 282$) felt overwhelmed because of their workload (selecting the option 'often' or 'very often'). A third (33%, $n = 249$) felt 'bogged down' by the system (selecting the option 'often' or 'very often'). Most participants agreed they enjoyed their work as a DH ($n = 315$, 40% stating often and $n = 215$, 27.4%

stating very often) and that their work as a DH makes them feel satisfied often ($n = 313$, 39.9%) or very often ($n = 125$, 15.9%).

AUDIT

The AUDIT found that 60.3% ($n = 474$) of DHs drink at least 2–4 times per month, and 18% of those participants drink four or more times a week ($n = 85$). Results showed that one in four DHs could qualify for binge drinking (25.6%, $n = 177$), 15.1% experienced blackout drinking episodes within the past year ($n = 118$) and 5% reported injuring someone because of their drinking ($n = 38$). When asked how often six or more drinks are consumed on one occasion, 5.1% ($n = 40$) reported drinking six or more drinks weekly, 7% ($n = 55$) reported drinking six or more drinks monthly, and 22.8% ($n = 179$) report drinking six or more drinks less than monthly. Globally, Ireland had the highest AUDIT score of 1.8, and South Africa at the lowest at 1.6. Responses to the AUDIT portion of the survey are represented in Table 3.

Mediating and moderating analysis

Four mediating and moderating models were run with several demographic, AUDIT and ProQoL variables to test research aims (Fig. 1). The statistical significance of all indirect effects was tested using bootstrapping procedures. Unstandardized indirect effects were computed for each of 10,000 bootstrapped samples, and the 95% confidence interval was computed by determining the indirect effects at the 2.5th and 97.5th percentiles.

Of the models, three statistically significant mediating relationships were found. Model 1 (multiple mediator) found the number of hours (x) and AUDIT scores (y) were fully mediated by BO (m_1) and CF. Tests between BO (condition index = 0.08) and CF (condition index = 0.03) showed no problems with multicollinearity (variance inflation factor (VIF) = 1.61). Figure 1 shows hours worked predicted BO (a_1 ; $R^2 = 0.01$, $F(1, 771) = 8.23$, $P = 0.004$) and CF ($R^2 = 0.01$, $F(1, 771) = 9.67$, $P = 0.002$). BO ($\beta = 0.06$, $P = 0.01$) and CF ($\beta = 0.14$, $P < 0.001$) predicted AUDIT scores after holding the effect of hours worked constant ($R^2 = 0.04$, $F(2, 769) = 17.34$, $P < 0.001$). The standardized mediated effect $a_1Xb_1 = 0.003$, 95% CI [0.0003, 0.0079] for BO and $a_2Xb_2 = 0.009$, 95% CI [0.0026, 0.0188] show both pathways are statistically significant mediators.

Model 2 (multiple mediator) found the number of patients (x) and AUDIT scores (y) were fully mediated by BO (m_1) and CF. Tests between BO (condition index = 0.17) and CF (condition index = 0.04) indicated no problems with multicollinearity (VIF = 1.62). Figure 2 shows patients per week predicted BO (a_1 ; $R^2 = 0.01$, $F(1, 771) = 8.23$, $P = 0.004$) and CF ($R^2 = 0.01$, $F(1, 771) = 9.67$, $P = 0.002$).

Table 3. AUDIT scores

| Questions | Responses | Count | % |
|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------|------|
| How often do you have a drink containing alcohol? | Never | 99 | 12.6 |
| | Monthly or less | 212 | 27.0 |
| | 2–4 times a month | 206 | 26.2 |
| | 2–3 times a week | 183 | 23.3 |
| | 4 or more times a week | 85 | 10.8 |
| How many drinks containing alcohol do you have on a typical day when you are drinking? | 1 or 2 | 537 | 75.2 |
| | 3 or 4 | 141 | 19.7 |
| | 5 or 6 | 26 | 3.6 |
| | 7–9 | 9 | 1.3 |
| | 10 or more | 1 | 0.1 |
| How often do you have six or more drinks on one occasion? | Never | 510 | 65.1 |
| | Less than monthly | 179 | 22.8 |
| | Monthly | 55 | 7.0 |
| | Weekly | 40 | 5.1 |
| | Daily or almost daily | 0 | 0.0 |
| How often during the last year have you found that you were not able to stop drinking once you had started? | Never | 679 | 86.8 |
| | Less than monthly | 66 | 8.4 |
| | Monthly | 20 | 2.6 |
| | Weekly | 13 | 1.7 |
| | Daily or almost daily | 4 | 0.5 |
| How often during the last year have you failed to do what was normally expected of you because of drinking? | Never | 720 | 92.1 |
| | Less than monthly | 49 | 6.3 |
| | Monthly | 9 | 1.2 |
| | Weekly | 4 | 0.5 |
| | Daily or almost daily | 0 | 0.0 |
| How often during the last year have you needed a drink in the morning to get yourself going after a heavy drinking session? | Never | 774 | 98.9 |
| | Less than monthly | 6 | 0.8 |
| | Monthly | 3 | 0.4 |
| | Weekly | 0 | 0.0 |
| | Daily or almost daily | 0 | 0.0 |
| How often during the last year have you had a feeling of guilt or remorse after drinking? | Never | 605 | 77.6 |
| | Less than monthly | 124 | 15.9 |
| | Monthly | 31 | 4.0 |
| | Weekly | 16 | 2.1 |
| | Daily or almost daily | 4 | 0.5 |
| How often during the last year have you been unable to remember what happened the night before because of your drinking? | Never | 661 | 84.9 |
| | Less than monthly | 93 | 11.9 |
| | Monthly | 18 | 2.3 |
| | Weekly | 6 | 0.8 |
| | Daily or almost daily | 1 | 0.1 |
| Have you or someone else been injured because of your drinking? | No | 738 | 94.6 |
| | Yes, but not in the last year | 38 | 4.9 |
| | Yes, during the last year | 4 | 0.5 |
| Has a relative, friend, doctor, or other healthcare worker been concerned about your drinking or suggested you cut down? | No | 740 | 94.9 |
| | Yes, but not in the last year | 21 | 2.7 |
| | Yes, during the last year | 19 | 2.4 |

BO ($\beta = 0.06$, $P = 0.02$) and CF ($\beta = 0.14$, $P < 0.001$) predicted AUDIT scores after holding the effect of hours worked constant ($R^2 = 0.06$, $F(2, 775) = 17.94$, $P < 0.001$). The standardized mediated effect $a_1 \times b_1 = 0.006$, 95% CI [0.0008, 0.0145] for BO and $a_2 \times b_2 = 0.02$, 95% CI [0.0042, 0.0403] show both pathways are statistically significant mediators.

A model was created to test the influence of age on AUDIT scores mediated by CS. The standardized regression coefficient (0.14, $P < 0.001$) between age and BO (a path) was statistically significant ($R^2 = 0.02$, $F(1, 774) = 46.57$, $P = 0.001$). CS was a statistically significant predictor of AUDIT scores ($\beta = -0.13$, $P < 0.001$) after holding age constant (b path) ($R^2 = 0.06$, $F(2, 723) = 15.87$, $P < 0.001$).

Table 4. Categorical demographics

| Survey item | Response | Count | % |
|-------------------------------------------------|-------------------------------------------|-------|------|
| What is your gender? | Male | 8 | 1.0 |
| | Female | 775 | 98.6 |
| | Non-binary | 0 | 0.0 |
| | Transgender | 1 | 0.1 |
| | Male | | |
| | Transgender | 0 | 0.0 |
| | Female | | |
| | Intersex | 1 | 0.1 |
| | Not listed | 0 | 0.0 |
| | Prefer not to answer | 1 | 0.1 |
| Are you of Hispanic, Latino, or Spanish origin? | Yes | | 3.2 |
| | No | | 96.8 |
| How would you best describe yourself? | White | 736 | 94.2 |
| | Black or African American | 10 | 1.3 |
| | American Indian or Alaska Native | | |
| | American Indian or Alaska Native | 2 | 0.3 |
| | Asian | | |
| | Asian | 33 | 4.2 |
| | Native Hawaiian or Other Pacific Islander | | |
| | Native Hawaiian or Other Pacific Islander | | |
| | Islander | | |
| Entry level dental hygiene degree | Certificate | 243 | 31.3 |
| | Associates | 348 | 44.8 |
| | Bachelors | 186 | 23.9 |
| | Bachelors | | |
| What is your highest level of education? | Associates | 334 | 44.3 |
| | Bachelors | 265 | 35.1 |
| | Bachelors | | |
| | Graduate | 155 | 20.6 |

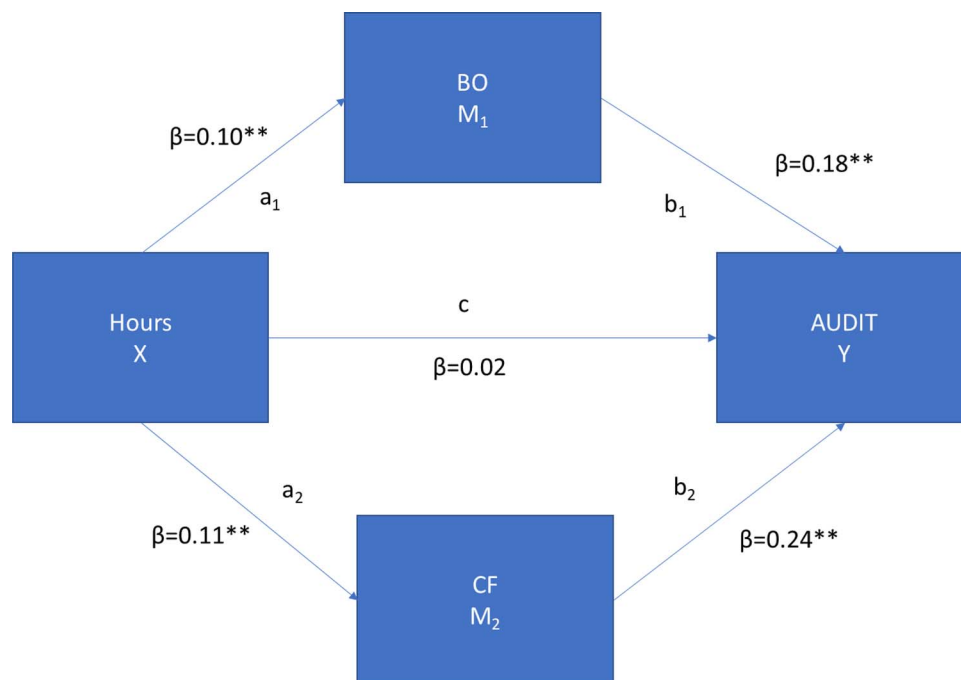


Fig. 1. Two mediator model showing the relationship between hours worked and AUDIT scores is fully mediated through burnout and compassion fatigue scores.

The standardized mediated effect (aXb path) was $= -0.02$. The influence of age on AUDIT scores is partially mediated through CF subscale scores; however, the b -path coefficient is smaller than c . This may indicate age independently predicts

AUDIT scores and CS is unlikely to predict AUDIT; however, this is a theoretical rather than methodological issue and cannot be tested. Model 3 should be interpreted conservatively and has been by the authors in the discussion section. Model

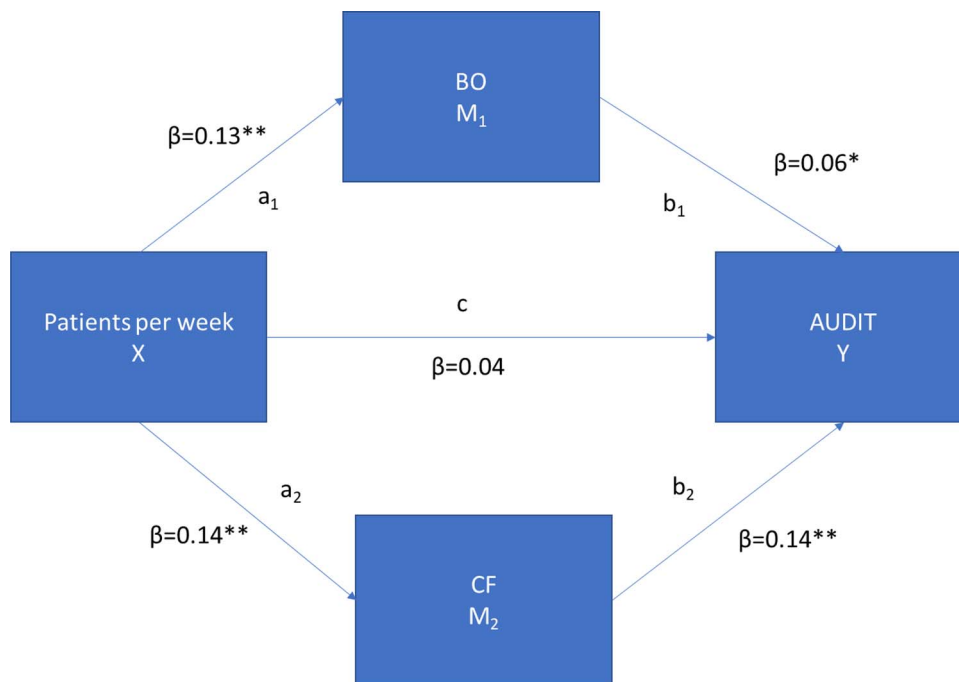


Fig. 2. Two mediator model showing the relationship between patients per week and AUDIT scores is fully mediated through burnout and compassion fatigue scores.

4, which analysed the number of patients predicting AUDIT scores moderated by education levels, associate, bachelor or graduate, was not significant.

DISCUSSION

This research aimed to study CF, CS, BO and alcohol use among DHs. Research has been conducted on alcohol use and CF among various healthcare professions, except DHs.

This research found relationships between CF, CS, BO, AUDIT scores, and certain demographic and work characteristics. Through mediation models 1 and 2, it was shown that both the number of hours worked a week (x) and the number of patients seen a day (x) were mediated by BO (m) when looking at AUDIT scores as a predictor variable (y). These two causal pathways suggest BO plays a vital role in the influence of specific work characteristics on alcohol use among DHs. Although researchers did not look at alcohol use, Jeung *et al.* (2017) had similar findings regarding the relationship between BO experienced by DHs and specific work characteristics such as workload (amount of patients seen or hours/days worked). In addition, Patel *et al.* (2021) found that workload impacted certain aspects of BO, which is congruent with findings from this study.

Compared with other studies on BO among dental providers, studies from Patel *et al.* (2021) and Malcolm *et al.* (2020) showed that age, long working hours and job stressors were also significantly associated with BO. However, this research study also examines mediating and moderating relationships of other variables such as alcohol use and CF on BO. This research adds to the body of literature on how certain demographics and work characteristics play an important role in the development and prevalence of BO.

In addition, when investigating binge drinking among dentists and DHs, Kenna and Wood (2004) had similar outcomes, finding one in three (32%) dentists participated in

binge drinking within the past month, whereas this study found one in four (25%) DHs participated in binge drinking within the last month. Although statistically similar, differences may be due to the level of BO or CF experienced. Other variables that may impact the difference in binge drinking rates may include a number of patients seen a day or the number of hours worked a week among dentists and hygienists.

Contrary to findings from this study, Winwood (2004) found that as age increased, so did alcohol consumption among dentists. This study found that as age increased, CF increased, resulting in lower AUDIT scores among DHs. Discrepancies among these two findings may be due to different workloads, treatments or job stressors experienced between dentists and DHs. However, other studies on alcohol use among dental providers showed work characteristics and demographics (such as age) were predictors of alcohol use among dentists (Kenna and Wood, 2004). Rosta (2008) found that doctors over the age of 40 drink more hazardously when compared with their younger counterparts. As noted previously, such differences between DHs and doctors (including dentists) may be due to variances in the pathogenesis of BO and/or CF including different workloads, treatments or job stressors.

When looking at other HCPs, Obadeji *et al.* (2015) found physicians who experienced certain career stressors have a higher rate of alcohol use. These findings from Obadeji *et al.* (2015) are similar to results produced from this study, which indicate career stressors among DHs such as hours worked a week and patients seen in a day result in higher alcohol use. These similarities may be due to high BO and CF among those responsible for treating people's healthcare needs (including oral healthcare).

This research provides an initial insight into alcohol use among DHs. The presence of binge drinking among hygienists and the relationship between alcohol use and certain work

characteristics warrant further investigation. In addition, this research shows CF among DHs and adds to the extremely small body of research on the topic.

There are several limitations within this study. First, this study uses a non-probability sample with potential self-selection bias and non-response bias from individuals who decline to participate in the study due to a factor that differs significantly from those who choose to respond. Another limitation worth discussing is confounding factors for alcohol use unrelated to demographics or AUDIT and ProQoL scores. Potential confounders include biological variables that may increase someone's chances of using alcohol or predispose them to alcohol misuse or addiction, independent of the variables researched in this study (Edenberg and Foroud, 2014).

Although there are several limitations to this study, there are also strengths. The response rate and wide geographical participant sample provide more accurate mean values, better ability to identify outliers and a smaller margin of error. Another strength is the use of validated surveys (AUDIT and ProQoL) increases validity and reliability.

CONCLUSION

This research demonstrates the presence of CF and BO among DHs and how they are related to demographic variables and alcohol use. The AUDIT score items provide evidence that one-fourth of hygienists may exhibit binge drinking behavior. Furthermore, a portion of DHs have engaged in hazardous drinking behavior such as blackout drinking (15.1%). The mediating analysis gave researchers insight into relationships between demographics, BO, CF and alcohol use regarding what extent mediating variables cause the effect in the outcome variable.

Future research should explore other relationships between CF, CS, BO and alcohol use among DHs to close the literature gap on this topic. In addition, the older the DH is, the more CS you have and lower AUDIT scores, which warrants further investigation on other protective factors against CF, BO and AUDIT.

Data Availability

Raw data was generated. Derived data supporting the findings of this study are available from the corresponding author on request.

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