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How psychologically healthy are New Zealand dentists?

The Prevalence of Psychological Conditions from the NZDA Wellness Survey

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Abstract

Background and objectives: Dentistry as a profession can be challenging. From training to practice, dentists experience multiple stressors including workload, time pressure, regulatory requirements, interactions with patients, complaints and the physical demands of daily work. Despite the stressors of being a dentist, there is limited data available on the psychological health of New Zealand practitioners.

Methods: This was a cross-sectional survey of the psychological health of members of the New Zealand Dental Association (NZDA), using instruments on burnout, depression, alcohol use, bullying, job satisfaction, self-compassion and perceived stress.

Results: Responses were received from 571 (27%) of NZDA members. About a third of the participants are at or above the threshold for burnout in the personal and work domains, and 11.4% of dentists report moderate to severe symptoms of depression. The results indicate problematic alcohol use in 21% of respondents.

Conclusions: These findings underscore the importance of raising awareness of wellbeing in the profession to enable early implementation of strategies to promote good psychological health.

Introduction

Dentists are a valuable asset to the New Zealand health workforce (Preet, 2013) and their wellbeing and retention should be a priority. However, training and practising dentistry can be difficult. Dentistry is a challenging undergraduate programme and successful completion requires proficiency in knowledge synthesis, clinical decision-making, advanced communication, fine motor skills and the ability to perform under pressure. The demands of dental school are well documented with a wide variety of stressors (Elani et al., 2014), which multiply post-qualification and are known to affect dentists' health (Puriene et al., 2007). Consequently there has been international interest in the psychological health of dentists, as the external demands of training and the workplace and the internal characteristics of many of those attracted to dentistry (Jackson, 2017) continue to negatively affect some dentists' health and quality of life, and to contribute to distress, compromised performance and departure from the workforce.

Several studies have been undertaken to document the prevalence of psychological conditions in the profession. Some international studies report that

dentists' self-reported health does not significantly differ from the general population (Gorter et al., 2000). Other sources indicate that working environments, in conjunction with individual personality traits, tend to predispose dentists towards higher rates of burnout, anxiety and depression (Kulkarni et al., 2016; Jugale et al., 2016). Furthermore, the quality of evidence is variable. A 2015 systematic review of physical and psychological ill-health in dentists concluded that the low quality and quantity of the data meant that a meta-analysis would have been unsuitable (de Ruijter et al., 2015). Consequently, those authors were not able to give a definitive answer as to the most significant risk factors for ill-health in dentists, and recommended that further high quality prevalence studies be undertaken to enable meta-analysis to occur.

There is a paucity of data regarding the state of health of dentists who work in New Zealand and therefore this research is timely. The study aimed to provide a descriptive overview of the prevalence of some common psychological conditions in practising dentists in New Zealand by using validated tools, and to put these in context, where possible, by comparing the results to external benchmarks. It also aimed to highlight demographic sub-groups within the sample, who reported experiencing more or less of the item of interest, as determined by statistical (but not necessarily practical) significance.

Methods

This was an anonymous cross-sectional psychological health survey of practising dentists who were members of the New Zealand Dental Association (NZDA), a professional body of chosen advocates who offer professional development and provide industry representation. An online survey was constructed in consultation with representatives from the NZDA. The survey instrument and process was approved by the University of Auckland Human Participants Ethics Committee (reference number 018891). The survey and participant information sheet were created in Survey Monkey. Links to the survey were e-mailed to all 2079 NZDA members via mailchimp on May 3rd 2017. The survey remained open for 24 days with 3 e-mail reminders being sent during this period. Written material inviting members to complete the survey was also included in the NZDA News magazine which is sent to all NZDA members. Respondents who completed the

survey and indicated that they were currently practising dentistry in New Zealand were eligible for inclusion in the final data set.

Survey Content

The survey contained 134 items and was comprised of seven standardised questionnaires: the Patient Health Questionnaire (PHQ-9) (Spitzer et al., 1999; Kroenke et al., 2001), a nine-item questionnaire that produces a summed score ranging from 0 (no depression) to 27 (severe depression)¹, with our focus being on scores above and below the threshold of moderate depression (score \geq 10 when used to divide into two groups); the CAGE Scale (Ewing, 1984), a four-item questionnaire that produces summed scores from 0-4, with responses of two or more indicating cause for concern regarding alcohol use; the Self-Compassion Scale – Short Form (SCS-SF) (Raes et al., 2011), a 12-item questionnaire producing mean scores ranging from 1 (low self compassion) to 5 (high self compassion); the Perceived Stress Scale (PSS) (Cohen et al., 1983), a 14-item questionnaire producing summed scores ranging from 0 (low perceived stress) to 56 (high perceived); the Job Satisfaction Questionnaire (JSQ) (Rentsch and Steel, 1992; Einarsen et al., 2009), a five-item questionnaire producing mean scores ranging from 1 (low job satisfaction) to 7 (high job satisfaction); the Copenhagen Burnout Inventory (CBI) (Kristensen et al., 2005), composed of three subscales (client, work, personal) with six, seven, and six items respectively producing scores ranging from 0 (low burnout) to 100 (high burnout) for each subscale; the Negative Acts Questionnaire (NAQ-R), a 22-item questionnaire scored here to show the number of cases where bullying is reported as occurring weekly or more often, therefore classified as ‘severe bullying’ (Einarsen et al., 2009); and additional items of interest to the NZDA. The full questionnaire is available on request.

Analyses

Data were captured electronically by Survey Monkey then exported to a csv file and analysed using the R and R studio statistical software packages, using the tidyverse library. Scores for each of the scales were calculated according to scale-specific rules available in the articles referenced in the previous section. Where a scale included a threshold, thresholds were applied to the calculated scores in order to categorise respondents into scale specific groups. Responses for each questionnaire were analysed and presented by key demographic groups of interest, specifically: Sex (M/F), Age Range, Scope of Practice, Country of Training, Employment Category, Years in Practice, Chairside Hours, and Annual Income. Employment focussed on whether respondents indicated they were employed in the private sector or not. All responses were as presented to respondents in the survey with

the exception of age range, country of training, and annual income. Age range has been converted from a raw age to age ranges used by Statistics New Zealand for reporting. To protect the anonymity of respondents and reduce the risk of unintentional identification of individual participants, the tables do not cross-tabulate demographics. In addition to this, when a cell would result in or was from data related to five or fewer respondents, that data has been suppressed or merged with another cell.

Spearman correlation analyses were used to explore relationships between demographic variables. Sex was dummy coded with male = 1 and female = 0. Employment was dummy coded with private employment as 1 and all other responses as 0. Age was taken in its raw form (i.e. not batched into groups). For country of training, data were collected using a free response field and recoded. This was simplified to NZ and other (coded as 1 and 0 respectively). The group order of all other variables was used (lowest = 0, highest = $N_{\text{categories}} - 1$).

Additional analyses focussed on testing whether the proportion of respondents above or below a given threshold differed to any ‘reference threshold’ for that particular questionnaire. Different analytical approaches were used depending on whether the reference group was external (other studies or established benchmarks) or internal (other NZDA respondents). The scales which had comparable diagnostic ‘cut-off scores’ in the literature were the PHQ-9, the CBI, the NAQ-R and the CAGE. For the other questionnaires, where there was not felt to be an easily comparable external reference group, comparisons were made between demographic sub-groups of the NZDA respondents. Bonferroni corrections were applied to address concerns with making multiple $(30)^2$ comparisons (alpha value = $.05/30 = .001667$) within a scale. For scales with thresholds, individual Fisher tests were conducted for each demographic sub-group on each scale. Each test compared the sub-group’s proportion of respondents above/below the threshold to the proportion seen in the rest of the respondents. For scales without thresholds, Fisher tests were replaced with Wilcoxon tests. Each test compared the median score of the sub-group to the median score of the rest of the respondents. When comparing to external reference thresholds, Chi Square tests were used to compare the overall NZDA results to the external reference group when categorical comparisons were available. Where categorical data was not available, t-tests were used to compare the mean score of NZDA respondents to that of the reference group. Comparisons to external reference groups were conducted at the overall level only and no Bonferroni corrections were applied.

1 PHQ-9 scores of 5, 10, 15, and 20 represent the thresholds for mild, moderate, moderately severe, and severe depression, respectively.

2 The tables in the report contain 32 demographic sub-group rows. One test was conducted per sub-group, with the exception of the sub-groups in the ‘country of training’ and ‘sex’ categories. Each of these categories contained two sub-groups, meaning that only one test needed to be conducted per category (i.e. if a test shows that males differ to females, there is no need to conduct a second test to determine whether females differ to males).

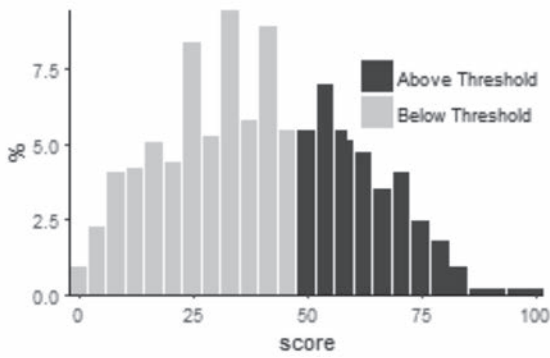
Results

At the time of the survey, there were 2886 registered dentists or dental specialists in New Zealand, of whom 2350 held an Annual Practising Certificate (APC) and 2079 were NZDA members. The survey link was sent to all NZDA members ($n=2079$), and 99.1% of these e-mails were successfully delivered ($n=2061$). Therefore 71% of all registered New Zealand dentists or dental specialists were contacted. Completed survey forms were received from 596 respondents of which 25 responses were removed (those not currently working as dentists). This resulted in the final dataset of 571 completed survey forms from practising dentists, giving a response rate of 27% of NZDA members, 24.3% of all dentists or dental specialists with an APC, and 19.8% of all registered dentists or dental specialists in New Zealand.

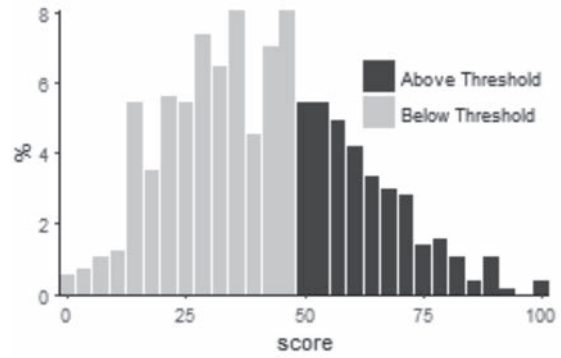
Breakdown of the key demographics used in subsequent analyses are provided in Table 1 and the relationships between the demographic variables are shown in Table 2. Demographic breakdowns are provided for each questionnaire in Tables 3-5. Table 3 contains the PHQ-9 results showing the thresholds for different levels of depression, and Table 4 contains the results for the other three scales which have thresholds: the CBI measuring burnout, the NAQ-R, measuring bullying and the CAGE, measuring alcohol use. Table 5 contains the results for the scales which do not have thresholds: the JSQ, measuring job satisfaction, the SC-SF, measuring self-compassion and the PSS, measuring perceived stress. Tables 6 and 7 report external comparators for some scales and the distribution of the scores within each questionnaire is shown in Figure 1.

Table 1: Respondent Demographics

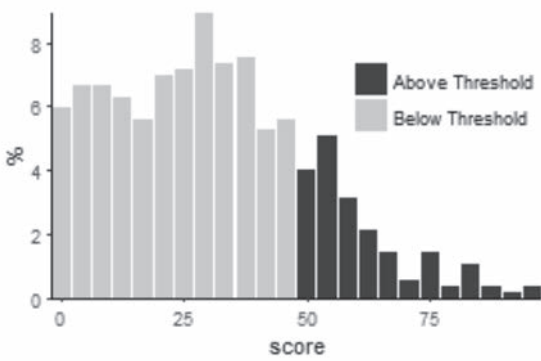
Demographic	Respondent demographics		
	N	%	
Overall	571	100%	
Scope of Practice	Dental Specialist	76	13.3%
	Dentist	495	86.7%
Sex	Female	273	47.8%
	Male	298	52.2%
Training Country	New Zealand	423	74.1%
	Other	148	25.9%
Employment	Equally Private and Public	17	3.0%
	Predominantly Private	485	84.9%
	Predominantly Public	69	12.1%
Years in Practice	Less than 5 years	57	10.0%
	5-10 years	61	10.7%
	10-20 years	101	17.7%
	20-35 years	226	39.6%
	More than 35 years	126	22.1%
Chairside Hours per week	Less than 20 hours	70	12.3%
	20-30 hours	152	26.6%
	30-40 hours	289	50.6%
	40-50 hours	52	9.1%
	More than 50 hours	8	1.4%
Annual Income	Less than \$50,000	21	3.7%
	\$50,000-\$100,000	151	26.4%
	\$100,000-\$300,000	329	57.6%
	\$300,000-\$500,000	46	8.1%
	\$500,000-\$700,000	24	4.2%
Age Range	<25	19	3.3%
	25-29	47	8.2%
	30-34	45	7.9%
	35-39	44	7.7%
	40-44	69	12.1%
	45-49	81	14.2%
	50-54	78	13.7%
	55-59	66	11.6%
	60-64	72	12.6%
	65+	50	8.7%



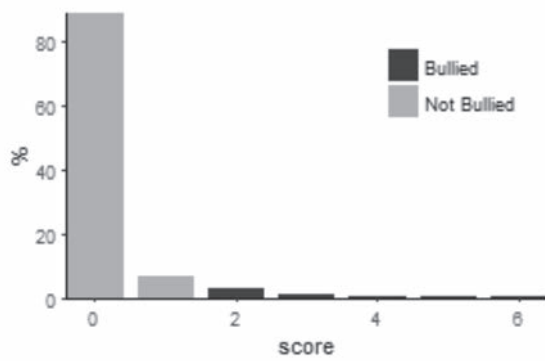
Copenhagen Burnout Inventory: Personal



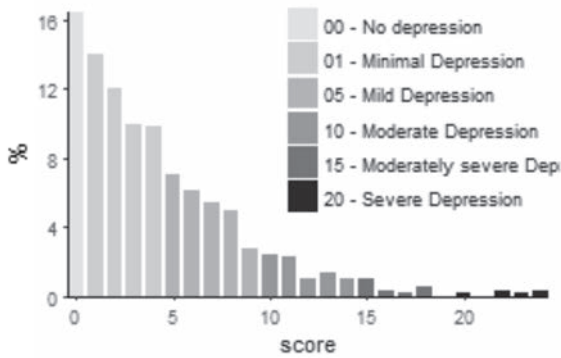
Copenhagen Burnout Inventory: Work



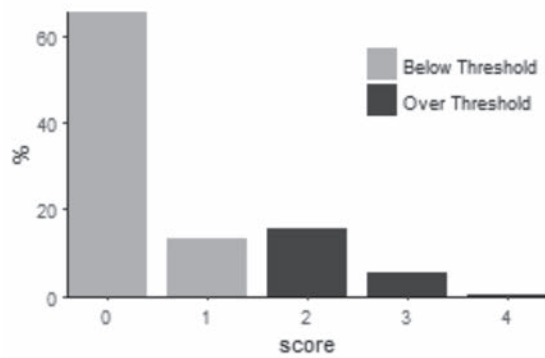
Copenhagen Burnout Inventory: Client



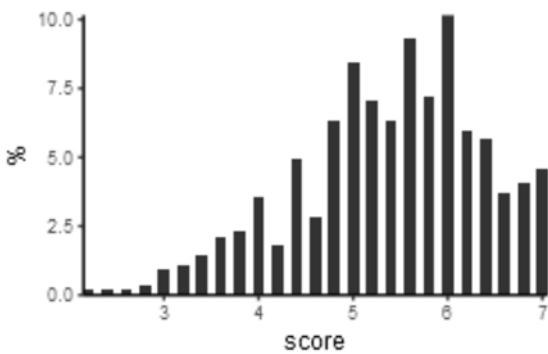
Negative Acts Questionnaire: (Bullying)



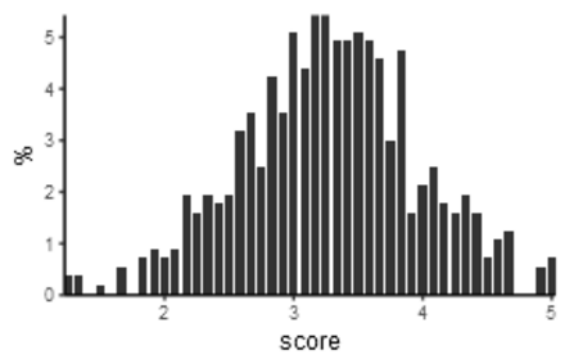
PHQ9: (Depression)



CAGE: (Alcohol)



JSQ: (Job Satisfaction)



SC-SF (Self Compassion)

Figure 1: Distribution of respondent scores, showing relevant thresholds where available.

The sample demographics in Table 1 show that just over half of the sample participants were male (52.2%) and almost three quarters had obtained their primary degree in New Zealand (74.1%). The next most common countries for undergraduate degrees were the UK (50), India (27), South Africa (26), Iraq (15), and Australia (5). Almost 85% of participants reported that they were working predominantly in private practice and approximately half (50.6%) worked 30-40 chairside hours per week.

Table 2 shows that the country of training did not appear to be correlated with the other variables, and working in private employment was also not clearly related to age, years in practice, or income. However, all other demographics were related to some extent. The strongest association was between age and the number of years in practice ($r = .932$, $p < .001$). The next strongest association was between chairside hours and income ($r = .384$, $p < .001$) showing that dentists who spent more time at the chairside were also more likely to be in higher income brackets, and the next strongest association was between age and sex ($r = .348$, $p < .001$), suggesting that the proportion of male dentists was high among older dentists compared to younger dentists.

In Table 3, PHQ-9 scores of 5, 10, 15 and 20 represent mild, moderate, moderately severe and severe depression, respectively. The percentage of dentists working with moderately severe or severe depression, as per PHQ-9 scores, was 3.2%. No statistically significant differences were observed in the prevalence of PHQ-9 scores associated with moderate (or worse) depression between any sub-group and the rest of the respondents.

The CBI consists of three sub-dimensions, scales measuring personal burnout, work-related burnout, and client-related burnout. Relative to established norms (Kristensen et al., 2005; Borritz et al., 2006a) a higher proportion of survey respondents showed burnout in all three subscales when using the 50 or higher criterion (see Table 3). Statistically significant differences between demographic sub-groups within the NZDA respondents were present in personal and work-related burnout. Relative to other respondents, personal and work-related

burnout were both higher in respondents who had been in practice for 10-20 years ($p < .001$) and lower in respondents who had been in practice for more than 35 years ($p < .001$). Personal and work-related burnout rates were also lower in the 65+ age group relative to all other age groups ($p < .001$). The 60-64 age group showed lower levels of burnout compared to respondents from other age groups ($p < .001$), while respondents in the 40-44 age range showed higher rates of burnout than respondents from other age groups ($p < .001$). A higher percentage of female respondents reached the threshold for personal burnout when compared to male respondents ($p < .001$).

The NAQ-R results for bullying scores were broadly consistent over the demographics examined, with no sub-group showing a statistically significant difference to the rest of the NZDA respondents.

Most respondents (79%) did not reach the CAGE threshold score (2+) for problem drinking. Among NZDA respondents, only two sub-groups showed a statistically significant difference to the other respondents, and each of these sub-groups relate to income. Respondents in the \$50 000-\$100 000 annual income group were less likely to reach the CAGE threshold than other respondents ($p < .001$), whereas respondents in the \$100 000-\$300 000 annual income group were more likely to have CAGE scores of 2 or more ($p = .0012$).

Median job satisfaction was higher among males than females ($p = .0016$), and higher in the private sector ($p < .001$) than the public sector ($p < .001$). Median job satisfaction was lower among respondents working 10-20 years in practice when compared to other respondents ($p < .001$), and higher among respondents who had been in practice for more than 35 years ($p < .001$). Similarly, median job satisfaction was higher among respondents in the 60-64 ($p < .001$) and 65+ ($p < .001$) age ranges when compared to other respondents.

Median self-compassion scores were higher among males than females ($p < .001$). Median self-compassion scores were lower among respondents working 10-20 years in practice when compared to other respondents ($p < .001$), and higher among respondents who had been

Table 2: Demographic Spearman Correlations

	Income	Age	Years in Practice	Chairside Hours	Private Employment	Country of Training	Sex
Income	-						
Age	.225	-					
Years in Practice	.259	.932	-				
Chairside Hours	.384	-.137	-.143	-			
Private Employment	.108	.046	.034	.275	-		
Country of Training	.027	-.025	.014	-.054	-.048	-	
Sex	.322	.348	.299	.205	.156	.066	-

Notes: The Spearman correlations between any two variables do not account for associated differences in other variables.

Values in bold are statistically significant after Bonferroni corrections have been applied (critical p value = $.05/21 = .00238$, critical r value = $.127$)

Table 3: PHQ-9 (Depression Scale)

Demographic		N	Mean	SD	No Depression	Minimal Depression	Mild Depression	Moderate Depression	Moderately Severe Depression	Severe Depression
Overall		571	4.3	4.3	16.5%	45.9%	26.3%	8.2%	2.1%	1.1%
Sex	Female	273	4.8	4.2	11.4%	45.4%	30.8%	10.3%	0.7%	1.5%
	Male	298	3.9	4.3	21.1%	46.3%	22.1%	6.4%	3.4%	0.7%
Training Country	New Zealand	423	4.3	4.1	17.0%	45.2%	26.0%	9.5%	1.4%	0.9%
	Other	148	4.4	4.7	14.9%	48.0%	27.0%	4.7%	4.1%	1.4%
Employment	Equally Private and Public	17	5.1	3.9	11.8%	35.3%	35.3%	17.6%	0.0%	0.0%
	Predominantly Private	485	4.4	4.4	16.9%	46.0%	25.6%	7.8%	2.5%	1.2%
	Predominantly Public	69	4.0	3.2	14.5%	47.8%	29.0%	8.7%	0.0%	0.0%
Years in Practice	Less than 5 years	57	6.1	4.7	7.0%	33.3%	35.1%	21.1%	0.0%	3.5%
	5-10 years	61	4.7	3.5	9.8%	45.9%	34.4%	8.2%	1.6%	0.0%
	10-20 years	101	5.1	4.2	10.9%	40.6%	33.7%	10.9%	4.0%	0.0%
	20-35 years	226	4.3	4.6	15.5%	49.1%	25.7%	5.3%	2.7%	1.8%
	More than 35 years	126	2.8	3.3	30.2%	50.0%	13.5%	5.6%	0.8%	0.0%
Chairside hrs per week	Less than 20 hours	70	4.3	3.5	14.3%	45.7%	28.6%	11.4%	0.0%	0.0%
	20-30 hours	152	4.3	4.1	15.1%	48.0%	27.0%	7.9%	0.7%	1.3%
	30-40 hours	289	4.2	4.0	15.9%	47.1%	25.6%	8.7%	2.4%	0.3%
	40-50 hours	52	5.3	6.4	25.0%	32.7%	26.9%	3.8%	5.8%	5.8%
	More than 50 hours	8	4.1	5.9	25.0%	50.0%	12.5%	0.0%	12.5%	0.0%
Annual Income	Less than \$50,000	21	3.3	3.0	23.8%	47.6%	23.8%	4.8%	0.0%	0.0%
	\$50,000-\$100,000	151	5.0	4.3	12.6%	41.1%	32.5%	11.9%	0.0%	2.0%
	\$100,000-\$300,000	329	4.4	4.4	15.2%	47.4%	24.9%	8.5%	3.3%	0.6%
	\$300,000-\$500,000	46	2.8	3.8	28.3%	50.0%	19.6%	0.0%	0.0%	2.2%
	\$500,000+	24	2.9	3.8	29.2%	45.8%	20.8%	0.0%	4.2%	0.0%
Age Range	<25	19	6.2	4.0	0.0%	36.8%	26.3%	36.8%	0.0%	0.0%
	25-29	47	5.49	4.8	10.6%	38.3%	34.0%	12.8%	0.0%	4.3%
	30-34	45	4.53	3.4	8.9%	51.1%	31.1%	8.9%	0.0%	0.0%
	35-39	44	5.14	4.3	11.4%	40.9%	29.5%	13.6%	4.5%	0.0%
	40-44	69	4.90	4.3	14.5%	37.7%	39.1%	5.8%	1.4%	1.4%
	45-49	81	4.78	4.3	9.9%	43.2%	35.8%	7.4%	2.5%	1.2%
	50-54	78	4.68	5.3	19.2%	47.4%	19.2%	6.4%	6.4%	1.3%
	55-59	66	3.68	3.5	16.7%	53.0%	22.7%	6.1%	1.5%	0.0%
	60-64	72	3.31	3.9	25.0%	50.0%	19.4%	4.2%	0.0%	1.4%
	65+	50	2.04	3.0	36.0%	54.0%	4.0%	4.0%	2.0%	0.0%

in practice for more than 35 years ($p < .001$). Similarly, median self-compassion scores were higher among respondents in the 60-64 ($p = .0011$) and 65+ ($p < .001$) age ranges when compared to other respondents. Self-compassion was also higher in the \$300-500,000 income range when compared to other respondents ($p < .001$).

Median perceived stress scores were higher among females than males ($p < .001$). Median perceived stress scores were higher among respondents working 10-20 years in practice when compared to other respondents ($p < .001$), and lower among respondents who had been in practice for more than 35 years ($p < .001$). Similarly, median perceived stress scores were lower among

respondents in the 60-64 ($p = .0012$) and 65+ ($p < .001$) age ranges when compared to other respondents. Perceived stress was also lower in the \$300-500,000 income range when compared to other respondents ($p < .001$).

Discussion

This study was a cross-sectional survey of members of the NZDA. The aim was to measure aspects of the psychological health of dentists practising in New Zealand. Rates of moderate (or worse) depression amongst respondents, at 11.4%, were similar to those seen in a New Zealand study of a more general population (Arroll et al., 2010). In terms of burnout, the

percentage of NZDA respondents with scores over the established thresholds was greater than that of a standard reference group in all three burnout sub-dimensions. Of the NZDA respondents, 36% reported personal burnout, 35% reported work burnout and 20% reported client-related burnout. Burnout levels were of concern especially in females and more junior practitioners. Rates of bullying amongst respondents were lower by the measure used in a report published by the Association of Salaried Medical Staff (ASMS) (4.6% for the NZDA vs 24.9% for the ASMS). With regards to alcohol, 21% of the NZDA sample reached the threshold for problematic alcohol use. The outcome measures that did not have thresholds were skewed toward the desirable end of the scale (i.e. bullying (NAQ-R), perceived stress (PSS) or normally distributed (SCS-SF). Importantly, self-compassion scores were similar to those seen in other clinical professions.

This study has several strengths, one being that it is the first study in New Zealand to describe the psychological health of practising dentists and uses a nationally representative sample, therefore contributing important information within the New Zealand context. Other strengths of the study are that it uses validated questionnaires and external benchmarking where possible. Key limitations to keep in mind when interpreting the results are the fact that the analyses undertaken were univariate (i.e. they do not account for associated differences in other variables), and the fact that the survey did not capture responses from all NZDA members. There is also no demographic data reported from all NZDA members or from all dentists registered with the Dental Council at that time, due to unavailability of suitable data for comparison purposes. This does not allow comment on whether the sample used is representative of New Zealand dentists. A further limitation of the survey is the reliance on self-report measures. However, this limitation should not be overemphasised as the self-report measures used here have been validated against objective measures in the literature and are a suitable methodology for the collection of psychological health data. Furthermore, the use of objective measures of psychological health would not have been feasible for this study. Additionally, the univariate analyses here are intended to provide a lay of the land and provide insights for further study, rather than drill into one particular aspect in depth. Finally, while the survey did not receive responses from all members, the response rate is in line with another recent national survey of New Zealand dentists (Looi S et al., 2018).

The tool used to measure levels of depression, the PHQ-9, although not diagnostic, correlates highly with a diagnosis of clinical depression at clinician interview. A PHQ-9 score of 10 or above was found to have a sensitivity of 88% and a specificity of 88% for major depression in a sample of US Primary Care and Obstetrics and Gynaecology patients (Kroenke and Spitzer, 2002), and a sensitivity of 0.74 and a specificity of 0.91 in a New Zealand primary care sample in 2010 (Arroll et al., 2010). The percentage of dentists in the NZDA sample with PHQ-9 scores of 10 or above was

11.4%, which is in line with the 13% reported by Arroll in the New Zealand cohort (Arroll et al., 2010) (See Table 7). The percentage of dentists in the NZDA sample with a PHQ-9 score of 15 or above was 3.2%, compared to Arroll's 5.3% (Arroll et al., 2010), a difference which was found to be statistically significant. Such results appear reassuring. It is pertinent to note, however, that there were still a significant number of dentists whose responses indicate they continued to work (18/571) despite self-reporting as depressed at a severity where active treatment would likely be recommended (New Zealand Guidelines Group, 2008; Arroll et al., 2018). A pivotal study of doctors, published in the *British Medical Journal*, demonstrated that doctors with depression made 6.2 times the number of medication errors of their non-depressed colleagues (Fahrenkopf et al., 2008). Given that the features that characterise depression can include loss of concentration, fatigue and slowed thoughts, it is likely that other clinicians, including dentists, may be similarly at risk of error if working whilst unwell, depending on the severity of the condition. Furthermore, a review of the burnout literature in the dental practitioner by Basson (2013) found that psychological duress and work-related stressors are detrimental for the dentist-patient relationship and emphasised the possible impact of clinicians' health on patient interactions (Basson 2013).

In terms of burnout, relative to established norms (Kristensen et al., 2005; Borritz et al., 2006a) (See Table 6), the NZDA sample show higher proportions of respondents over the burnout threshold (a score of 50) on all three CBI scales. For burnout symptoms, it is thought that emotional exhaustion is the key dimension to consider in dentists as it may be an early warning sign (Te Brake et al., 2008), and that lack of career perspective is one of the most strongly-related stressors (Gorter et al., 1998). CBI scales have been shown to predict use of pain killers, sleep problems, future sickness absence, and intention to quit (Borritz et al., 2006b). Alongside personal health consequences and workforce implications, dentists with higher burnout scores have also been shown to demonstrate poorer personal health behaviour with regards to alcohol use, diet and exercise (Gorter et al., 2000). Previous comparisons between burnout in German dental and medical students indicated that dental students had higher burnout scores than medical students, and that depersonalisation in particular was prominent (Prinz et al., 2012). This is of concern, as if a dental student has experienced stressful patient interactions it is possible for this to lead to depersonalisation, a state where the dental student may perceive patients as objects rather than people, possibly in order to protect themselves from future negative patient experiences. This perception can, in turn, result in a lack of empathy and a communication style that appears cynical and detached, which further complicates patient interactions (Prinz et al., 2012). Therefore, although depersonalisation can start off as a coping mechanism, it can perpetuate a negative cycle which impacts on patients.

Table 4: Scales With thresholds

Demographic	N	(CBI) Copenhagen Burnout Inventory										NAQ-R Overall (Bullying)				CAGE (Alcohol Use)						
		CBI Personal Dimension			CBI Work Dimension			CBI Client Dimension				Mean	SD	% Above Threshold	% Below Threshold	Mean	SD	% Above Threshold	% Below Threshold			
Overall	571	40.3	20.3	35.9%	64.1%	41.8	19.2	35.0%	65.0%	30.7	20.3	20.0%	80.0%	0.2	0.7	4.6%	95.4%	0.6	0.9	21.0%	79.0%	
Sex																						
Female	273	45.7	19.6	45.8%	54.2%	45.3	18.9	41.0%	59.0%	31.4	21.6	22.0%	78.0%	0.3	0.8	5.5%	94.5%	0.5	0.9	17.6%	82.4%	
Male	298	35.4	19.6	26.8%	73.2%	38.7	18.9	29.5%	70.5%	30.0	19.2	18.1%	81.9%	0.1	0.6	3.7%	96.3%	0.7	1.0	24.2%	75.8%	
Training Country																						
New Zealand	423	39.5	20.3	35.5%	64.5%	41.5	18.8	35.5%	64.5%	30.6	19.9	18.4%	81.6%	0.2	0.6	4.5%	95.5%	0.7	1.0	23.2%	76.8%	
Other	148	42.6	20.2	37.2%	62.8%	42.7	20.3	33.8%	66.2%	31.0	21.7	24.3%	75.7%	0.2	0.7	4.7%	95.3%	0.5	0.8	14.9%	85.1%	
Employment																						
Equally Private and Public	17	42.4	12.6	29.4%	70.6%	43.9	15.6	47.1%	52.9%	27.2	17.8	5.9%	94.1%	0.5	1.3	11.8%	88.2%	0.7	1.1	29.4%	70.6%	
Predominantly Private	485	39.9	20.6	35.3%	64.7%	41.4	19.7	34.0%	66.0%	31.3	20.4	21.4%	78.6%	0.2	0.6	3.5%	96.5%	0.6	1.0	20.8%	79.2%	
Predominantly Public	69	42.9	19.4	42.0%	58.0%	44.3	16.4	39.1%	60.9%	26.9	20.4	13.0%	87.0%	0.4	0.7	10.1%	89.9%	0.6	0.9	20.3%	79.7%	
Years in Practice																						
Less than 5 years	57	47.2	17.7	52.6%	47.4%	48.8	18.3	50.9%	49.1%	37.1	22.4	28.1%	71.9%	0.4	1.0	12.3%	87.7%	0.3	0.7	8.8%	91.2%	
5-10 years	61	42.4	17.3	32.8%	67.2%	45.7	15.7	39.3%	60.7%	30.1	21.1	19.7%	80.3%	0.2	0.9	4.9%	95.1%	0.6	0.9	21.3%	78.7%	
10-20 years	101	49.1	18.3	55.4%	44.6%	48.3	16.7	49.5%	50.5%	37.4	20.9	30.7%	69.3%	0.2	0.6	6.9%	93.1%	0.6	0.9	18.8%	81.2%	
20-35 years	226	40.5	20.8	35.0%	65.0%	42.4	19.9	35.4%	64.6%	29.9	19.7	17.7%	82.3%	0.2	0.7	4.0%	96.0%	0.7	1.0	22.6%	77.4%	
More than 35 years	126	28.8	17.9	15.9%	84.1%	30.6	16.8	13.5%	86.5%	24.1	17.3	11.9%	88.1%	0.1	0.2	0.0%	100.0%	0.7	1.0	25.4%	74.6%	
Chairside Hours																						
Less than 20 hours	70	41.7	20.0	34.3%	65.7%	41.6	18.3	34.3%	65.7%	28.3	21.7	20.0%	80.0%	0.2	0.7	4.3%	95.7%	0.6	0.9	24.3%	75.7%	
20-30 hours	152	41.2	20.5	40.1%	59.9%	41.1	19.7	30.3%	69.7%	31.1	18.2	19.1%	80.9%	0.2	0.5	4.6%	95.4%	0.6	0.9	22.4%	77.6%	
30-40 hours	289	39.3	19.4	34.3%	65.7%	41.3	18.3	36.0%	64.0%	30.7	20.3	19.7%	80.3%	0.2	0.7	3.8%	96.2%	0.6	1.0	20.8%	79.2%	
40-50 hours	52	41.8	24.1	36.5%	63.5%	47.2	22.5	46.2%	53.8%	34.7	23.9	25.0%	75.0%	0.3	0.9	5.8%	94.2%	0.5	0.9	15.4%	84.6%	
More than 50 hours	8	39.1	23.7	25.0%	75.0%	43.3	25.4	25.0%	75.0%	17.7	18.6	12.5%	87.5%	0.5	0.9	25.0%	75.0%	0.6	0.7	12.5%	87.5%	
Annual Income																						
Less than \$50,000	21	37.3	22.5	28.6%	71.4%	36.7	21.2	19.0%	81.0%	26.4	23.2	19.0%	81.0%	0.3	1.1	4.8%	95.2%	0.3	0.7	14.3%	85.7%	
\$50,000-\$100,000	151	43.6	19.1	41.1%	58.9%	44.9	18.7	45.0%	55.0%	33.9	21.1	27.2%	72.8%	0.3	0.9	6.6%	93.4%	0.4	0.8	11.3%	88.7%	
\$100,000-\$300,000	329	41.1	20.2	38.3%	61.7%	42.4	19.0	35.6%	64.4%	31.2	20.0	18.5%	81.5%	0.2	0.6	3.6%	96.4%	0.7	1.0	25.8%	74.2%	
\$300,000-\$500,000	46	29.5	20.6	17.4%	82.6%	33.3	18.5	17.4%	82.6%	22.5	18.7	10.9%	89.1%	0.2	0.6	4.3%	95.7%	0.6	0.9	23.9%	76.1%	
\$500,000+	24	32.5	18.3	12.5%	87.5%	35.0	18.5	12.5%	87.5%	23.3	15.5	12.5%	87.5%	0.1	0.4	4.2%	95.8%	0.5	1.0	16.67%	83.33%	
Age Range																						
<25	19	44.1	18.0	47.4%	52.6%	44.6	18.7	52.6%	47.4%	32.9	21.1	15.8%	84.2%	0.3	0.7	10.5%	89.5%	0.1	0.2	0.0%	100.0%	
25-29	47	47.5	19.6	51.1%	48.9%	48.9	18.7	46.8%	53.2%	38.0	22.9	29.8%	70.2%	0.4	1.1	8.5%	91.5%	0.5	0.9	17.0%	83.0%	
30-34	45	41.9	15.8	31.1%	68.9%	45.5	15.3	40.0%	60.0%	29.2	20.6	17.8%	82.2%	0.1	0.4	2.2%	97.8%	0.6	0.8	22.2%	77.8%	
35-39	44	46.6	17.5	47.7%	52.3%	47.8	15.5	52.3%	47.7%	36.8	20.3	31.8%	68.2%	0.4	1.0	11.4%	88.6%	0.5	0.8	15.9%	84.1%	
40-44	69	48.8	19.4	55.1%	44.9%	48.8	19.1	47.8%	52.2%	36.6	21.6	30.4%	69.6%	0.2	0.5	4.3%	95.7%	0.6	0.9	18.8%	81.2%	
45-49	81	44.4	20.6	44.4%	55.6%	46.7	18.9	46.9%	53.1%	31.8	20.5	19.8%	80.2%	0.2	0.9	4.9%	95.1%	0.7	1.1	23.5%	76.5%	
50-54	78	40.5	22.2	32.1%	67.9%	40.3	20.3	25.6%	74.4%	29.1	19.6	14.1%	85.9%	0.2	0.6	6.4%	93.6%	0.5	0.9	18.0%	82.1%	
55-59	66	37.5	17.4	31.8%	68.2%	39.8	17.4	28.8%	71.2%	29.0	18.5	19.7%	80.3%	0.2	0.5	3.0%	97.0%	0.9	1.0	33.3%	66.7%	
60-64	72	32.2	18.4	18.1%	81.9%	34.0	17.5	19.4%	80.6%	26.7	18.2	15.3%	84.7%	0.1	0.2	0.0%	100.0%	0.8	1.0	25.0%	75.0%	
65+	50	22.0	15.7	8.0%	92.0%	24.5	14.9	6.0%	94.0%	19.3	15.5	6.0%	94.0%	0.0	0.1	0.0%	100.0%	0.6	0.9	18.0%	82.0%	

Note: Values in bold and italics show a statistically significant difference to the combined results of the rest of their demographic sub-group (e.g. 40-44 year olds compared to anyone not in the 40-44 year old age group), after Bonferroni corrections (critical value = .05/30 = .001667)

Table 5: Scales Without Thresholds

Demographic	N	JSQ (Job Satisfaction)					SC-SF (Self-Compassion)					PSS (Perceived Stress)											
		Min	P25	Median	P75	Max	Mean	SD	Min	P25	Median	P75	Max	Mean	SD								
Overall	571	6	2.20	4.80	5.60	6.00	7.00	5.39	3	1.25	2.83	3.25	3.67	5.00	3.28	6	17.00	21.00	27.00	50	21.71	7.24	
Sex																							
Female	273	6	2.20	4.60	5.40	6.00	7.00	5.24	3	1.25	2.67	3.17	3.58	4.92	3.12	7	18.00	23.00	28.00	50	23.06	6.95	
Male	298	8	2.60	5.00	5.60	6.20	7.00	5.52	4	1.33	3.00	3.42	3.83	5.00	3.42	6	15.00	20.00	25.00	40	20.48	7.29	
Training Country																							
New Zealand	423	7	2.40	4.80	5.40	6.00	7.00	5.38	3	1.25	2.83	3.33	3.75	5.00	3.31	6	16.00	22.00	27.00	49	21.56	7.25	
Other	148	6	2.20	4.80	5.60	6.20	7.00	5.41	3	1.25	2.83	3.21	3.58	4.92	3.18	6	17.00	21.00	27.00	50	22.15	7.20	
Employment																							
Equally Private and Public	17	13	3.60	4.00	4.80	5.60	6.80	4.79	16	2.33	3.08	3.25	3.50	4.67	3.27	13	18.00	24.00	30.00	33	23.82	6.58	
Predominantly Private	485	6	2.20	5.00	5.60	6.20	7.00	5.48	3	1.25	2.83	3.33	3.75	5.00	3.30	6	16.00	21.00	26.00	50	21.41	7.35	
Predominantly Public	69	7	2.40	4.20	5.00	5.60	7.00	4.92	3	1.25	2.75	3.08	3.58	4.33	3.13	7	19.00	24.00	28.00	34	23.30	6.34	
Years in Practice																							
Less than 5 years	57	10	3.00	4.40	5.20	6.00	7.00	5.07	6	1.50	2.58	3.00	3.42	4.67	3.04	9	19.00	23.00	29.00	39	24.02	6.72	
5-10 years	61	10	3.00	4.80	5.40	6.00	7.00	5.38	10	1.83	2.67	3.08	3.50	4.92	3.11	8	19.00	22.00	26.00	35	22.51	5.90	
10-20 years	101	10	3.00	4.60	5.20	5.60	7.00	5.10	3	1.25	2.58	3.00	3.50	4.67	3.04	7	20.00	25.00	29.00	38	24.43	6.57	
20-35 years	226	6	2.20	4.80	5.60	6.00	7.00	5.38	4	1.33	2.92	3.33	3.75	5.00	3.33	6	17.00	21.00	26.00	50	21.53	7.50	
More than 35 years	126	9	2.80	5.20	5.80	6.40	7.00	5.77	8	1.67	3.17	3.58	3.98	4.92	3.56	6	14.00	17.00	23.00	38	18.44	6.83	
Chairside Hours																							
Less than 20 hours	70	10	3.00	4.60	5.00	5.60	7.00	5.15	4	1.33	2.67	3.17	3.67	4.67	3.17	6	17.25	23.00	26.75	33	21.77	6.56	
20-30 hours	152	6	2.20	4.80	5.40	6.00	7.00	5.34	10	1.83	2.92	3.33	3.75	5.00	3.32	7	16.00	21.00	26.25	50	21.39	6.93	
30-40 hours	289	8	2.60	4.80	5.60	6.20	7.00	5.45	3	1.25	2.83	3.33	3.75	5.00	3.30	6	17.00	22.00	27.00	44	21.73	7.32	
40-50 hours	52	10	3.00	4.95	5.60	6.00	7.00	5.38	3	1.25	2.67	3.21	3.58	4.67	3.10	9	18.00	20.50	28.00	49	22.79	8.44	
More than 50 hours	8	15	4.00	5.65	6.40	6.45	7.00	5.98	13	2.08	3.21	3.54	3.83	4.92	3.57	8	14.25	20.50	22.75	33	19.75	8.17	
Annual Income																							
Less than \$50,000	21	12	3.40	5.00	5.20	6.40	6.80	5.38	17	2.42	2.92	3.50	3.75	4.08	3.30	12	18.00	22.00	27.00	33	22.10	6.07	
\$50,000-\$100,000	151	8	2.60	4.40	5.20	6.00	7.00	5.15	3	1.25	2.71	3.17	3.54	4.92	3.13	6	18.50	23.00	27.00	39	22.73	6.57	
\$100,000-\$300,000	329	7	2.40	4.80	5.60	6.00	7.00	5.39	3	1.25	2.83	3.33	3.75	5.00	3.28	6	17.00	22.00	27.00	49	21.94	7.37	
\$300,000-\$500,000	46	6	2.20	5.60	6.00	6.40	7.00	5.87	11	1.92	3.33	3.58	4.08	5.00	3.63	6	13.25	16.00	22.50	50	17.89	8.24	
\$500,000+	24	13	3.60	5.55	6.00	6.50	7.00	5.91	13	2.08	2.92	3.46	3.79	4.67	3.48	9	14.75	19.00	21.25	33	19.25	5.82	
Age Range																							
<25	19	10	3.00	4.30	5.60	6.10	7.00	5.15	8	1.67	2.75	3.08	3.29	4.42	3.09	9	19.50	26.00	28.50	35	24.47	6.62	
25-29	47	10	3.00	4.60	5.20	5.80	6.60	5.14	6	1.50	2.42	3.00	3.54	4.67	3.07	9	17.50	21.00	27.00	39	22.53	6.88	
30-34	45	13	3.60	4.80	5.40	6.00	7.00	5.37	10	1.83	2.67	3.08	3.42	4.92	3.08	8	21.00	24.00	27.00	34	23.22	5.70	
35-39	44	10	3.00	4.80	5.10	5.60	7.00	5.20	3	1.25	2.67	3.13	3.58	4.67	3.09	9	20.75	25.00	31.00	38	25.50	6.78	
40-44	69	6	2.20	4.40	5.20	5.80	7.00	5.13	10	1.83	2.58	3.08	3.58	5.00	3.10	6	18.00	24.00	27.00	50	22.74	7.54	
45-49	81	7	2.40	4.60	5.40	6.00	7.00	5.24	11	1.92	2.67	3.25	3.58	5.00	3.23	7	18.00	23.00	28.00	49	23.04	7.53	
50-54	78	8	2.60	4.80	5.40	6.15	7.00	5.32	4	1.33	2.92	3.25	3.56	4.58	3.24	6	18.00	21.00	25.50	40	22.18	7.33	
55-59	66	10	3.00	4.80	5.60	6.00	7.00	5.44	8	1.67	3.08	3.42	3.83	4.92	3.41	8	14.00	20.00	24.75	33	19.53	6.17	
60-64	72	9	2.80	5.20	5.80	6.40	7.00	5.76	11	1.92	3.17	3.54	3.92	4.67	3.50	9	15.00	18.00	23.50	33	19.40	6.21	
65+	50	9	2.80	5.45	6.00	6.60	7.00	5.98	22	2.83	3.27	3.67	4.25	5.00	3.76	6	11.00	17.00	22.75	38	17.12	7.59	

Note: Values in bold and italics show a statistically significant difference to the combined results of the rest of their demographic sub group (e.g. 60-64 year olds compared to anyone not in the 60-64 year old age group), after Bonferroni corrections (critical value = .05/30 = .001667)



Table 6: External comparators for scales with thresholds

Scale	NZDA	Comparator		P
	% over threshold	Source	% over threshold	
PHQ9 >=10	11.4%	(Arroll et al., 2010)	13.0%	.262
PHQ9 >=15	3.2%	(Arroll et al., 2010)	5.2%	.024
CBI Personal	35.9%	PUMA (Borritz et al., 2006a; Kristensen et al., 2005)	22.2%	<.001
CBI Work	35.0%	PUMA (Borritz et al., 2006a; Kristensen et al., 2005)	19.8%	<.001
CBI Client	20.0%	PUMA (Borritz et al., 2006a; Kristensen et al., 2005)	15.9%	.009
NAQR	4.6%	ASMS (Chambers and Frampton, 2016)	24.9%	<.001
CAGE	21.0%	(Smart et al., 1991)	10.9%	<.001

Note: Bolded values indicate that a results from chi square analyses show a significant difference. Differences are seen in all cases, except for the PHQ9>=10 comparison

Table 7: External Comparators for SelfCompassion Scale

	Our sample			Comparator				Comments	p
	N	Mean	SD	Comparator	N	Mean	SD		
Self Compassion	571	3.28	0.68	(Lockard et al., 2014)	1609	2.8	0.74	College Counselling Centre Clients	<.001
				(Mills et al., 2018)	369	3.26	0.63	Palliative Care	.645
				(Finlay-Jones et al., 2015)	198	3.27	0.74	Female Psychologists	.867

In addition to depersonalisation, a practitioner with burnout may become less efficient, with implications for their livelihood, quality of care and quality of life. It is common for those with burnout to initially compensate in an attempt to keep up their current standard of practice, by increasing their levels of effort and forcing themselves to put in more energy and time. This means that measures of productivity initially may show little change. However, the compensatory effort required in order to achieve that same level of performance is at the detriment of the person's physical and psychological health. This finding has been shown in dentists (Hakanen and Koivumaki, 2014), and further highlights the importance of gathering robust prevalence data, as it underscores that performance outputs are not necessarily a true reflection of practitioners' health.

In terms of bullying, relative to data from ASMS (Chambers and Frampton, 2016) and Gardner et al., (2013), the NZDA sample shows a lower proportion of respondents meeting the Lutgen-Sandvik et al (2007) threshold for bullying (Lutgen-Sandvik et al., 2007). It is worth noting that the ASMS study sample of dentists was very small and was comprised only of dentists working in District Health Boards (Chambers and Frampton, 2016), whereas the majority of the dentists in this NZDA study worked in private practice. It is clear that many dentists in the US have witnessed or experienced aggression or bullying in their workplace (Murdoch-Kinch et al., 2017), with one US study reporting that Faculty could provide more support to students, and that improvements could be made to the emotional climate of dental school (Henzi et al., 2005). Although this has not been shown to be the case with this New Zealand study, it is wise to nurture

positive learning and working environments (Basudan et al., 2017).

The CAGE results seen in the NZDA responses are consistent with the results from a Canadian general population sample (Bisson et al., 1999). While we are unaware of current New Zealand norms, it is worth noting that norms reported in the literature vary widely across, and even within studies, depending on how drinking alcohol is conceptualised. A survey of 437 dentists practising in New Zealand in 2006 reported that over a quarter of respondents used alcohol to relieve stress (Ayers et al., 2008). However, as the present NZDA survey did not include this specific question, it is not possible to comment on a change in alcohol use as a coping mechanism over a decade later.

Regarding levels of self-compassion, the self-compassion (SCS-SF) scores of the dentists as a group are significantly higher compared to college students attending counselling (Lockard et al., 2014) and similar in those seen in Australian Psychologists (Finlay-Jones et al., 2015) and in palliative care nurses and doctors (Mills et al., 2018). While this suggests that there are unlikely to be self-compassion-related concerns for dentists as a group, self-compassion is still relevant to individuals. Lower self-compassion scores also imply a tendency to be self-critical (Neff, 2004), and such personality traits increase the risk for depression, anxiety and burnout (Rada and Johnson-Leong, 2004; Jackson 2017).

Dentists in this study sample indicated that the peak time for higher levels of perceived stress was 10-20 years post-graduation, and that older dentists experienced less stress. Certainly the early years of training and

practising appear to be the most stressful, with several studies focussing on undergraduate students (Alzahem et al., 2011; Elani et al., 2014) and finding that dental students' levels of stress increase as they progress through their training (Gorter et al., 2008; Ersan et al., 2017), with the end of the academic year being particularly stressful (Alzahem et al., 2011). Similar to our findings, stress levels are generally higher in females than in males (Heath et al., 1999; Ersan et al., 2017). Students' stressors include examinations, fear of failure (Heath et al., 1999), clinical requirements, supervisors (Alzahem et al., 2011) and debt (Boyles and Ahmed, 2017). Although the stressors are likely to be similar for any student body, individuals will have a variety of stress responses, in part due to their own resilience thresholds, past experiences and coping mechanisms (Zubin and Spring, 1977; Bretherton et al., 2016b; Crego et al., 2016; Gambetta-Tessini et al., 2016; Ersan et al., 2017). In a large study of oral health professional students' coping strategies, active coping and positive re-framing showed a negative correlation with levels of perceived stress, whereas maladaptive coping mechanisms such as self-blame and self-distraction were associated with higher stress levels (Gambetta-Tessini et al., 2016). This is of interest, as helpful coping strategies are a skill which can be learned. Whilst acknowledging that it is possible for individuals to take steps to increase their resiliency skills, a comprehensive wellbeing approach will also consider factors which can be addressed in the system (Hangartner et al., 2016; Shanafelt and Noseworthy, 2017; Moodley et al., 2018).

There are multiple psychological stressors for dentists, which have been cited in the literature over the years (Dunlap and Stewart, 1982; Bretherton et al., 2016a) which include workload and time pressures, strict and costly regulatory requirements, uncertainties regarding the future, limited opportunities for growth (Ahmad et al., 2015), and challenging interactions with patients or their families (Gorter et al., 1999). Ayers et al's 2008 study of New Zealand dentists also identified that there were some gender differences with respect to stressors, with male dentists reporting causing pain and having to maintain higher levels of concentration as more frequent stressors than female dentists, a difference which reached statistical significance (Ayers et al., 2008). A complaint can be a major life-event, putting a dentist under additional psychological pressure on top of their day-to-day load, and can lead to feelings of helplessness, anxiety, loss of confidence and self-esteem, and fears about loss of income (Stuart and Cunningham, 2015). It has been reported that New Zealand dentists coping with a complaint tend to seek legal help, but rarely seek psychological support, or seek it late. One study highlighted the importance of providing emotional support early in a complaints process, and stated that this responsibility lay with the wider profession (Stuart and Cunningham, 2015). Alongside psychological health, it is important to acknowledge the physical demands of dentistry with musculoskeletal disorders being highly prevalent (De Sio et al., 2018), and stress being one of the main risk

factors for such disorders (Gupta, 2011). One Australian study reported that although 88.9% of dentists and 83.6% of orthodontists had reported experiencing a musculoskeletal problem in the previous year, less than a third of these practitioners had ever received any ergonomic training at University (Sakzewski and Naserud-Din, 2015).

Looking more broadly at our study results, dentists who have been working for longer seem to have better psychological wellbeing than those who are new to the profession, with statistically significant differences from the age/years in practice sub-groups tending to be positive among older/longer serving NZDA members and negative among younger/newer dentists. This is similar to other health professionals, as more experienced doctors have been shown to have less burnout (Dyrbye et al., 2014) and less barriers to compassion than more junior colleagues, and younger veterinarians are more at risk of experiencing stress than more experienced practitioners (Gardner and Hini, 2006). It is possible that older clinicians have developed better coping mechanisms, or have more options regarding their work configuration. It is possible that those with psychological difficulties might have left the profession, prior to survey data being collected, leaving behind a group of senior clinicians who provide higher psychological health scores. It is worth considering if this 'learned' experience can be handed down to the newer dentists, or if it is a rite of passage that must be endured. It would seem worthwhile to explore mentor programmes, and the NZDA already has a well-established graduate mentor programme. This is an important area for future research, as there is little robust research into mentoring programmes to evaluate their effectiveness in terms of psychological health of the mentee in longitudinal controlled trials.

In any discussion of the health of health practitioners, it is important to consider the positioning of potential interventions to prevent or manage ill-health and enhance wellbeing, and their optimal placement in the pathway from university entry to retirement. For example, resilience could be discussed as part of selection processes, although this is a complex issue to be addressed carefully. Selection criteria need ensure that those selected are emotionally robust enough to withstand the demands of the programme, whilst enabling diversity in the profession, (Crompton, 2012; Murdoch-Kinch et al., 2017), and must avoid discriminating against those with past or present illness (Moir et al., 2018). Specific skills could be taught to address common stressors at key transition points, such as the first year at university (Bowman, 2017). Wellbeing curricula could be introduced as an integral part of undergraduate training with burnout prevention, stress resistance and emotional intelligence skills as core competencies (Hasegawa et al., 2016; Moir, 2018). The importance of such training cannot be ignored. Higher levels of emotional intelligence are associated with better job satisfaction, which is considered an integral factor in retention (Pau and Sabri, 2015). Furthermore, postgraduate training could address practicalities known to minimise stress, such as assigning new graduates to one stable workplace, rather than requiring them to

move frequently between placements, as rotation has been shown to be associated with poorer mental health in postgraduate dental trainees in countries where this system is in place (Takarada et al., 2014). Individual dentists can also be encouraged to reflect on their own coping strategies. Are these likely to enhance their own health in the long term, for instance, playing sport, or to potentially be harmful for example drinking alcohol to de-stress? Strategies outlined by New Zealand dentists as ways of coping with stress include interacting with other people, finding ways to forget about work, changing the work environment and engaging in hobbies (Ayers et al., 2008).

Alongside boosting individual resiliency skills, it is vital to consider systems factors, which would require public and private employers, and national key stakeholders including professional bodies, to acknowledge and attempt to address the wider issues affecting the psychological wellbeing of the profession (Anan and Dixon, 1999). There is potential for interventions to be designed at an organisational level to improve working environments for dentists, and such strategies have been outlined in the evidence (Berthelsen et al., 2017). Recent models of clinician wellbeing, such as the one developed by The National Academy of Medicine Action Collaborative on Clinician Well-Being and Resilience, highlight the role of addressing individual and systems factors simultaneously (Brigham et al., 2018). In addition, future researchers might find it valuable to study job engagement, conceptualised as the opposite of burnout, as positive factors also influence wellbeing (Montasem,

2017). Other interventions worth considering might be those to effect change further afield, such as how the media might be utilised to affect the public's perception of dentists, and how this in turn might impact patients' expectations and behaviour.

Conclusion

This is the first study of the prevalence of psychological health of dentists in New Zealand and documents the high rates of burnout amongst practising dentists. In particular, when looking at personal burnout by sex, significantly more females are over the burnout threshold than males. Similarly, a higher proportion of junior dentists are over the personal and work-related burnout thresholds than their senior colleagues. These findings imply the need to identify these conditions early. Individual practitioners can undertake training to manage the stress of practising in dentistry as well as working on modifiable behaviours like self-compassion, and systems factors can also be identified and addressed. Such action may mitigate burnout, depression and overall psychological distress. Professional organizations like the NZDA can be instrumental in identifying at-risk practitioners and promoting the wellbeing of its members.

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