Occupational burnout and work engagement: a national survey of dentists in the United Kingdom

D. A. Denton,[1] J. T. Newton[2] and E. J. Bower[3]

RESEARCH

IN BRIEF

- Burnout is a state characterised by exhaustion, cynicism and inefficacy.
- Work engagement is a positive construct characterised by approaching working life with vigour, dedication and absorption.
- Dentists with postgraduate qualifications and those who work in larger teams had lower burnout and more positive work engagement. Dentists who spend more time in NHS practice showed lower work engagement and higher levels of burnout.

VERIFIABLE CPD PAPER

Objective To determine the levels of burnout and work engagement among dentists in the United Kingdom. **Study design** Postal survey of 500 dentists selected at random from the General Dental Council register. **Methods** Respondents completed a questionnaire pack comprising the Utrecht Work Engagement Scale (UWES-17) and the Maslach Burnout Inventory-Human Services Survey (MBI-HSS), together with questions on demographic characteristics. **Results** Approximately 8% of respondents had scores suggestive of burnout on all three scales of the MBI-HSS and a further 18.5% had high scores in two of the domains. Eighty-three percent of respondents had work engagement scores suggestive of moderate or high work engagement. Dentists with postgraduate qualifications and those who work in larger teams had lower burnout scores and more positive work engagement scores. Dentists who spend a greater proportion of their time in NHS practice showed lower work engagement and higher levels of burnout. **Conclusions** Burnout affects a small but significant proportion of dental practitioners in the United Kingdom. A larger proportion of practitioners show low work engagement, suggesting a negative attitude to their work. Higher burnout scores and lower work engagement scores were found in dentists without postgraduate qualifications, those in small teams and in those who spend a greater proportion of their time in NHS practice.

Dentistry as an occupation is considered to possess many positive qualities,[1,2] however it also has the reputation of being a stressful occupation,[3] which may result in emotional and physical ill health.[4] A recent survey of British general dental practitioners (GDPs) reported that 60% were experiencing symptoms of stress.[5] Occupational burnout may develop in response to prolonged chronic and interpersonal stressors in the work environment[6] and is associated with high levels of exhaustion, cynicism (depersonalisation) and inefficiency (reduced personal accomplishment). Schaufeli and Enzmann[7] define burnout as *'...a persistent, negative, work related state of mind in "normal" individuals which is primarily characterised by exhaustion, which is accompanied by distress, a sense of reduced effectiveness, decreased motivation, and the development of dysfunctional attitudes and behaviours at work. This psychological condition develops gradually and may remain unnoticed for a long time by the individual involved. It results from a misfit between intentions and the reality of the job.'* Often burnout is self-perpetuating due to inadequate coping strategies that are associated with the syndrome.[7]

Humphris,[8] in his review of burnout among dentists, speculates that dentists are prone to burnout due to the nature of their work. He comments that burnout is an issue of great relevance to the delivery of dental care since it is assumed to have an adverse influence on the quality of work. However, what is quite clear when examining studies on burnout among dentists is that the majority of dentists are not victims. Apparently, a large percentage experience their work to be stimulating and engaging.[9]

Schaufeli *et al.*[10] comment that the turn of the century has brought with it a more positive approach to psychology, with a focus on the positive rather than the negative. Seligman and Csikszentmihalyi[11] argue that in the latter half of the 20th century, psychology had become more focused on mental illness and as a result had developed a distorted view of what normal and exceptional human experience is like. In line with this approach, the concept of 'work engagement' has been proposed as the antipode to burnout. This model suggests that burnout is one end of a continuum, the other end of which is work engagement, which has been defined as *'...a positive, fulfilling, work-related state of mind that is characterised by vigour, dedication and absorption which rather than being a momentary and specific state, is a more persistent and pervasive affective-cognitive state.'*[12] However, recently it has been shown that burnout and work engagement are different but related constructs and not opposite ends of the same continuum, and as such should be measured using different instruments.[12-14] In order to ascertain an accurate picture of the impact of dental practice on the working

[1]Senior Dental Officer, North Lincolnshire, [2]Professor of Psychology as Applied to Dentistry, [3]Clinical Research Assistant, Oral Health Services Research & Dental Public Health, King's College London Dental Institute, King's College Hospital, Caldecot Road, London, SE5 9RW
*Correspondence to: Professor Tim Newton
Email: Tim.Newton@kcl.ac.uk

Refereed Paper
Accepted 1 February 2008
DOI: 10.1038/sj.bdj.2008.654

lives of dentists, it is important to assess both burnout and work engagement.

Work engagement is associated with positive attitudes to work, for example learning motivation and low turnover intention, and positive behaviours such as being proactive, as well as increased job satisfaction. It also leads to improved job performance. Health benefits include low levels of depression and psychosomatic complaints.[10] Clearly these issues relating to the well-being of dentists are of great relevance to the delivery of dental care in the United Kingdom.

The current study aimed to assess the current levels of occupational burnout and work engagement in dentists in the United Kingdom. The most recent European study of burnout in dentists that used a representative sample[15] identified 13% to be in the high burnout category. There has never been a study measuring burnout in a representative sample of dentists in the United Kingdom. Work engagement has also never been measured in dentists in the United Kingdom, there being only one study measuring work engagement among dentists carried out in Finland.[16] Since these concepts are strongly related but separate aspects of the work experience of dentists, the authors argue that it is essential that both are measured in the same sample.

MATERIALS AND METHODS

A cross sectional postal questionnaire survey was conducted on a random sample of dentists working in the United Kingdom (UK). The survey method, in relation to questionnaire design and timings of mailings, followed guidelines on design of surveys to maximise response rates,[17,18] details of which will be described below.

Participants

A sample size of 500 was deemed necessary, based on a calculation of the number of dentists required from a population of 32,000 dentists to detect an outcome of 50% of dentists experiencing burnout/work engagement with a confidence interval of 5% and the usual assumptions of significance levels (alpha = 0.05) and power (80%). Since there has been no previous published survey of work engagement in UK dentists, a proportion of 50% was taken as the basis of the sample size determination as it will give the most conservative assessment of sample size required. On this basis, 380 dentists were required and given an anticipated response rate of 75%, a sample size of 500 was deemed to be sufficient.

A random sample of 500 dentists was selected from the most recent Dentists Register at the time of the survey.[19] Randomisation was achieved using computer generated random number selection. The register does not specify in which sector of dentistry the participant works. It was assumed that the sample would include dentists working in general dental practice, the community dental service, the hospital sector, specialist practices, the armed forces and dental public health. Dentists with a first qualification date of 1962 or earlier (who were likely to be retired) and dentists residing outside the UK were excluded and replaced by another random selection.

Measures

A questionnaire pack was designed comprising two measuring instruments, the Utrecht Work Engagement Scale (UWES-17)[20] and the Maslach Burnout Inventory-Human Services Survey (MBI-HSS).[21] In addition, the following demographic information was requested at the end of the questionnaire:

- Gender
- Year of first dental qualification
- Educational level (BDS or equivalent/higher qualification(s))
- Work setting for most of the week (eg GDS/community/hospital)
- Proportion of time spent providing NHS services
- Number of dentists in the team
- Number of working hours per week.

The UWES-17[20] consists of a series of 17 statements which relate to each of the work engagement domains, vigour (VI), dedication (DE) and absorption (AB). The respondents use a seven point Likert scale to indicate the frequency with which they experience the feeling described by the statement, ranging from 0 (never) to 6 (always). Examples of items on the three domains of work engagement are: VI scale, 'At my job I feel strong and vigorous'; DE scale, 'I find the work that I do full of meaning and purpose'; AB scale, 'It is difficult to detach myself from my job'. Item scores are totalled and divided by 17. The total score for work engagement ranges from 0-6 and scores are grouped into five categories (very low, low, average, high, very high) according to guidelines produced by the authors of the scale.[20] Only the total work engagement scale score was used in this study. The authors of the scale have shown that the UWES-17 has satisfactory psychometric properties.[14]

The MBI-HSS[21] contains 22 statements which relate to each of the three burnout domains, emotional exhaustion (EE), depersonalisation (DP) and personal accomplishment (PA). Respondents are asked to use a seven point Likert scale to indicate the frequency with which they experience the feeling described by the statement, ranging from 0 (never) to 6 (every day). Summing the appropriate items derives scores for each of the three domains.

Examples of items on the three scales are: EE scale, 'I feel emotionally drained form my work'; DP scale, 'I feel as if I treat some patients as if they were impersonal objects'; PA scale, 'I feel I am positively influencing other people's lives through my work'. EE consists of nine items, with a score range from 0-54; DP consists of five items with a score range from 0-30; and PA consists of eight items with a score range from 0-48. High scores on EE and DP and low scores on PA are indicative of burnout. The MBI-HSS-22 does not provide an overall burnout score since all three domains are considered to be important enough to be measured in their own right. The authors of the inventory state that burnout should be conceptualised as a continuous variable, ranging from low to moderate to high degrees of experienced feeling. It should not be viewed as a dichotomous variable which is either present or absent.[21] The MBI manual provides a table of norm scores for each burnout subscale and cut-off points for easy categorisation. Scores are considered to be high if they are in the upper third of the normative distribution, average if they are in the middle third and low if they are in the lower third. The psychometric properties of the MBI are well established.[21,22]

In order to avoid answering bias, burnout and engagement items were merged into a 39-item questionnaire, following a procedure used by Schaufeli *et al.*[12] It was also necessary for respondents to be unaware that burnout and work engagement were being measured. For this reason, the questionnaire was titled 'Work and well being survey of dentists 2006', which is in line with the recommendations of the developers of both measuring instruments.[20,21]

Procedure

The questionnaire was sent out in the first week of June 2006 with further mailings at three and five weeks following the initial mailing.

Statistical analysis

Data were analysed using the Software Package for the Social Sciences-Version 14.

In order to assess if the sample was representative of the population of dentists within the UK, the gender and country of initial dental qualification of the sample were compared with those of dentists in the most recent dentists register.[19]

Descriptive statistics were calculated for occupational burnout and work engagement scales. Because much of the data were not normally distributed, non-parametric statistical analyses were used. Median burnout/work engagement scores were compared according to gender and qualification status using the Mann-Whitney U test, and the Kruskal-Wallis test (a non-parametric test for more than two independent samples) was used to compare median burnout/work engagement scores with work sector. The correlations of burnout/work engagement with number of years post-qualification, NHS commitment, working hours and number of dentists in a team were assessed using Spearman's rho.

An analysis of non-respondents was undertaken. The difference in mean number of years post-qualification between respondents and non-respondents was tested using the Mann-Whitney U Test. The gender balance between non-respondents and respondents was tested using the Chi-square test.

Differences were tested with an overall significance level of 0.05.

Table 1 Demographic characteristics of respondents to survey (n = 335)

	n (%)
Gender of respondent	
Male	214 (63.9%)
Female	121 (31.6%)
Possession of additional dental qualifications	
Yes	115 (34.3%)
No	220 (65.7%)
Sector of work of respondents	
General practice/personal dental services	267 (79.7%)
Community dental service	21 (6.3%)
Hospital dental service	27 (8.0%)
Other	20 (6.0%)
	Descriptive statistics
Number of years qualified	
Mean	18.6 years
(SD)	11.0 years
Median	17 years
Range	1-43 years
Proportion of time allocated to NHS work	
Mean	63.2%
(SD)	39.1%
Median	80.0%
Range	0% (42 individuals, 12.5% of sample) to 100% (66, 19.7%)
Number of dentists working in same team	
Mean	4.2
(SD)	4.3
Median	3
Range	1-50
Number of hours worked per week	
Mean	32.6 hours
(SD)	8.9 hours
Median	35 hours
Range	1-60 hours

Table 2 Distribution of scores on Maslach Burnout Inventory and Utrecht Work Engagement scales for sample of dental practitioners

Scale	n (%)
MBI-HSS emotional exhaustion (n = 332)	
Low score	66 (19.9%)
Moderate score	126 (38.0%)
High score	140 (42.2%)
Median	25
Overall mean (SD)	25.1 (10.2)
MBI-HSS depersonalisation (n = 329)	
Low score	121 (36.8%)
Moderate score	144 (43.8%)
High score	64 (19.5%)
Median	8
Overall mean (SD)	8.6 (4.9)
MBI-HSS personal accomplishment (n = 332)	
Low score (high burnout)	106 (31.9%)
Moderate score	154 (46.4%)
High score (low burnout)	72 (21.7%)
Median	34
Overall mean (SD)	33.9 (5.5)
Utrecht Work Engagement scale (n = 326)	
Low/very low score	56 (17.2%)
Moderate score	221 (67.8%)
High/very high score	49 (15%)
Median	3.8
Overall mean (SD)	3.8 (0.8)

Table 3 Comparison of participants on Maslach Burnout Inventory and Utrecht Work Engagement scales by demographic characteristics

	Maslach Burnout Inventory			Utrecht Work Engagement
	Emotional exhaustion	Depersonalisation	Personal accomplishment	
Gender *Male* *Female*	 Mean = 25.2 (SD 10.7) Mean = 25.0 (SD 9.5) Mann-Whitney U = 12,660 p = 0.944	 Mean = 8.8 (SD 5.1) Mean = 8.2 (SD 4.5) Mann-Whitney U = 11,858 p = 0.474	 Mean = 34.3 (SD 5.7) Mean = 33.4 (SD 5.0) Mann-Whitney U = 11,155 p = 0.078	 Mean = 3.9 (SD 0.8) Mean = 3.8 (SD 0.7) Mann-Whitney U = 10,756 p = 0.08
Additional qualifications *Yes* *No*	 Mean = 23.0 (SD 10.4) Mean = 26.2 (SD 10.0) Mann-Whitney U = 10,094 p = 0.005**	 Mean = 7.5 (SD 4.4) Mean = 9.2 (SD 5.0) Mann-Whitney U = 9,929 p = 0.005**	 Mean = 34.9 (SD 5.2) Mean = 33.5 (SD 5.6) Mann-Whitney U = 10,531 p = 0.022*	 Mean = 4.1 (SD 0.8) Mean = 3.7 (SD 0.8) Mann-Whitney U = 9,047 p <0.001***
Sector of work *General practice/PDS* *Community dental service* *Hospital dental service* *Other*	 Mean = 26.0 (SD 10.1) Mean = 21.3 (SD 9.3) Mean = 22.3 (SD 10.3) Mean = 21.0 (SD 10.5) Kruskal-Wallis Chi² = 10.35 p = 0.016*	 Mean = 8.9 (SD 5.0) Mean = 9.4 (SD 5.2) Mean = 7.1(SD 3.2) Mean = 5.5 (SD 4.2) Kruskal-Wallis Chi² = 11.63 p = 0.009**	 Mean = 33.9 (SD 5.6) Mean = 32.7 (SD 3.2) Mean = 34.0 (SD 4.7) Mean = 36.3 (SD 6.1) Kruskal-Wallis Chi² = 5.43 p = 0.143	 Mean = 3.8 (SD 0.8) Mean = 3.7(SD 0.5) Mean = 4.1(SD 0.8) Mean = 4.1(SD 0.8) Kruskal-Wallis Chi² = 6.63 p = 0.085
Number of years qualified	Spearman's rho = 0.03 p = 0.545	Spearman's rho = -0.11 p = 0.046*	Spearman's rho = -0.02 p = 0.676	Spearman's rho = -0.02 p = 0.679
Proportion of practice which is NHS	Spearman's rho = -0.13 p = 0.811	Spearman's rho = 0.20 p <0.001***	Spearman's rho = -0.14 p = 0.013*	Spearman's rho = -0.15 p = 0.006**
Number of dentists in team	Spearman's rho = -0.15 p = 0.008**	Spearman's rho = 0.01 p = 0.791	Spearman's rho = 0.13 p = 0.022*	Spearman's rho = 0.14 p = 0.015*
Number of hours worked per week	Spearman's rho = 0.86 p = 0.117	Spearman's rho = 0.05 p = 0.323	Spearman's rho = 0.17 p = 0.002**	Spearman's rho = 0.18 p = 0.001**

* p ≤0.05
** p ≤0.01
*** p ≤0.001

A series of multiple regression analyses was conducted entering demographic variables as predictors and with the three burnout scales and the work engagement scale as outcome variables.

Ethical approval for the study was granted by the Research Ethics Committee at King's College London (reference 06/Q0703/76). Advice on research and development was sought from the Research and Development Office at King's College Hospital. Although formal research and development approval was not required, a research and development number was allocated to the study.

Pilot study

Following ethical approval, the questionnaire pack was sent to ten local dentists with a reply paid envelope and covering letter, together with a brief evaluation sheet. They were asked to time themselves filling in the questionnaire and state if the instructions were clear and the questionnaire easy to fill in. No changes to the questionnaire were deemed necessary.

RESULTS

A total of 354 questionnaire packs were returned after three mail outs, giving an overall response rate of 70.8%. Of the 354 questionnaires returned, 19 (3.8%) respondents indicated that they did not practice clinical dentistry leaving 335 (67%) questionnaires available for statistical analysis. There was no significant difference in the gender distribution between responders and non-responders (Chi-square = 0.088, p = 0.77). The mean number of years since qualification of respondents was 18.71 (SD 11.11) and that of non-respondents was 15.86 (SD 10.18). This difference was found to be statistically significant (Mann-Whitney U = 21,999, p = 0.004), since fewer more recently qualified dentists returned their questionnaires. The response rate (71.4%) from Scotland, Northern Ireland and Wales (combined) was slightly higher than the response rate (67.9%) from England, though this difference was not significant (Chi-square = 0.393, p = 0.53).

Table 1 summarises the demographic characteristics of the respondents.

MBI-HSS scores

Nine respondents failed to complete all MBI items. For each burnout domain the distribution of respondents in low, moderate and high categories as defined in the manual of the MBI-HSS was calculated, together with the overall mean and standard deviation for the scale. These data are summarised in Table 2.

Twenty-six respondents (8.0%) exhibited scores in the most severe category in all three burnout domains. A further 22 (6.7%) had high levels of emotional exhaustion and depersonalisation, which are considered to be the core elements of the burnout syndrome by some

commentators.[6,7] A further 38 (11.8%) respondents had high levels of emotional exhaustion and low levels of personal accomplishment.

UWE-17 scores

A total of 326 respondents returned questionnaires for which a score for work engagement could be calculated (65.2% of the original sample). Table 2 shows the distribution of scores for the sample.

Bi-variate analysis of the relationship of burnout and work engagement with demographic variables

Table 3 summarises the analyses comparing the three burnout domains and the work engagement scores across demographic variables. In general the possession of further qualifications was associated with a positive work experience, whereas there was a trend for working a greater proportion of time in NHS practice to be associated with more negative experiences.

Dentists with further professional qualifications had lower levels of emotional exhaustion than dentists with a BDS or equivalent. Levels of emotional exhaustion were found to be higher in general dental practitioners (GDPs) compared to the other three groups. There was a negative correlation between the number of dentists in the team and emotional exhaustion. Similarly, dentists with further professional qualifications had lower levels of depersonalisation, and levels of depersonalisation were found to vary according to the work sector. There was a positive correlation between the proportion of time spent providing NHS clinical services and depersonalisation. There was a negative correlation between number of years qualified and depersonalisation.

Levels of personal accomplishment were higher among dentists with additional qualifications. There was a positive correlation between hours worked and personal accomplishment. However, there was a negative correlation between the proportion of work carried out on the NHS and personal accomplishment and a positive correlation between the number of dentists in the team and personal accomplishment.

Finally, for work engagement, dentists with further professional qualifications had higher levels of work engagement than all other dentists. There was a positive correlation between hours worked and work engagement and a positive correlation between the number of dentists in the team and work engagement. There was a negative correlation between the proportion of work carried out on the NHS and work engagement.

Regression analyses of the relationship of burnout and work engagement with demographic variables

Table 4 summarises the findings from the multiple regression analyses of the three burnout scores and the work engagement scale. After controlling for other demographic characteristics, emotional exhaustion was related to hours worked, with those working the longest hours showing the highest scores on this trait. There was a significant relationship between the proportion of the practitioner's time spent on NHS work and scores on the depersonalisation scale.

Table 4 Multiple regression analyses predicting burnout and work engagement scores

	Emotional exhaustion			Depersonalisation			Personal accomplishment			Work engagement		
	B (95% CI)	ß	p	B (95% CI)	ß	p	B (95% CI)	ß	p	B (95% CI)	ß	p
Gender	0.703 (-1.881, 3.287)	0.033	0.593	-1.166 (-2.378, 0.046)	-0.116	0.059	-0.155 (-1.536, 1.226)	-0.014	0.825	-0.023 (-0.216, 0.170)	-0.014	0.815
Years qualified	0.055 (-0.057, 0.168)	0.061	0.335	-0.036 (-0.089, 0.017)	-0.081	0.187	-0.017 (-0.077, 0.043)	-0.034	0.585	-0.003 (-0.012, 0.005)	-0.048	0.435
Qualifications	-1.407 (-4.199, 1.385)	-0.066	0.322	-0.875 (-2.180, 0.429)	-0.086	0.188	1.084 (-0.403, 2.571)	0.094	0.152	0.285 (0.078, 0.492)	0.176	0.007**
Work sector	-2.593 (-6.185, 0.999)	-0.101	0.157	-1.212 (-2.890, 0.467)	-0.099	0.157	-0.296 (-2.210, 1.619)	-0.021	0.762	-0.040 (-0.305, 0.225)	-0.021	0.767
Hours worked	0.155 (0.015, 0.296)	0.129	0.030*	0.018 (-0.047, 0.084)	0.032	0.587	0.088 (0.013, 0.162)	0.135	0.022*	0.012 (0.002, 0.023)	0.138	0.018*
% NHS time	0.016 (-0.013, 0.045)	0.062	0.287	0.032 (0.018, 0.045)	0.257	0.000***	-0.021 (-0.037, -0.005)	-0.152	0.008**	-0.003 (-0.005, -0.001)	-0.152	0.008**
No. dentists in team 1†	-0.522 (-4.119, 3.076)	-0.017	0.776	-0.829 (-2.537, 0.880)	-0.057	0.341	1.006 (-0.934, 2.946)	0.061	0.308	0.090 (-0.179, 0.358)	0.039	0.511
4-5†	-1.289 (-4.058, 1.481)	-0.055	0.361	-0.145 (-1.435, 1.146)	-0.013	0.826	0.805 (-6.665, 2.275)	0.064	0.282	0.167 -0.039, 0.372)	0.093	0.112
6 or more†	-2.447 (-5.685, 0.791)	-0.094	0.138	-0.441 (-1.958, 1.077)	-0.036	0.568	2.787 (1.062, 4.513)	0.198	0.002**	0.346 (0.105, 0.586)	0.176	0.005**
Adjusted R^2	0.031			0.079			0.061			0.087		

† Reference category 2-3 dentists in team
* p ≤0.05
** p ≤ 0.01
*** p ≤0.001

Scores on the personal accomplishment scale were related to both hours worked and the proportion of time spent on NHS work. A lack of personal accomplishment was related to working long hours and a greater proportion of time spent working in NHS practice.

Work engagement scores were related to four demographic variables. Higher levels of work engagement were found amongst dentists who had additional professional qualifications, worked longer hours and worked in large group practices. Spending a greater proportion of time in NHS practice was associated with lower levels of work engagement.

DISCUSSION

A small proportion (8%) of UK dentists experienced significant burnout in all three domains. A further 6.7% possessed a combination of unfavourable scores in the two domains which are considered to be the core elements of the burnout syndrome, emotional exhaustion and depersonalisation.[6] A further group of 11.8% possessed unfavourable scores in emotional exhaustion and personal accomplishment. According to these scores, and using the same criteria for categorisation into a risk group as used by te Brake *et al.*,[23] 18.5% of dentists working within the UK can be considered to be at risk of burnout and a group for which there is 'considerable reason for concern', in addition to the 8.0% classified with high levels of experienced burnout. Approximately 42% of the dentists surveyed were in the highest category of emotional exhaustion. This contrasts markedly with the survey of Gorter *et al.*,[15] where 18% of their sample were in the 'high' or 'very high' category for emotional exhaustion.

The proportion of dentists experiencing significant burnout in all three domains is low in comparison to previous studies within the UK and Europe. Thirteen percent of Dutch dentists[15] and 11% of GDPs in the South East of England[24] were found to have high levels of burnout in all three domains. Caution should be exercised in comparing these studies. The latter study[24] used a non-random sample of GDPs from just one area of England and an earlier edition of the Maslach Burnout Inventory-Human Services Survey was used.[22]

The Maslach Burnout Inventory[21] is quite clear that it does not identify 'burned out' individuals when used epidemiologically. Schaufeli and Enzmann[7] comment that no clinically valid reason exists for using the cut-off points as the dividing line between clinical cases and non-cases, since there is insufficient research on the pattern of scores as indicators of individual dysfunction or the need for intervention.[21] The test manual does, however, state that people scoring high for emotional exhaustion and depersonalisation and low for personal accomplishment, are considered to exhibit high levels of experienced burnout.[21]

This is the first study within the UK to measure the levels of work engagement in dentists. Some 15% of the dentists had high levels of work engagement, 68% of dentists were categorised as having average levels of work engagement and 17% had low scores. The only other study among dentists that used this measure was carried out in Finland,[16] and no indication of the proportion of dentists within each group was given. Dentists in the UK had a mean overall work engagement score of 3.84 (SD 0.78), whereas the mean score in Finland was 4.32 (SD 1.03). It would appear that the dentists in Finland have greater work engagement than British dentists. Any comparison should be handled with caution since the researchers used the Finnish version of the Utrecht Work Engagement Scale, details of which were not discussed.

No statistically significant gender differences in any of the burnout domains were found in the current study. This is contrary to a Dutch study,[23] which indicated significantly higher depersonalisation in male dentists ($p = 0.009$). The authors of the Dutch study did comment that there might be other reasons for their results, in that other confounding variables may have led to this finding. They commented that men were more likely to put in longer working hours, treat more patients, and were older. The difference in depersonalisation disappeared when controlling for working hours and age. Gender differences were not reported by Osborne and Croucher[24] or Gorter *et al.*[15]

Dentists who had been qualified longer had lower levels of depersonalisation, a finding shared by Osborne and Croucher.[24] In contrast, Gorter *et al.*[15] identified higher levels of emotional exhaustion and depersonalisation in dentists aged 40-54, whereas analysis of personal accomplishment identified dentists under 30 as having more unfavourable scores.

The possession of postgraduate qualifications was significantly associated with overall work engagement, indicating that this resource possibly has a buffering effect against the development of burnout. It is also possible that such a resource may actually deliver energy and boost work engagement.[9] In an earlier study, Gorter *et al.*[25] identified a lack of career perspective as being the aspect of experienced work stress most strongly related to burnout. The personality of the dentist may be a factor that may help to explain this finding, in that the type of dentist who takes on postgraduate study may exhibit greater resourcefulness and be less liable to go on to develop burnout. Langelaan *et al.*[26] have shown that personality and temperament, particularly in relation to neuroticism and extroversion, make a difference in predicting burnout and work engagement. A work engaged person by definition is more likely to invest in their work, which could include taking on postgraduate study. It is also possible that dentists with postgraduate qualifications are more likely to be specialists. There is a suggestion that the level of stressors reported by specialists is lower than that reported by GDPs.[27] It is also possible that dentists with postgraduate qualifications could be involved in other pursuits at work that have been shown to protect against burnout, such as teaching, research and administrative duties, which are built into their working day giving greater variety. Interestingly, a higher educational level was not predictive of lower burnout in any of the domains in the regression analysis of the data obtained by Croucher *et al.*[28]

There were higher levels of emotional exhaustion in dentists working within general practice/PDS than the other work sectors. Depersonalisation was lowest in the 'other' group, which mainly comprised dentists working within specialist practices, which included orthodontics and implantology. Again this

result should be viewed with caution since the study design led to a representative sample of dentists within the United Kingdom where there was a large general dental practice group and much smaller community, hospital and other groups. Humphris *et al.*,[29] in a study of burnout and stress-related factors in three hospital specialities in Merseyside, identified lower levels of depersonalisation in orthodontic specialists.

The number of hours worked was associated in the regression analyses with depersonalisation and levels of personal accomplishment. Similarly, average work hours were positively associated with burnout in nurses.[30] The finding that personal accomplishment has a similar association to working hours as work engagement is not surprising. The personal accomplishment dimension has been shown to load heavily onto work engagement.[20]

The number of dentists in the team was associated negatively with emotional exhaustion, supporting the findings of Croucher *et al.*[28] They concluded that the number of dentists working in a practice was of greater relative importance as a protective factor against the development of burnout than the amount of non-NHS work undertaken. Depersonalisation was not significantly associated with the number of dentists in the team but personal accomplishment and work engagement were. This is in line with the findings of Hakanen *et al.*,[16] who identified peer contacts to be strongly correlated with work engagement. Gorter *et al.*[9] identified professional contacts, which included keeping company with colleagues and the participation in discussion groups or study groups on dental topics, as being a resource that may be a factor in burnout prevention, or even a resource that actually delivers energy and enhances work engagement. Schaufeli and Bakker[20] have identified a phenomenon they call 'collective engagement', in which there is transference of work engagement from one employee to another, which may be a factor in the higher work engagement in dentists who work in larger teams.

Most burnout interventions are individual-centred and include counselling, learning coping skills, or changing work behaviour.[6] Access to occupational health services for counselling varies according to region for dentists in general dental practice. For example, GDPs in England have access to occupational health services, whereas those in Northern Ireland do not. The significant proportion of dentists at risk of burnout in this study would suggest that such services are necessary throughout the UK.

A shift in focus from individuals to the working environment may also be required to prevent burnout and promote work engagement.[6,7,16] In this study, dentists providing mainly NHS treatment had higher depersonalisation scores and lower personal accomplishment and work engagement scores than dentists working in the private sector. The working environment of NHS dentists is partly shaped by local and national health policy. An NHS system which is perceived to be fair, provides variety and appropriate rewards, encourages peer contact and allows dentists to practice according to their values, is more likely to promote work engagement.[6,16] The study also suggests an association between postgraduate education and work engagement. Although decisions to undertake postgraduate education are made by individuals, barriers to education such as a heavy clinical load, cost and the belief that no benefit would be realised,[31] could be significantly addressed through health policy changes.

The conclusions of the study should be tempered by consideration of its limitations. The response rate was 70.2%. Because the sample was derived from the dentists register[19] it was not possible to identify dentists who were not practising clinical dentistry. Nineteen questionnaires (3.8% of the sample drawn) were returned from non-practising dentists, further reducing the effective response rate to 67%. The calculation of the original sample size was based on a response rate of 75%, which other studies of a similar design and subject had achieved.[15,24] It was also noted that responders and non-responders differed in their years since qualification so there may be some non-response bias, but it is unclear how this will have affected the findings. The current study measured burnout and work engagement on working individuals and as such it is possible that it ignored the population of dentists who are in effect so burned out that they are no longer working. This is a limitation of much of the burnout research that has been carried out and it has been noted that the extent to which burnout is truly a social problem is not known, because it is impossible to determine how many people experience levels of burnout which prevent them from working.[32] The study was cross-sectional, limiting inference about causal relationships.

Longitudinal research is required to assess which job demands and resources are most relevant in the development of burnout and work engagement in dentistry. Assessing the impact of burnout on patient care is also important. Only one small-scale study has attempted to evaluate the effectiveness of an intervention programme to reduce burnout in affected dentists.[33] Further intervention studies are required to ensure the effective targeting of resources.

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