



## Burnout syndrome in dentists: Work-related factors

Cristina Gómez-Polo<sup>a,\*</sup>, Ana María Martín Casado<sup>b</sup>, Javier Montero<sup>c</sup>

<sup>a</sup> Department of Dentistry, School of Medicine, University of Salamanca, Spain

<sup>b</sup> Department of Statistics, School of Medicine, University of Salamanca, Spain

<sup>c</sup> Department of Surgery, School of Medicine, University of Salamanca, Spain

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### ABSTRACT

**Objective:** To study the sociodemographic and work-related factors that affect the level of burnout syndrome in Spanish dentists through an observational epidemiological study.

**Method:** An online survey answered by 1298 Spanish dentists was used to record their gender, age, work environment, number of practices in which they work, whether they work alone or not, whether they own or co-own the practice, years of experience, working hours per week, and their answers to the Maslach Burnout Inventory (MBI-HSS). A univariate analysis was carried out to study the relationship between the work-related and sociodemographic factors examined for each of the three dimensions of burnout: Emotional Exhaustion (EE), Depersonalisation (DP) and Personal Accomplishment (PA). Subsequently, multivariate logistic regression models were fitted.

**Results:** The percentage of dentists with signs of burnout classified as "Emotional Exhaustion" was higher: for women (64.4%) than men (56.7%) ( $p=0.005$ ); for those working in a rural setting (70.1%) than for those working in an urban setting (59.9%) ( $p=0.009$ ); for non-owners (65.6%) in comparison to owners (58.3%) ( $p=0.008$ ); and for those who always or frequently work alone (63.7%), compared to dentists who never or rarely work alone (59.9%) ( $p=0.007$ ). A high level of burnout was experienced by 9.8% of dentists.

**Conclusion:** In the population studied, environment, age and working hours per week have a significant impact upon EE, while ownership of the practice, years of experience, and working hours per week significantly affect DP. Working alone brings with it a high risk of suffering from a low sense of PA.

**Clinical Significance:** Burnout syndrome is more likely to affect young dentists who do not own a practice and work long hours each week.

### 1. Introduction

Burnout syndrome is a condition of a complex, multidimensional nature, which is why multiple definitions have been identified [1,2]. The syndrome is an extreme negative response to chronic stress originating in the work environment, which causes adverse individual, organisational or occupational, and social repercussions derived from a large amount of interaction with other people. Although there may be underlying causes related to personal attributes, it is most commonly associated with external factors that are specific to the workplace. [3] This syndrome has serious negative consequences for well-being, causing negative feelings and attitudes, non-adaptive thinking, and resulting in less effective work. [3,4] The originator [5] has described three dimensions of the syndrome [6], produced a theoretical-explanatory model of its aetiology [7], and devised the most

widely used assessment questionnaire. [8,9] As mentioned in the definition provided above, this phenomenon has been studied in groups whose daily work involves a great deal of interaction with other people: primarily, professionals in health [10], education [11] and social services [12]. The World Health Organisation (WHO) has officially recognised burnout syndrome as a disease, following ratification of the eleventh revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-11), which was approved in 2018 and is set to come into force on 1 January 2022. The syndrome has negative repercussions for organisations, clinics and companies [13,14], resulting in poor service to patients, increased absenteeism, clinical errors [15–19] and financial losses [20], as well as negative consequences for the individual in question that are very similar to the symptoms of depression [21–23], potentially even leading to suicide [24].

According to the model of the process [23], burnout syndrome does

\* Corresponding author at: Department of Dentistry, School of Medicine, Campus Miguel de Unamuno s/n 37007 Salamanca University of Salamanca, Spain  
E-mail address: [crisgident@usal.es](mailto:crisgident@usal.es) (C. Gómez-Polo).

not appear suddenly but occurs gradually (ranging between low, moderate and high levels of experienced feeling) progressively increasing in severity through its three dimensions [24–25]. The first phase is Emotional Exhaustion (EE), characterised by: loss of energy, psychological and physical exhaustion, constant fatigue, and feelings of lacking strength. Sufferers are overwhelmed in terms of emotional resources. The second phase is Depersonalisation (DP), which is characterised by: irritability, cynicism, bad moods, rejection of or negative feelings towards the recipients of one’s work, emotional distancing, lack of empathy, etc. This is a defensive construct by which individuals attempt to protect themselves from feelings of frustration. The third phase is termed Low Personal Accomplishment (PA), characterised by: low self-esteem, poor performance at work, a consistently bad attitude, negative self-perception, feelings of failure, avoidance of social relationships, depression, and a limited ability to solve work and personal problems. Burnout syndrome is conceptualised as a multidimensional construct, brought together by a single theoretical construct [26]. The dental profession is generally linked to high levels of burnout syndrome [27–37].

There are elements of stress, in addition to that which is purely care-related [38], which make members of the dental profession more vulnerable to suffering from burnout syndrome, including the following: a) Work-related variables: overload of patients; working alone; pressure to keep to the scheduled treatment time; the need to create a climate of trust and loyalty with the patient; the desire to ensure that the patient is satisfied with the treatment, as they can freely choose between dentists; the dental speciality performed; b) Physical variables: visual, auditory and tactile challenges; fine motor coordination; c) Management variables associated with the profession [39]: whether the individual owns the dental clinic; economic management of auxiliary staff; a non-fixed income, as the vast majority of dentists work privately (with no link to the public health service); d) Personal variables: factors related to the individual’s personality, coping style, emotional intelligence, engagement and cognitive flexibility; e) Demographic and economic variables related to dentistry: in Spain, the dental profession has grown considerably in recent years. The number of dental clinics is growing approximately 15% faster than the number of inhabitants, meaning that the population ratio for each dentist is becoming smaller and smaller. The number of dentists therefore exceeds the care needs of the population [40]. This can affect the physical and mental well-being of dentists, and therefore the quality and quantity of the dental services they provide [38–41].

Engaging in some professions has been described as a risk factor in itself for suffering from burnout syndrome [42], although it is not always possible to predict the presence or intensity of the symptoms associated with this syndrome [43]. This is because individual variables can act as protective factors [44–52]. It is advisable to identify the adverse organisational or work-related variables that increase the probability of suffering burnout, in order to adjust or minimise them.

This epidemiological study aimed to assess which sociodemographic and occupational factors are related to burnout syndrome in Spanish dentists.

**2. Materials and method**

An epidemiological study was conducted whose protocol was approved by the Institutional Bioethics Committee of the University of Salamanca.....(0000356-24.05.2019). Through the professional dental associations, an invitation was sent to all Spanish dentists to participate in the study online, answering a questionnaire to quantify their burnout level and providing several sociodemographic and work-related variables, such as: 1) gender; 2) age; 3) the setting in which they practice (rural or urban); 4) the frequency with which they work alone; 5) whether they work in several practices; 6) the number of hours they work per week; 7) years of work experience; 8) whether they own a practice.

In order to obtain a representative sample of the population of Spanish dentists, and considering that the Spanish National Institute of Statistics (2018) gives a figure for this population of approximately 38,000, with a confidence coefficient of 95.5%, precision of 3% and p=q=0.50, a minimum sample size of 1080 subjects was estimated.

The population of Spanish dentists (N=37,787)

$$n = \frac{Nz_{\alpha/2}^2pq}{d^2(N-1) + z_{\alpha/2}^2pq} = \frac{37787 \cdot 2^2 \cdot 0.5 \cdot 0.5}{0.03^2 \cdot 37786 + 2^2 \cdot 0.5 \cdot 0.5} = 1079.4 \rightarrow = 1,080$$

To mitigate the risk that not all subjects would respond to the survey, oversampling was carried out to ensure a representative and effective sample size.

To quantify the level of burnout, the Maslach Burnout Inventory -Human Services Survey (MBI-HSS) [53] (Table 1) was used, due to its high level of internal consistency (Cronbach’s alpha coefficient, for each dimension: 0.90 for EE, 0.79 for DP and 0.71 for PA [54]), and because it is aimed at healthcare personnel [55–57]. Participants responded regarding the frequency of the feelings described in its 22 items, using the following scale: 0 - "Never"; 1 - "A few times a year or less"; 2 - "Once a month or less"; 3 - "A few times a month or less"; 4 - "Once a week"; 5 - "A few times a week"; 6 - "Every day". Burnout syndrome is composed of three dimensions [53]: 1) Emotional Exhaustion (EE), for which there are nine items on the MBI-HSS and a score ranging from 9 to 54; 2) Depersonalisation (DP), with 5 items and a score ranging from 5 to 30; and 3) Personal Accomplishment (PA), with 8 items and a score of between 8 and 48. For EE and DP, the scores are directly proportional to the intensity of the syndrome, while for PA, the score is inversely proportional.

For each of the three dimensions of the MBI-HSS, the sample was divided into two groups according to whether or not they showed signs of burnout for that dimension. Therefore, three dichotomous variables were obtained – one for each dimension – with the categories "Shows signs of burnout" and "Does not show signs of burnout". The BMI-HSS cut-off points established by the questionnaire manual [58] were used: scores above 26 for EE, above 9 for DP, and below 34 for PA indicate the presence of burnout in each of these dimensions. Subjects with a high level of burnout can be identified by the fact that they simultaneously score high for EE and DP, and low for PA [23].

To assess whether there was a relationship between the presence of burnout in each dimension and the sociodemographic and work factors

**Table 1**  
Maslach Burnout Inventory MBI-HSS [53].

MASLACH BURNOUT INVENTORY Human Services Survey (MBI-HSS)	
<i>0=Never; 1=A few times a year or less; 2= Once a month or less; 3= A few times a month or less; 4= Once a week; 5= A few times a week; 6= Every day</i>	
1.	I feel emotionally drained from my work
2.	I feel used up at the end of the workday
3.	I feel fatigued when I get up in the morning and have to face another day on the job
4.	I can easily understand how my recipients feel about things
5.	I feel I treat some recipients as if they were impersonal objects
6.	Working with people all day is really a strain for me
7.	I deal very effectively with the problems of my recipients.
8.	I feel burned out from my work
9.	I feel I’m positively influencing other people’s lives through my work
10.	I’ve become more callous toward people since I took this job
11.	I worry that this job is hardening me emotionally
12.	I feel very energetic
13.	I feel frustrated by my job
14.	I feel I’m working too hard on my job
15.	I don’t really care what happens to some recipients
16.	Working with people directly puts too much stress on me
17.	I can easily create a relaxed atmosphere with my recipients
18.	I feel exhilarated after working closely with my recipients
19.	I have accomplished many worthwhile things in this job
20.	I feel like I’m at the end of my rope
21.	In my work, I deal with emotional problems very calmly
22.	I feel recipients blame me for some of their problems

analysed (gender, age, work environment, years of experience, ownership of the practice, whether the subject works alone or in several practices, working hours per week), the  $\chi^2$  test was used for dichotomous variables or factors and the t-test for quantitative variables or factors. To quantify the strength of relationship, the effect size was assessed using the odds ratio [59] in the former case, and Cohen's *d* [60] in the latter, and the values obtained were then interpreted [61,62].

Effect size is the magnitude of the difference between groups, and the main finding of a quantitative study [62]. While a *p* value can tell us whether an effect exists, it does not reveal the size of the effect. With a sufficiently large sample, a statistical test will almost always demonstrate a significant difference, unless there is no effect whatsoever. Thus, to fully understand the results, reporting only the significant *p* value is not sufficient. For this reason, American Psychological Association publications have made reporting effect sizes and confidence intervals an explicit requirement [63,64]. To predict dependent variables in the study (signs of burnout / no signs of burnout), a logistic regression procedure was completed for each of the three dimensions of the syndrome [65]. The IBM-SPSS-25 (v 25.0 for Windows; Armonk, NY, USA) software was used for the statistical analyses.

### 3. Results

After removing incomplete records ( $n=651$ ), the effective sample size of our study was 1298 dentists, including 517 men (39.8%) and 781 women (60.2%), representing a response rate of 3.4% of the total population of Spanish dentists. The mean age was 41.9 years with a standard deviation of 11.5 (range 22-74 years). Regarding the dentists' work environment, 1,111 (85.6%) worked in an urban environment. Fifty-eight percent (58.6%) of the dentists in the sample (760 dentists) owned the practice in which they worked; the mean number of years of experience was 16.9 (standard deviation 10.3) (range 0 to 50); the mean number of working hours per week was 36.4 (standard deviation 9.5) (range 5 to 67 hours / week); 37% of the dentists always worked alone, and 48% worked in several practices.

The reliability analysis conducted on the participants' responses resulted in a Cronbach's alpha of 0.931 for the EE items, 0.721 for the DP items, and 0.803 for the PA items. For EE, the mean score was 30.8 with a standard deviation of 10.9. For DP, the mean score was 10.3 with a standard deviation of 4.7. Finally, for PA, the mean score was 39.8 with a standard deviation of 5.9.

As can be seen in Table 2, 61.3% of Spanish dentists were estimated to have high scores for EE (95%CI: 58.7-63.9), 45.8% had high scores for DP (95%CI: 43.1-48.5) and 14.6% had low scores for PA (95%CI: 12.7-16.5). The proportion of dentists who had high scores for EE and DP, as well as a low score for PA (high level of burnout) is 9.8% (95%CI:8.2-11.4). Of the dentists in the sample, 32.5% had unfavourable scores for two dimensions of burnout.

Table 3 shows the results obtained in the analysis of the association between each of the dichotomous factors examined and showing signs of burnout in each of the BMI-HSS dimensions.

#### 3.1. Burnout and gender

Of the male dentists in our sample, 56.7% had high EE scores, 48.0% scored highly for DP and 15.1% had low PA scores. Of the female dentists, the percentage with high EE scores was 64.4%, for DP it was 44.4%

**Table 2**

Number of dentists in the sample (percentage) with signs of high burnout levels (high EE, high DP and low PA scores) or without signs of burnout for each of the dimensions of the BMI-HSS questionnaire.

Signs of Burnout	EE	DP	PA
Yes	796 (61.3%)	595 (45.8%)	190 (14.6%)
No	502 (38.7%)	703 (54.2%)	1108 (85.4%)

and 14.3% had low PA scores. The association between having high a burnout score and gender was only significant for EE, although the magnitude of the effect was insignificant [61] (OR=1.38). The percentage of dentists with signs of burnout in the EE dimension was higher for women than men ( $p=0.005$ ).

#### 3.2. Burnout and the work environment

Of the dentists working in a rural environment, 70.1% were estimated to have high burnout scores for EE, 52.4% for DP and 13.4% had low PA scores. The association between having signs of burnout and the work environment (rural or urban) was only significant for EE, although the magnitude of the effect was also insignificant (OR=0.64) [61], while somewhat higher than the effect of gender. The percentage of dentists with signs of burnout in the EE category was higher for those working in a rural setting than for those working in an urban setting ( $p=0.009$ ).

#### 3.3. Burnout and practice ownership

Of the dentists who do not own the practice in which they work, 65.6% scored highly for EE, 52.0% for DP and 14.5% had low levels of PA. The association between the presence of burnout and whether a dentist has a share of ownership in the practice where they work was significant for EE and DP, although the magnitude of the effect was insignificant in both cases (OR=0.73 and OR=0.65, respectively) [61]. The percentage of dentists with signs of burnout in both dimensions was higher for non-owners than for owners ( $p=0.008$  and  $p<0.001$ , respectively).

#### 3.4. Burnout and working alone

Of the dentists who never or rarely work alone, 59.9% scored high for EE, 45.2% for DP, and 12.6% scored low for PA. The association between having burnout and whether the dentist works alone was only significant for PA, although the magnitude of the effect was insignificant [61] (OR=1.54). The percentage of dentists with signs of burnout in this dimension was higher for those who always or frequently work alone than for those who never or rarely work alone ( $p=0.007$ ).

#### 3.5. Burnout and working in several practices

Of the dentists who do not work in multiple practices, 62.4% scored highly for EE, 43.1% had high DP scores and 14.2% scored low for PA. The association between suffering burnout and whether the dentist works in several practices or just one was only significant for DP, with an insignificant effect size [61] (OR=1.25). The percentage of dentists with signs of burnout in the DP dimension was higher for those who work in multiple practices than for those who do not ( $p=0.043$ ).

Table 4 shows the results obtained in the analysis of each of the quantitative factors examined and whether the dentists showed signs of burnout in each of the BMI-HSS dimensions.

#### 3.6. Burnout and age

Of the dentists in the sample, the mean age of those who scored highly for EE-related burnout was 40.5 years, while the mean age of those who showed no evidence of EE-related burnout was 44.1 years. The mean age of dentists with no evidence of burnout in the EE dimension was higher than the mean age of dentists with evidence of EE-related burnout ( $p < 0.001$ ), but the effect size was small ( $d=0.31$ ) [62]. The mean age of those in the sample who scored highly for DP-related burnout was 40.3 years, while the mean age of those who had no evidence of DP-related burnout was 43.1 years. The mean age of dentists with no evidence of burnout in DP was higher than the mean age of dentists with evidence of burnout in that dimension ( $p < 0.001$ ), but the effect size was small ( $d=0.31$ ) [62].

**Table 3**  
Relationship between the dichotomous factors analysed and the 'having unfavourable scores for the dimensions of burnout' variable.

	EE		DP		PA	
	Yes(n=796)	No (n=502)	Yes(n=595)	No(n=703)	Yes(n=190)	No(n=1108)
<b>Gender</b>						
Male	293 (56.7%)	224 (43.3%)	248 (48.0%)	269 (52.0%)	78 (15.1%)	439 (84.9%)
Female	503 (64.4%)	278 (35.6%)	347 (44.4%)	434 (55.6%)	112 (14.3%)	669 (85.7%)
<i>p</i> value	0.005*		0.211		0.748	
OR (CI95%)	1.38 (1.09; 1.75)		0.87 (0.69; 1.09)		0.94 (0.68; 1.31)	
<b>Environment</b>						
Rural	131 (70.1%)	56 (29.9%)	98 (52.4%)	89 (47.6%)	25 (13.4%)	162 (86.6%)
Urban	665 (59.9%)	446 (40.1%)	497 (44.7%)	614 (55.3%)	165 (14.9%)	946 (85.1%)
<i>p</i> value	0.009*		0.057		0.656	
OR (CI95%)	0.64 (0.45; 0.90)		0.74 (0.53; 1.01)		1.13 (0.71; 1.86)	
<b>Owner of the practice</b>						
No	353 (65.6%)	185 (34.4%)	280 (52.0%)	258 (48.0%)	78 (14.5%)	460 (85.5%)
Yes	443 (58.3%)	317 (41.7%)	315 (41.4%)	445 (58.6%)	112 (14.7%)	648 (85.3%)
<i>p</i> value	0.008*		<0.001*		0.937	
OR (CI95%)	0.73 (0.58; 0.93)		0.65 (0.52; 0.82)		1.02 (0.74; 1.41)	
<b>Works alone</b>						
No	490 (59.9%)	328 (40.1%)	370 (45.2%)	448 (54.8%)	103 (12.6%)	715 (87.4%)
Yes	306 (63.7%)	174 (36.3%)	225 (46.9%)	255 (53.1%)	87 (18.1%)	393 (81.9%)
<i>p</i> value	0.170		0.566		0.007*	
OR (CI95%)	1.18 (0.93; 1.49)		1.07 (0.85; 1.34)		1.54 (1.13; 2.10)	
<b>Works in several practices</b>						
No	418 (62.4%)	252 (37.6%)	289 (43.1%)	381 (56.9%)	95 (14.2%)	575 (85.8%)
Yes	378 (60.2%)	250 (39.8%)	306 (48.7%)	322 (51.3%)	95 (15.1%)	533 (84.9%)
<i>p</i> value	0.417		0.043*		0.629	
OR (CI95%)	0.91 (0.73; 1.14)		1.25 (1.01; 1.56)		1.08 (0.79; 1.47)	

\* statistical significance  $p < 0.05$

**Table 4**  
Comparison of the means of the quantitative factors analysed and having unfavourable scores for each of the dimensions of burnout.

	EE		DP		PA	
	Yes(n=796)	No (n=502)	Yes(n=595)	No(n=703)	Yes(n=190)	No(n=1108)
<b>Age</b>						
Mean (SD)	40.5 (10.9)	44.1 (12.2)	40.3 (11.2)	43.1 (11.6)	42.3 (11.5)	41.8 (11.5)
<i>p</i> value	<0.001*		<0.001*		0.558	
d (CI95%)	0.31 (0.19; 0.43)		0.24 (0.12; 0.36)		-0.05 (-0.17; 0.07)	
<b>Years of experience</b>						
Mean (SD)	15.8 (9.8)	18.7 (10.8)	15.6 (10.1)	18.1 (10.3)	17.4 (10.1)	16.8 (10.3)
<i>p</i> value	<0.001*		<0.001*		0.473	
d (CI95%)	0.28 (0.16; 0.40)		0.24 (0.12; 0.36)		-0.06 (-0.18; 0.06)	
<b>Working hours per week</b>						
Mean (SD)	37.5 (9.0)	34.6 (10.0)	37.4 (9.0)	35.6 (9.9)	36.6 (9.4)	36.4 (9.5)
<i>p</i> value	<0.001*		<0.001*		0.743	
d (CI95%)	-0.31 (-0.43; -0.19)		-0.19 (-0.31; -0.07)		-0.03 (-0.15; 0.09)	

\* statistical significance  $p < 0.001$

### 3.7. Burnout and years of experience

Similarly to the results for the age variable, the mean number of years of experience for dentists without EE-related burnout was higher than the mean number of years of experience for dentists with EE-related burnout ( $p < 0.001$ ), although the effect size was small ( $d = 0.28$ ) [62]. The mean number of years of experience for dentists with a high DP score was 15.6 years, while the mean number of years of experience of those without DP-related burnout was higher, at 18.1 years ( $p < 0.001$ ). The effect size was also small ( $d = 0.24$ ) [62]. The difference between the mean number of years of experience for Spanish dentists with and without low PA scores (17.4 and 16.8, respectively) was not significant.

### 3.8. Burnout and working hours per week

The mean number of hours worked by dentists with signs of EE-related burnout was 37.5 hours and differed significantly ( $p < 0.001$ ) from the mean number of hours worked by the dentists without EE, at 34.6 hours, being higher in the first group than in the second. The effect size was small ( $d = -0.31$ ) [62]. The same phenomenon was observed for the DP dimension of burnout, in those dentists who worked on average 37.4 hours per week, compared to those showing few signs of DP, who worked 35.6 hours on average. The effect size was very small ( $d = -0.19$ ) [62]. There was no significant difference between the mean number of working hours per week and PA scores.

### 3.9. Logistic regression model to predict the burnout dimension scores

After evaluating the predictive capacity of each work-related factor individually, the multivariate logistic regression models were fitted to predict the degree of burnout for each of the three dimensions, using the variables that were significant in the analysis described above as predictive variables. Table 5 shows the logistic regression model fitted to predict burnout for the EE dimension (1 = presence of EE-related burnout; 0 = no EE-related burnout) from the following variables: gender (0 = Male; 1 = Female); environment (0 = urban; 1 = rural); ownership of the practice (0 = no; 1 = yes); age; years of experience and working hours per week.

The fitted model, considered in its entirety, was statistically significant ( $\chi^2=62.453, p<0.001$ ) and had a Nagelkerke R<sup>2</sup> coefficient of 0.064. The correctly classified overall percentage was 62.2%, those dentists with high scores for Emotional Exhaustion having been classified above (88.4%) those without high scores for EE (20.7%). Finally, the value of the Hosmer-Lemeshow goodness of fit test statistic did not reach statistical significance ( $p=0.922$ ), meaning that the null hypothesis establishing that the fit is good could not be rejected. In the fitted model, the predictive variables of gender, ownership of the practice, and working hours per week were excluded, because they were not statistically significant in the multivariate model.

Table 6 shows the logistic regression model that was fitted to predict high scores in the DP dimension (1 = presence of DP-related burnout; 0 = no DP-related burnout), using the following variables: ownership of the practice (0 = no; 1 = yes); works in several practices (0 = no; 1 = yes); age; years of experience, and working hours per week.

The fitted model, taken in its entirety, was statistically significant ( $\chi^2=35.046, p<0.001$ ) and had a Nagelkerke R<sup>2</sup> coefficient of 0.036. The correctly classified overall percentage was 58.0%, those dentists with high scores for DP (73.5%) having been classified above those without high scores for DP (39.7%). Finally, the value of the Hosmer-Lemeshow goodness of fit test statistic did not reach statistical significance ( $p=0.582$ ), meaning that the null hypothesis establishing that the fit is good could not be rejected. In the fitted model, the ‘works in several practices’ and ‘age’ predictive variables were excluded, because they were not statistically significant in the multivariate model (Table 6). No multivariate logistic regression model was fitted to predict burnout related to a lack of PA, given that the only significant predictive variable was ‘works alone’ (OR=1.54, CI95% 1.13-2.10).

## 4. Discussion

Interaction between a combination of sociodemographic, work-related [66], and psychological factors [67–69] could be the trigger for burnout syndrome, as well as other factors such as marital status, number of children and national social welfare policies, which have not been examined in this research. The study sample of 1,298 dentists is representative of the total population of Spanish dentists, which is made

**Table 5**

Multivariate logistic regression model, fitted to predict whether the subject scores highly for EE. Predictors: gender, environment, ownership of the practice, age, years of experience, and working hours per week.

MULTIVARIATE LOGISTIC REGRESSION TO PREDICT EMOTIONAL EXHAUSTION						
	B	DE (B)	Wald	p	OR	IC 95% de OR
Environment	0.427	0.174	6.032	0.014	1.533	1.090-2.156
Working hours per week	0.031	0.006	25.256	<0.001	1.032	1.019-1.045
Age	-0.026	0.005	25.617	<0.001	0.975	0.965-0.984

\* statistical significance  $p<0.05$

**Table 6**

Multivariate logistic regression model, fitted to predict whether the subject will score highly in DP. Predictors: ownership of the practice, works in several practices, age, years of experience, and working hours per week.

MULTIVARIATE LOGISTIC REGRESSION TO PREDICT DEPERSONALISATION						
	B	DE (B)	Wald	p	OR	IC 95% de OR
Ownership of the practice	-0.330	0.135	5.955	0.015	0.719	0.552-0.937
Working hours per week	0.022	0.006	12.892	<0.001	1.022	1.010-1.035
Years of experience	-0.014	0.006	4.868	0.027	0.986	0.973-0.998

\* statistical significance  $p<0.05$

up of 16,520 men (43.8%) and 21,267 women (56.2%); these percentages are similar to those in the study sample, in which 60.2% of participants were women and 39.8% were men. The results published here were collected three months before the appearance of Covid-19, so they can be considered valid for use in comparisons on burnout syndrome after the emergence of Covid-19. It is likely that the high levels of work-related stress involved in practising dentistry during the pandemic has increased the percentage of dentists with high levels of burnout [35]. Like the vast majority of published studies on burnout [37], the present study was cross-sectional, which precludes making cause-effect associations [70]. It is possible that there was a bias in the responses and that the participation of dentists with burnout symptoms and of those who have previously suffered burnout was higher than that of dentists who have never suffered burnout symptoms. This may have led to an overestimation of the scores for the dimensions of burnout [32,71], but it is also worth considering that the large sample size may have diminished this overestimation effect.

### 4.1. External validity

Several studies, in a range of industrialised countries, have examined the prevalence of a high risk of burnout (when there are high levels of EE and PD, and low levels of PA) among dentists. The percentage of such cases is 8% in the United Kingdom [72], 9.8% in this study from Spain, 11% in south east England [73], 13% of dentists in Germany and the United States, [74,75] 15.3% in Lithuania [32] and 16% in Northern Ireland [29]. Comparisons between these percentages should be made with caution, given that: in some cases, the sample sizes were not representative of the population of dentists; some research did not identify the cut-off points; the cut-off points given for the three dimensions were not always the same; and some authors have argued that there is no scientifically proven reason to use cut-off points to distinguish between ‘clinical cases’ and ‘non-clinical cases’ [76].

### 4.2. Mean burnout scores

The mean scores in the population of Spanish dentists are higher for the three dimensions of burnout syndrome than the mean scores of the general Spanish population (EE=20.39; DP=6.36; PA=36.02) [77]. As found in other articles, the most significant difference is between the dentists’ and the general population’s scores for the EE dimension, i.e. the first phase of burnout syndrome, which is also the dimension with which subjects are most frequently affected – up to 61.3% – while the dimension subjects are least affected by is PA. [30,32,78].

### 4.3. Individual factors

#### 4.3.1. Gender

Singh et al. [37] stated that the dimensions of burnout vary according to gender. Women obtain higher scores from the instruments

measuring burnout syndrome, especially for the EE dimension [32,41,58,79], while, contrastingly, other research shows that men score higher [37,80-81]. In the present study, as in other similar studies [30], we have not found sufficiently solid statistical evidence to affirm that there are differences in burnout syndrome based on the gender of the participants. Therefore, gender is considered by some authors to be a moderating variable [82].

#### 4.3.2. Age

For Spanish dentists, there are statistically significant differences ( $p < .001$ ) in EE and DP (Table 4), with an inverse relationship: the younger the age, the higher the score for the dimension in question. Many studies concur in concluding that burnout is more prevalent among younger professionals [78,80,83-90]. As they gain more years of experience in the sector, dentists seem to practice and learn more, acquiring greater care skills and competencies, which allows them to face problems more effectively and in a better mental state. There may therefore be a period in which these professionals gradually develop a more realistic outlook, going from idealistic expectations to the practical day-to-day reality.

#### 4.4. Seniority at work

Age overlaps with work experience, so it seems that there is a higher risk of burnout early in the career [91]. However, these results should be interpreted with caution due to "survivorship bias", according to which dental professionals who burn out early in their careers are likely to leave their jobs, leaving behind "survivor" dentists with lower levels of burnout [92]. The DP and EE dimensions have a significant inverse relationship with years of experience: a finding that is consistent with most related studies [32,78,80,83-90]. Other studies, in contrast, found no correlation between having little experience and burnout [38,93].

#### 4.5. Rural / urban environment

Unexpectedly, the results show that EE is significantly lower in the urban environment than in the rural environment, although we must be cautious due to the difference in sample size. In contrast, working in a rural area is a protective factor for primary health care professionals [94].

#### 4.6. Practice ownership

It is striking that dentists who do not own their own practice had significantly worse scores for two dimensions of burnout: higher levels of EE and DP. One explanation is that dentists who are not owners must prove that they are competent and that they have the ability to solve clinical problems. As a result of this pressure, they may not perform well and their self-esteem may be damaged, which can lead to discomfort and fatigue. Another element to consider is that dentists owning their practice may have higher PA values, due to having successfully created a working dental practice.

#### 4.7. Working hours per week

It would be reasonable to think that burnout syndrome becomes more prevalent as working hours increase, as many studies have reported [30,32,95-104]. While there were statistically significant differences ( $p < .001$ ) for EE and DP, the effect size was small ( $d = -0.31$  and  $d = -0.19$ , respectively), so we conclude that there is no solid evidence. This leads us to believe that an increase in working hours is not as decisive a factor as it seems in itself [30,58,93,94,100,105]; if the increase in working hours is forced, without economic need, the subject is likely to perceive it negatively [95].

#### 4.8. Working alone or in company

A good range of relationships with colleagues in the workplace could be considered a buffering factor that may decrease the prevalence of burnout syndrome [106]. Statistically significant differences have been found indicating that working alone has a negative influence on the level of PA [102-104], underlining that working alone prevents the sharing of doubts and frustrations (emotional support), which increases the risk of depression. It should be noted that almost 37% of the dentists consulted frequently work alone, or even always do so (freelance professionals without a permanent contract).

Other related studies have pointed to variables such as the level of income, and a lack of return on economic investment [29] as reasons that influence the physical and mental health of dentists. These variables have not been considered in this study.

We agree with Karger (1981) [107] when he stated that "burnout syndrome is more an impressionistic description of symptoms than a concrete theory, since there is no systematically organised body of knowledge with which to analyse, explain and predict this phenomenon". This is what makes it a challenge to analyse the interdependence between the various factors that influence the appearance and development of the syndrome.

Attending to a patient when in pain, and undergoing high levels of anxiety and fear, as often occurs in the dental field, is an experience that leads to the dentist feeling overloaded. These factors make it very difficult to deliver the dental treatment in question. It is therefore desirable to start developing studies that consider basic research into: 1) personal variables such as types of coping strategies, emotional intelligence [108,109], engagement or commitment, factors related to personality, cognitive flexibility; 2) organisational or work-related variables of dentistry as a profession, so as to better understand this phenomenon; 3) the availability of treatments for dentists to reduce work-related pressure, such as mindfulness, moderate-intensity sport, yoga, implementing effective communication strategies and emotion management. It is the authors' view that it is necessary to act on these three levels in conjunction, and to raise awareness about burnout. Dental associations and the competent health authorities should be familiarised with the issue and take measures to prevent and treat the symptomatology of burnout early. This is essential to increase the well-being of affected clinicians, improve the effectiveness of the organisation, and avoid reductions in the quality and quantity of dental treatment, thereby guaranteeing patient satisfaction.

## 5. Conclusions

In the population studied, a significant relationship was observed between all the sociodemographic and occupational variables analysed and one or more of the three dimensions (of which, the connection with EE was strongest). Environment, age and working hours per week have a significant impact upon EE, while ownership of the practice, years of experience, and working hours per week significantly affect DP. Working alone brings with it a high risk of suffering from a low sense of PA.

#### CRedit authorship contribution statement

**Cristina Gómez-Polo:** Conceptualization, Methodology, Software, Visualization, Investigation, Writing – original draft. **Ana María Martín Casado:** Supervision, Software, Validation, Data curation. **Javier Montero:** Writing – review & editing.

#### Declaration of Competing Interest

The authors declare no conflict of interest.

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