Factors associated with burnout among dentists in public hospitals, southern Thailand

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Abstract Background/purpose: Physician burnout is now a public health crisis and dentist is a stressful professional health occupation. The purpose of this cross-sectional study was to determine the level of burnout and related factors among 423 Thai dentists working in public hospitals, southern Thailand.

Materials and methods: A self-administered questionnaire was collected through an online platform and included 5 parts: general information, work information, 22-item Maslach Burnout Inventory-Human Services Survey (MBI-HSS), 23-item Thai Effort-Reward Imbalance Questionnaire (Thai ERIQ), and the Utrecht Work Engagement Scale-9 (UWES-9). The data were analyzed for descriptive statistics — frequency, percentage, mean, standard deviation — and inferential statistics using binary logistic regression.

Results: The prevalence of medium to high level of burnout were 45.8%, 44.3%, 4.0% for emotional exhaustion, depersonalization, and low personal accomplishment, respectively. Regarding to the multivariate analysis, the statistically significant factors associated with emotional exhaustion were age, work engagement, workplace relationship, work effort, work reward, grade point average, and workplace consultant. The factors associated with depersonalization were age, work engagement, workplace relationship, work effort, and job reselction. The factors associated with personal accomplishment were age, work engagement, work reward, and level of workplace.

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Introduction

Burnout is a frail state of mind which is a prolonged response to chronic work problems, and is a syndrome consisting of emotional exhaustion, depersonalization and reduced personal accomplishment that can occur in people especially whose work has to interact with others, for example, human service works. Burnout not only influences one’s physical and emotional health and behavior, but also influences work quality, absenteeism and intention of resignation, which negatively affects colleagues and the organization.

Physician burnout is now a public health crisis, which has to be urgently taken care of. A paper published in 2018 by the Harvard T.H. Chan School of Public Health, the Harvard Global Health Institute, the Massachusetts Medical Society and Massachusetts Health and Hospital Association revealed that 78% of physicians surveyed had sometimes experienced feelings of professional burnout, with an increase of 4% from the 2016 survey. The US Department of Health and Human Services (HHS) has also predicted that if the situation of burnout is not handled properly, there will be a nationwide shortage of nearly 90,000 burnout physicians by the year 2025, which can cause complicating matters, such as recruiting and replacing a physician which in turn has an economic impact.

Dentist is a stressful professional health occupation which is susceptible to a number of occupational hazards during performing the job such as biological, chemical, physical, and especially psychological including stress, and burnout is a known possible outcome of stress. Previous studies among dentists demonstrated different levels and prevalence of burnout in different countries and mentioned various factors implicated in burnout. Dentists are extensively exposed to different kinds of stress and factors related to burnout. In a national survey, a ratio between number of population and dentists was 8151 to 1 which indicates a high level of responsibility, with most dentists working in public hospitals.

Burnout is one of the most important problems affecting healthcare personnel including dentists but there are no previous published studies measuring burnout in a representative sample of Thai dentists. The current study aimed to determine the level of burnout and investigate the effects of factors on burnout among Thai dentists.

Materials and methods

Study design and population

A cross-sectional online questionnaire survey was conducted to determine burnout level among Thai dentists working in public hospitals. From a database of 955 dentists working in public hospitals, we invited the 760 dentists who met the eligibility criteria of having worked at their current workplace for at least one year. The study was approved by Research Ethics Committee, Faculty of Dentistry, Prince of Songkla University, Thailand (EC6301-001). Written consent was acquired from all participations. The research adhered to guidelines of Ethics of the World Medical Association (Declaration of Helsinki).

Questionnaire

The self-administered online questionnaire comprised 5 parts: general information, work information, the Thai version of 23-item Thai Effort-Reward Imbalance Questionnaire (ERIQ), and the Thai version of Utrecht Work Engagement Scale-9 (UWES-9).

The Thai version of MBI-HSS was legally licensed through www.mindgarden.com. The questionnaire has been one of the most widely used instruments to measure burnout in previous studies, has been developed and has acceptable validity and reliability. It contains 22 questions relating to each of the burnout domains, emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA). Items on PA were presented in the positive direction. Response was obtained using a 7-point Likert scale, EE and DP domains ranging from 0 (never), 1 (A few times a year or less), 2 (Once a month or less), 3 (A few times a month), 4 (Once a week), 5 (A few times a week) to 6 (Everyday), and conversely for PA domain. Emotional exhaustion includes 9 items, with a score range of 0–54; depersonalization includes 5 items, with a score range of 0–30; and personal accomplishment includes 8 items, with a score range of 0–48. High scores on EE and DP and low scores on PA are indicative of burnout.

The Thai ERIQ containing 23 questions was divided into three parts: effort, reward and over-commitment. Effort includes 6 items (Q1–6) and response was obtained using a 5-point Likert scale ranging from 1 (disagree), 2 (agree but I don’t feel bad about it), 3 (agree and I feel a bit bad about it), 4 (agree and I feel bad about it) to 5 (agree and I feel very bad about it), with a total score range of 6–30, the higher of total score means the higher perception of work effort. Reward includes 11 items (Q7–17) including negative phrases (Q10–13), for which responses were obtained using a 5-point Likert scale ranging from 5 (disagree), 4 (agree but I don’t feel bad about it), 3 (agree and I feel a bit bad about it), 2 (agree and I feel bad about it) to 1 (agree and I feel very bad about it), and positive phrases (Q7–9,14–17), with responses were obtained using a 5-point Likert scale ranging from 5 (agree), 4 (disagree but I...
don’t feel bad about it), 3 (disagree and I feel a bit bad about it), 2 (disagree and I feel bad about it) to 1 (disagree and I feel very bad about it), with a total score range of 11–55, the higher of total score means the higher perception of work reward. Over-commitment including 6 items with a total score range of 4–24, the higher of total score means the higher perception of over-commitment to work. Response was obtained using 4-point Likert scale ranging from 1 (strongly disagree), 2 (disagree), 3 (agree) to 4 (strongly agree), except for Q20 which is interpreted oppositely.

The Thai version of UWES-9 was used as an instrument to measure work engagement, as it has been the most widely used instrument in previous studies. It has been developed and has acceptable validity and reliability. The instrument contains 9 questions. Response was obtained using a 7-point Likert scale ranging from 0 (never), 1 (a few times a year or less), 2 (once a month or less), 3 (a few times a month), 4 (once a week), 5 (a few times a week) to 6 (everyday). Total score ranging from 0 to 54 was divided by 9. Thus, final score of work engagement ranges from 0 to 6; very low (0–1.77), low (1.78–2.88), moderate (2.89–4.66), high (4.67–5.50), very high (5.51–6.00).

For the analysis of reliability, Cronbach’s alpha coefficients for burnout, job stress and work engagement were 0.81, 0.73 and 0.95, respectively.

Data collection
A self-administered questionnaire was delivered through an online platform. Invitation to participate in the study was through dentist representatives in each province by verbal, email and text messages.

| Table 1  | General and work information (n = 423). |
|----------|-----------------------------------------|
| Variable | n | % |
| **General information** |
| Gender |
| Female | 306 | 72.3 |
| Male | 117 | 27.7 |
| Age (years) |
| (mean ± SD, range = 34.6 ± 7.6, 25–59) |
| 25–33 | 230 | 54.4 |
| 34–42 | 121 | 28.6 |
| 43–51 | 63 | 14.9 |
| 52–60 | 9 | 2.1 |
| GPA (n = 412) |
| (mean ± SD, range = 3.13 ± 0.35, 2.12–3.89) |
| ≤3.00 | 150 | 36.4 |
| >3.00 | 262 | 63.6 |
| Level of public hospital (workplace) |
| Secondary care hospital | 310 | 73.3 |
| Tertiary care hospital | 113 | 26.7 |
| Highest educational degree |
| Bachelor | 233 | 55.1 |
| Higher than Bachelor | 190 | 44.9 |
| Job position |
| Practitioner | 110 | 26.0 |
| Professional | 201 | 47.5 |
| Senior professional/Expert | 112 | 26.5 |
| Head of dental department |
| Yes | 105 | 24.8 |
| No/Used to | 318 | 75.2 |
| Marital status |
| Single | 273 | 64.5 |
| Married/Widow/Divorced | 150 | 35.5 |
| Children |
| No | 325 | 76.8 |
| Yes | 98 | 23.2 |
| Economic status of family |
| Adequate with savings | 350 | 82.7 |
| Adequate without savings/Inadequate | 73 | 17.3 |
| **Work information** |
| Number of patients per week |
| (mean ± SD, range = 54 ± 33, 0–250) |
| ≤50 | 242 | 57.2 |
| >50 | 181 | 42.8 |
| Job satisfaction |
| Not satisfied | 7 | 1.7 |
| Satisfied | 416 | 98.3 |
| Job reselection |
| No | 77 | 18.2 |
| Yes | 346 | 81.8 |
| Workplace relationship |
| Bad | 39 | 9.2 |
| Good | 384 | 90.8 |
| Workplace support |
| Inadequate | 25 | 5.9 |
| Adequate | 398 | 94.1 |
| Access to workplace consultant |
| Inadequate | 50 | 11.8 |
| Adequate | 373 | 88.2 |

SD: standard deviation, Job reselection: would choose to do the same job again.

| Table 2  | Job stress and work engagement (n = 423). |
|----------|-----------------------------------------|
| Variable (potential scores) | Mean | S.D. | Range | n (%) |
| **Job stress** |
| Work effort (6–30) | 12.72 | 3.92 | 6–30 |
| Work reward (11–55) | 16.55 | 5.21 | 11–49 |
| Over-commitment (4–24) | 13.59 | 2.96 | 6–22 |
| **Work engagement** |
| Very low/low | 3.99 | 1.01 | 0–6 |
| Moderate | 275 | 65.0 |
| High/very high | 109 | 25.8 |
| **Data collection** |

A self-administered questionnaire was delivered through an online platform. Invitation to participate in the study was through dentist representatives in each province by verbal, email and text messages.

| Table 3  | Distribution of burnout domains (n = 422). |
|----------|-----------------------------------------|
| Domain | Low n (%) | Medium/High n (%) | Mean S.D. Range |
| EE (n = 421) | 228 (54.2) | 193 (45.8) | 16.91 9.78 0–50 |
| DP | 235 (55.7) | 187 (44.3) | 7.04 4.96 0–24 |
| PA | 17 (4.0) | 405 (96.0) | 12.90 8.72 0–41 |

SD: standard deviation; EE: emotional exhaustion; DP: depersonlization; PA: personal accomplishment.
### Table 4  Crude odds ratio (OR) between general information and each burnout domain.

| Variable                        | EE (n = 421) | Crude OR (95% CI) | P-value | DP (n = 422) | Crude OR (95% CI) | P-value | PA (n = 422) | Crude OR (95% CI) | P-value |
|---------------------------------|--------------|-------------------|---------|--------------|-------------------|---------|--------------|-------------------|---------|
| **General information**         |              |                   |         |              |                   |         |              |                   |         |
| Gender                          |              |                   |         |              |                   |         |              |                   |         |
| Female                          | 169 (74.1)   | 135 (69.9)        | 1       | 173 (73.6)   | 132 (70.6)        | 1       | 11 (64.7)    | 294 (72.6)        | 1       |
| Male                            | 59 (25.9)    | 58 (30.1)         | 1.23 (0.80–1.89) | 62 (26.4)   | 55 (29.4)         | 1.16 (0.76–1.78) | 6 (35.3)    | 111 (27.4)    | 0.69 (0.25–1.92)  | 0.48    |
| Age (years)                     | 35.7 ± 7.7, 33.2 ± 6.4 | 0.95 (0.92–0.98) | <0.01* | 36.1 ± 7.7, 32.7 ± 6.2, 25–59 | 1       | 0.93 (0.91–0.96) | 38.0 ± 6.9, 34.4 ± 7.2, 25–59 | 0.05    |
| GPA (n = 412)                   |              |                   |         |              |                   |         |              |                   |         |
| >3.00                           | 148 (66.7)   | 113 (60.1)        | 1       | 110 (47.6)   | 113 (62.8)        | 1       | 11 (68.8)    | 188 (47.6)        | 1       |
| ≤3.00                           | 74 (33.3)    | 75 (39.9)         | 1.33 (0.89–1.99) | 121 (52.4)  | 67 (37.2)         | 1.08 (0.72–1.62) | 5 (31.3)    | 207 (52.4)    | 1.27 (0.43–3.70)  | 0.67    |
| Level of public hospital (workplace) |              |                   |         |              |                   |         |              |                   |         |
| Secondary care (mean ± SD, range) | 160 (70.2)  | 150 (77.7)        | 1       | 173 (73.6)   | 137 (73.3)        | 1       | 9 (52.9)     | 301 (74.3)        | 1       |
| Tertiary care                   | 68 (29.8)    | 43 (22.3)         | 0.68 (0.43–1.05) | 62 (26.4)   | 50 (26.7)         | 1.02 (0.66–1.57) | 8 (47.1)    | 104 (25.7)    | 0.39 (0.15–1.03)  | 0.06    |
| Highest educational degree      |              |                   |         |              |                   |         |              |                   |         |
| Higher                          | 108 (47.4)   | 81 (42.0)         | 1       | 114 (48.5)   | 76 (40.6)         | 1       | 10 (58.8)    | 180 (44.4)        | 1       |
| Bachelor                        | 120 (52.6)   | 112 (58.0)        | 1.24 (0.85–1.83) | 121 (51.5)  | 111 (59.4)        | 1.38 (0.93–2.03) | 7 (41.2)    | 225 (55.6)    | 1.79 (0.67–4.79)  | 0.25    |
| Job position                    |              |                   |         |              |                   |         |              |                   |         |
| Senior professional/Expert      |              |                   |         |              |                   |         |              |                   |         |
| Professional                    | 100 (43.8)   | 100 (51.8)        | 2.27 (1.39–3.69) | 107 (45.5)  | 94 (50.3)         | 1.99 (1.22–3.25) | 7 (41.2)    | 194 (47.9)    | 2.15 (0.76–6.10)  | 0.13    |
| Practitioner                    | 51 (22.4)    | 59 (30.6)         | 2.62 (1.51–4.54) | 51 (21.7)   | 59 (31.6)         | 2.62 (1.51–4.54) | 2 (11.8)    | 108 (26.7)    | 4.19 (0.87–20.22) | 0.02*   |
| Head of department              |              |                   |         |              |                   |         |              |                   |         |
| No/used to                      | 161 (70.6)   | 155 (80.3)        | 1       | 166 (70.7)   | 151 (80.7)        | 1       | 12 (70.6)    | 304 (75.1)        | 1       |
| Yes                             | 67 (29.4)    | 38 (19.7)         | 0.59 (0.37–0.93) | 69 (29.4)   | 36 (19.3)         | 0.57 (0.36–0.91) | 5 (29.4)    | 101 (24.9)    | 1.08 (0.34–3.39)  | 0.90    |
| Marital status                  |              |                   |         |              |                   |         |              |                   |         |
| Married/Widow/Divorced          |              |                   |         |              |                   |         |              |                   |         |
| Married                         | 87 (38.2)    | 63 (32.6)         | 1       | 94 (40.0)    | 56 (29.9)         | 1       | 5 (29.4)     | 145 (35.8)        | 1       |
| Divorced                        | 141 (61.8)   | 130 (67.4)        | 1.27 (0.85–1.90) | 141 (60.0)  | 131 (70.1)        | 1.56 (1.04–2.34) | 12 (70.6)    | 260 (64.2)    | 0.75 (0.26–2.16)  | 0.24    |

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Statistical analysis

Data were analyzed using a statistical program. The hospitals were divided into 2 levels: tertiary care hospital which has a capacity of at least 200 beds, 6 specialists (obstetrician, surgeon, internist, pediatrician, orthopedist, anesthesiologist) and capable of tertiary care and referral patients; secondary care hospital which has 30 to 200 beds and capable of secondary care.26 Descriptive statistics were calculated for frequency, percentage, mean, and standard deviation for general information, work information, work engagement, job stress, and burnout. Crude odds ratio of independent factors of burnout elements were calculated. The factors of P-value ≤ 0.2 were entered into binary logistic regression analysis using forward stepwise selection. The statistical significance level was set at 0.05.

Results

Out of 760 dentists working in southern public hospitals, 423 responded to the questionnaire, giving in a response rate of 55.7%. The general information and work information of the sample is shown in Table 1. Job stress and work engagement are shown in Table 2. The mean ± SD of each domains of job stress were 12.72 ± 3.92 for work effort, 16.55 ± 5.21 for work reward and 13.59 ± 2.96 for over-commitment. Approximately 65% had moderate work engagement.

The mean score for EE, DP, PA and the burnout level are shown in Table 3. Approximately 230 (54.0%) had low EE with the mean score of 16.91 ± 9.78, 235 (55.7%) had low DP with the mean score of 7.04 ± 4.96. Almost all of the sample (96.0%) had medium and high PA with the mean score of 12.90 ± 8.72.

Tables 4 and 5 summarize the crude OR of burnout domains by the sample’s general/work information, work engagement and job stress. Levels of EE were found to be higher in lower age, working as a practitioner dentist, not being a head of dental department, not choosing this job again, bad workplace relationship, inadequate workplace support and access to consultant, lower work engagement, higher work effort, work reward and over-commitment. Lastly, levels of PA were found to be higher in more than 50 patients per week, satisfied with job, higher work engagement and lower work reward.

The adjusted odds ratio in burnout domains from multiple logistic regression models are illustrated in Table 6. The factors associated with EE were good workplace relationship (OR = 0.37, 95% CI = 0.15–0.91), higher work effort (OR = 1.22, 95% CI = 1.13–1.32), higher work reward (OR = 1.09, 95% CI = 1.03–1.17), GPA ≥ 3.00 (OR = 2.30, 95% CI = 1.35–3.93), and adequate access to workplace consultant (OR = 0.25, 95% CI = 0.11–0.59). The factors associated with DP were good workplace relationship (OR = 0.37, 95% CI = 0.17–0.81), higher work effort...
Table 5  Crude odds ratio (OR) between work information, work engagement, job stress domain and each burnout domain.

| Variable                  | EE (n = 421) | Crude OR (95% CI) | P-value | DP (n = 422) | Crude OR (95% CI) | P-value | PA (n = 422) | Crude OR (95% CI) | P-value |
|---------------------------|--------------|-------------------|---------|--------------|-------------------|---------|--------------|-------------------|---------|
| **Work information**      |              |                   |         |              |                   |         |              |                   |         |
| Number of patients per week |            |                   |         |              |                   |         |              |                   |         |
| >50                       | 100 (43.9)   | 79 (40.9)         | 1       | 105 (44.7)   | 75 (40.1)         | 1       | 3 (17.6)     | 177 (43.7)        | 1       |
| ≤50                       | 128 (56.1)   | 114 (59.1)        | 1.13 (0.77 −1.66) | 130 (55.3) | 112 (59.9) | 1.21 (0.82 −1.78) | 14 (82.4) | 228 (56.3) | 0.28 (0.08 −0.98) |
| Job satisfaction          |              |                   |         |              |                   |         |              |                   |         |
| Not satisfied             | 1 (0.4)      | 6 (3.1)           | 1       | 1 (0.4)      | 6 (3.2)           | 1       | 2 (11.8)     | 5 (1.2)           | 1       |
| Satisfied                 | 227 (99.6)   | 187 (96.9)        | 0.14 (0.02 −1.15) | 234 (99.6) | 181 (96.8) | 0.13 (0.02 −1.08) | 15 (88.2) | 400 (98.8) | 10.67 (1.91 −59.51) |
| Job reselection           |              |                   |         |              |                   |         |              |                   |         |
| No                        | 26 (11.4)    | 51 (26.4)         | 1       | 27 (11.5)    | 50 (26.7)         | 1       | 5 (29.4)     | 72 (17.8)         | 1       |
| Yes                       | 202 (88.6)   | 142 (73.6)        | 0.36 (0.21 −0.60) | 208 (88.5) | 137 (73.3) | 0.36 (0.21 −0.60) | 12 (70.6) | 333 (82.2) | 1.93 (0.66 −5.64) |
| Workplace relationship    |              |                   |         |              |                   |         |              |                   |         |
| Bad                       | 10 (4.4)     | 29 (15.0)         | 1       | 13 (5.5)     | 26 (13.9)         | 1       | 2 (11.8)     | 37 (9.1)          | 1       |
| Good                      | 218 (95.6)   | 164 (85.0)        | 0.26 (0.12 −0.55) | 222 (94.5) | 161 (86.1) | 0.36 (0.18 −0.73) | 15 (88.2) | 368 (90.9) | 1.33 (0.29 −6.03) |
| Workplace support         |              |                   |         |              |                   |         |              |                   |         |
| Inadequate                | 5 (2.2)      | 20 (10.4)         | 1       | 9 (3.8)      | 16 (8.6)          | 1       | 1 (5.9)      | 24 (5.9)          | 1       |
| Adequate                  | 223 (97.8)   | 173 (89.6)        | 0.19 (0.07 −0.53) | 226 (96.2) | 171 (91.4) | 0.43 (0.18 −0.99) | 16 (94.1) | 381 (94.1) | 0.99 (0.13 −7.69) |
| Access to workplace consultant |       |                   |         |              |                   |         |              |                   |         |
| Inadequate                | 11 (4.8)     | 39 (20.2)         | 1       | 19 (8.1)     | 31 (16.6)         | 1       | 3 (17.6)     | 47 (11.6)         | 1       |
| Adequate                  | 217 (95.2)   | 154 (79.8)        | 0.20 (0.10 −0.40) | 216 (91.9) | 156 (83.4) | 0.44 (0.24 −0.81) | 14 (82.4) | 358 (88.4) | 1.63 (0.45 −5.89) |
| **Work engagement**       |              |                   |         |              |                   |         |              |                   |         |
| Very high/high            | 82 (36.0)    | 27 (14.0)         | 1       | 82 (34.9)    | 27 (14.4)         | 1       | 2 (11.8)     | 107 (26.4)        | 1       |
| Moderate                  | 138 (60.5)   | 135 (69.9)        | 2.97 (1.81 −4.88) | 143 (60.9) | 131 (70.1) | 2.78 (1.70 −4.57) | 9 (52.9) | 265 (65.4) | 0.55 (0.12 −2.59) |
| Low/very low              | 8 (3.5)      | 31 (16.1)         | 11.77 (4.83 −28.68) | 10 (4.3) | 29 (15.5) | 8.81 (3.80 −20.40) | 6 (35.3) | 33 (8.1) | 0.10 (0.02 −0.53) |
| **Job stress (Median ± IQR, (Q1,Q2))** | | | | | | | | | |
| Work effort               | 11.0 ± 4.0   | 14.0 ± 6.0        | 1.27 (1.20 −1.35) | 11.0 ± 5.0 | 14.0 ± 6.0 | 1.19 (1.13 −1.26) | 13.0 ± 7.0 | 12.0 ± 6.0 | 1.01 (0.89 −1.15) |
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Table 5 (continued)

| Variable   | Crude OR (95% CI) | P-value | Crude OR (95% CI) | P-value | Crude OR (95% CI) | P-value |
|------------|-------------------|---------|-------------------|---------|-------------------|---------|
| EE Low     | 1.00 (0.60–1.65)  | 0.98    | Moderate/High     | 1.00 (0.60–1.65) | 0.98    | 1.00 (0.60–1.65) | 0.98    |
| EE Moderate | 1.00 (0.60–1.65) | 0.98   | Moderate/High     | 1.00 (0.60–1.65) | 0.98   | 1.00 (0.60–1.65) | 0.98   |
| EE High    | 1.00 (0.60–1.65)  | 0.98    | Moderate/High     | 1.00 (0.60–1.65) | 0.98    | 1.00 (0.60–1.65) | 0.98    |

Discussion

This cross-sectional study was designed to analyze the relationships between burnout and related factors among Thai dentists working in public hospitals. Our result reveals that approximately half of the sample (54.2%) had low emotional exhaustion, similar to previous studies among India dentists (66.4%), Hong Kong dentists (44.8%), Thai psychiatrists (55.2%), and Thai physicians (42.1%).

We found 2 important factors significantly related to every domain of burnout, namely low work engagement and age. In this study, having more work engagement was related to having less EE, DP and more PA. Calvo1 and González-Romá et al.23 identified relationships between each domain of burnout and work engagement (divided into 3 domains: vigor, dedication, absorption). EE inversely related to vigor; DP inversely related to dedication; PA related to absorption, though the relationships were not linear. However, we cannot claim that work engagement and burnout are the opposite poles of each other, but work engagement is still one of the important factors. Regarding age, we found that younger age experienced more EE, DP and PA. For EE and DP domains. Similar results were found in previous studies.10,11 This can be explained that as people become older they will be able to understand better, have more stable emotional condition, be able to cope with environmentally related controversy by forming good interpersonal relationships and overcome burnout on EE and DP domains.10 Considering PA domain, it can be hypothesized that dentists perceive dentistry as being more stressful compared to other professions. Low self-esteem is one of the important factors contributing stress in dentistry occupational hazard, which older dentist can experience more comparing to younger.4 It is possible that dentists who considered public hospitals an unsatisfying working environment had left the hospitals as they aged, thereby resulting as survivorship bias in this study.

Considering each burnout domain, for EE, we discovered the 2 strongest factors associated with EE which are work effort and GPA. Since GPA is an unchangeable factor, we would like to consider discussing more on work effort which can be managed to prevent EE. Similarly for DP, the most important factor related to DP is also work effort. Work
effort is one of subscales in ERIQ, and a similar result was illustrated in a previous study that having more work stress is significantly related to having more EE and DP, this can be explained that EE is a burnout dimension of exhaustion, DP is a dimension of interpersonal relationship, putting too much effort can cause work overload and lack of control which easily relate to more EE ad DP.

In consideration of PA, the strongest factor associating with PA is level of workplace. We found that dentists working in secondary hospitals had more PA compared to those in tertiary hospitals. Many different factors between tertiary and secondary hospitals might influence the opportunity to use more skills and to interact with colleagues and patients. There are higher number of patients in tertiary hospitals and also more difficulty in work that dentists have to face, which can relate to less PA.

The strength of this study is that it was the first research to explore burnout situation in Thai dentists. An extensive range of potential factors was included to comprehensively explain the associations with burnout. However, the study results should be interpreted with caution as there are some limitations. The response rate was approximately 56%. This left 337 out of 760 dentists (44%), probably leading to non-response bias. The analysis of the non-respondents could not be undertaken to compare with respondents, as a result of inaccessibility to data of the non-respondents. The other limitation is that sample in the study are survivors which could not reach the late stage of burnout, resulting in survivorship bias. However, this proportion is valid and to be in the acceptable range of the response rate. This study suggests the ways to prevent dentists from burnout through the modification of risk factors. The work engagement in workplace is crucial and to be reinforced. Furthermore, early and periodic detection of burnout is important and should be prioritized prior to reaching the high levels, because burnout is a chronic state which can be prevented.

The findings indicate that burnout affects a considerable proportion of Thai dentists. Low work engagement and age were considered to be significantly associated with all 3 burnout domains. Regarding emotional exhaustion, additional significant factors were bad workplace relationship, excessive work effort, higher work reward, low grade point average, and inadequate access to workplace consultant. For depersonalization, the associated factors were bad workplace relationship, excessive work effort, and not willing to reselect to do this job. For reduced personal accomplishment, the significant factors were higher work reward, and working in tertiary care hospital. These several factors can be modified to reduce the risk of burnout among dentists in Thailand.

**Declaration of competing interest**

The authors have no conflict of interest relevant to this article.

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**Table 6** Adjusted odds ratio (OR) from multiple logistic regression models (n = 412).

| Variable                          | EE       | P-value | EE       | P-value | EE       | P-value |
|----------------------------------|----------|---------|----------|---------|----------|---------|
|                                  | Adjusted OR (95% CI) |         | Adjusted OR (95% CI) |         | Adjusted OR (95% CI) |         |
| Age (years)                      | 0.92 (0.89–0.96) | <0.01* | 0.93 (0.90–0.96) | <0.01* | 0.92 (0.86–0.99) | <0.02* |
| Work engagement                  |          |         |          |         |          |         |
| Very high/high                   | 1        |         | 1        |         | 1        |         |
| Moderate                         | 1.94 (1.07–3.52) | 1.76 (1.02–3.04) | 0.377 (0.08–1.89) |         |         |
| Low/very low                     | 4.08 (1.39–11.98) | 3.48 (1.35–8.96) | 0.09 (0.01–0.60) |         |         |
| Workplace relationship           |          |         |          |         |          |         |
| Bad                              | 0.03*    |         | 0.02*    |         |          |         |
| Good                             | 0.37 (0.15–0.91) | 0.37 (0.17–0.81) |         |         |
| Work effort                      | 1.22 (1.13–1.32) | 1.17 (1.10–1.25) | 0.01*    |         |         |
| Work reward                      | 1.09 (1.03–1.17) | 1.09 (1.03–1.17) | 0.01*    |         |         |
| GPA                              |          |         |          |         |          |         |
| >3.00                            | 1        |         | 1        |         |          |         |
| ≤3.00                            | 2.30 (1.35–3.93) |         |          |         |
| Access to workplace consultant   |          |         |          |         |          |         |
| Inadequate                       | 0.25 (0.11–0.59) |         |          |         |
| Job reselection                  |          |         |          | <0.05*  |          |         |
| No                               | 1        |         |          |         |          |         |
| Yes                              | 0.55 (0.30–0.99) |         |          |         |
| Size of public hospital (workplace) |          |         |          |         | <0.05*  |         |
| Secondary care hospital          | 1        |         |          |         |          |         |
| Tertiary care hospital           |          |         |          |         | 0.31 (0.11–0.91) |         |

*Statistical significance at P-value <0.05.

OR: odds ratio; CI: confidence interval; EE: emotional exhaustion; DP: depersonalization; PA: personal accomplishment; GPA: grade point average.
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