Chiang Mai Dental Journal

Original Article

Editor:
Pinpinut Wanichsaithong,
Chiang Mai University, Thailand.

Received: Febryary 16, 2023
Revised: March 28, 2023
Accepted: May 8, 2023

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CM Dent J. 2023; 44(2): 22-33

Factors Affecting Stress and Stress Management Among Dentists Graduated from Chiang Mai University

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Abstract

Objectives: This study aims to explore the levels of overall and occupational stress, correlation between overall and occupational stress, factors affecting overall and occupational stress, and stress management strategies among dentists who graduated from Chiang Mai University.

Methods: 2,650 dentists who graduated from Chiang Mai University between 1983 and 2020 and are now working in Thailand were the subject of this study. Between May and September 2021, 2,466 dentists were provided online surveys that included the Suanprung Stress Test-20, Work Stress Inventory for Dentists, and Stress-coping strategy checklist. 588 respondents filled out the surveys (response rate was 23.8%). With the level of significance set at 0.05, descriptive and analytical statistics were used to examine the data using SPSS.

Results: 78% of respondents had moderate to high level of overall stress, 84.9% had low to normal level of occupational stress. There was a positive correlation between overall and occupational stress (rs=0.686, $p<0.001$). 'age', 'having underlying disease', and 'financial status' were the factors which significantly resulted in different overall stress scores ($p<0.05$). 'hobbies' had the highest rating for stress coping (87.6%), followed by 'resting' (79.7%) and 'eating' (68.4%).

Conclusions: The majority of dentists had normal levels of occupational stress, moderate to high levels of overall stress, and occupational stress significantly correlated with overall stress. There were a few factors that affect overall stress after adjusting for influences of the confounding variables. And there were a variety of stress coping strategies that dentists used for stress management. The findings of this study could be useful for strategic planning to prevent and resolve dentists' stress issues in the future.

Keywords: Chiang Mai University, dentist, factors, management, stress

Introduction

It is recognized that dentistry is a stressful profession.[1-3] There are numerous sources of stress for dentists, including the necessity for high-quality work, working in confined spaces, requiring intense focus, using coordinated movements of various body parts, frequently having to stay in one position for extended periods of time,[4] treating a high volume of patients on a time limit, attempts to establish a practice and dealing with different patients (especially nervous or high-expectation patients), and the development of new and complex technologies, methods and treatment techniques.[5,6]

Prolonged exposure to these stressors results in dentists tending to experience chronic high levels of occupational stress, which may have an impact on physical health, mental health, and health behaviors. The most commonly reported stress-related physical health issues are lower back pain, musculoskeletal pain, headache, and gastrointestinal problems.[6] Moreover, dentists also reported having a significantly high risk of coronary heart disease and immune disease due to occupational stress more than general population.[7] Regarding mental health, the consequences often include burnout, anxiety, and depression,[1] which can decrease motivation and self-esteem.[6] Additionally, stress experienced by dentists can even lead to suicide; the risk among dentists is higher than in the rest of the general population.[8] As for health behaviors, dentists are at a higher risk for stress exhibit poorer health and a higher rate of unhealthy behaviors than their less stressed colleagues.[6] The study found that 12-19% of dentists and physicians become addicted to alcohol or drugs, while in the general American population that figure is only 10-12%.[9] In short, a chronic high level of occupational stress can have manifold negative effects on dentists' health and wellbeing. It can also have negative effects on their interpersonal and professional relationships due to poor work quality, poor communication, and poor management.[3]

Numerous factors can induce stress in dentists, including work-related stressors, dentist–patient interactions, and dentist personality traits and perceptions of stress.[9] Regulations, dental healthcare systems, workplace culture, work sector, quality of the work environment, lack of material resources, understaffing, and poor staff quality are additional factors that can contribute to stress.[10] Dentists with identical stressors will experience disparate levels of stress and choose distinct coping methods due to individual differences in the factors mentioned above. Therefore, it is important that dentists recognize their stressors and regularly measure their stress levels to prevent or minimize the negative effects that stress may have on their physical and mental well-being, as the ability of dentists to maintain balanced stress levels and engage in effective coping strategies may impact their overall health.[6,9]

Based on the significance of the issues caused by occupational stress described above, we recognized the significance of stress issues in dentists' professional and personal lives and its consequences. From literature review, there were several studies about stress among dentists in Thailand, with publication years of 1987, 2007, and 2008.[11-13] As a result, a current study on stress among dentists who graduated from Chiang Mai University in 2021 was carried out, with the aim to explore the levels of overall and occupational stress, correlation between overall and occupational stress, factors affecting overall and occupational stress, and their stress management. The findings of this study could be used for strategic planning to prevent and resolve dentists' stress issues. Without a suitable solution and management, the stress issue will affect not only the dentists but also adjacent residents and patients.

Materials and Methods

Subjects

2,650 dentists who graduated from Chiang Mai University between 1983 and 2020 and are now working in Thailand were included in the study (receiving data from Dentistry CMU Alumni Association, April 2021).

Ethical considerations

The study was approved by the Research Ethic Committee Faculty of Public Health, Chiang Mai University (ET011/2564) on April 26th, 2021. The study details were explained to all subjects and informed consent was obtained by click agree before participation.

Questionnaire construction

The Google form questionnaire was divided into six parts:

1. Three-question quiz to ensure the respondent was

a dentist

2. Demographic information as gender, age, marital status, etc.

3. Work-related information as sector of practice, location of practice, years of practice, etc.

4. Suanprung Stress Test-20 (SPST-20)[14]: Participants were asked 20 questions to rate the level of stress they experienced over the last six months on a five-point scale ranging from '1=No stress' to '5=A great deal of stress'. The total score will be used to define four levels of stress, ranging from mild to severe.

5. Work Stress Inventory for Dentists (WSID): This was developed from the original version by Cooper *et al.*[5] and Choy and Wong[15] to identify specific work stressors experienced by general dental practitioners. Participants were asked to rate the level of stress they experienced on a five-point scale ranging from '1=No stress' to '5=A great deal of stress'. Twenty-seven stressors were grouped into five domains: patient-related, time-related, income-related, job-related, and staff-related or technically related.

6. Stress-coping strategy checklist: This was developed from our literature review.[2,6,15,16] There were 14 activities in this part, and participants were given the option to select the choices that best described their strategies for stress management.

In Thailand, the Suanprung Stress Test-20 (SPST-20), which showed concurrent validity >0.27 and a Cronbach's alpha of >0.7, was widely employed to measure overall stress. The study did not modify any of the material and utilized SPST-20 to measure subjects' overall stress. The Work Stress Inventory for Dentists (WSID) and the Stress-coping strategy checklist were used in a reliability test with a Cronbach's reliability coefficient alpha=0.9 and previous content validity from 3 quality test experts.

Data collection

After receiving contact information from Dentistry CMU Alumni Association, the questionnaires were sent to the 2,466 dentists who graduated from Chiang Mai University and are working in Thailand via social media (Facebook messenger, LINE messenger, etc.), e-mail, and post mail between May and September 2021.

Statistical analysis

The data were analyzed using the SPSS (Windows version 18). Descriptive statistics were described as frequencies, percentages, means, and standard deviations. Analytic statistics used Spearman's Rank Correlation, Mann-Whitney U test, Kruskal-Wallis H test, and Linear regression, with the level of significance at 0.05.

Results

Response

184 of the 2,650 dentists could not be contacted; questionnaires were sent to the remaining 2,466 dentists. 588 questionnaires were returned (a response rate of 23.8%). There were 12 incomplete questionnaires, and 576 complete questionnaires were brought in for analysis.

Demographic information

Of the 576 respondents, 67.2% (n=387) were female. Most participants were between the ages of 30 and 39 (34.4%, n=198), 79.5% (n=458) had no underlying disease, 44.4% (n=256) reported exercising once or twice a week, 59.5% (n=343) claimed to be single, 28.1% (n=162) reported having an income 70,001-100,000 Baht per month, 46.8% (n=270) reported having one or more people in their care, 49.8% (n=287) had income greater than to expense 0 to 50%, 53.0% (n=305) were general practitioners, 70.3% (n=405) worked in the public sector, 51.4% (n=296) did not work at their hometown, 31.4% (n=181) had 5-9 years of work experience, 80.6% (n=464) provided dental services, 36.5% (n=210) worked 35.1-42 hours per week, and 78.0% (n=449) did not own a dental clinic (Table 2).

Overall stress and occupational stress

The mean (± standard deviation) total SPST score was 45.48±17.16, which indicated that dentists had high level of stress. The mean (± standard deviation) total WSID score was 74.58±18.6. As shown in Table 1, the SPST and WSID scores were divided into a variety of stress levels.

As compared to all respondents, there were different proportions in some variables for 321 respondents in the group with a high to severe level of SPST scores and 87 in the group with a high to severe level of WSID scores as shown in Table 2.

Table 3 shows the mean for each of the five domains of occupational stressors. The patient-related stressors group had the highest mean score (3.61±0.67), while job-related stressors group had the lowest mean score (1.92±0.75).

The top 10 stressors according to the percentage distribution of the respondents' ratings '4' or '5' (considered to be high level) are shown in Table 4. Five of the top 10 highest ranked stressors were patient-related stressors. The 6th-10th were time-related stressors and staff-related or technically related stressors.

The relationship between SPST scores and WSID scores

SPST scores were significantly highly correlated with WSID scores (r_s=0.686, p<0.001). In addition, SPST scores were also significantly highly correlated with all five domains of occupational stressors: patient-related (r_s=0.422, p<0.001), time-related (r_s=0.558, p<0.001), income-related (r_s=0.556, p<0.001), job-related (r_s=0.581, p<0.001), and staff-related or technically-related (r_s=0.561, p<0.001). This means that high overall stress was associated with high perception of occupational stressors (considered to be high occupational stress).

Differences in overall stress and occupational stress according to demographic and work-related information

Numerous factors significantly affected both overall stress and occupational stress (p<0.05), including age, marital status, income per month, financial status, graduate qualifications, location of practice, years of practice, and ownership of dental clinic. Several factors significantly affected overall stress only, including having underlying disease, exercise frequency, and sector of practice (Table 5). Therefore, the factors that significantly affected occupational stress were a subset of the factors that significantly affected overall stress.

Regression analysis of factors to adjusting for influences of the confounding variables

After adjusting for influences of the confounding variables, age, having an underlying disease, and financial status were the factors that significantly affected overall stress scores (p<0.05), while none of the factors significantly affected occupational stress scores, as shown in Table 6.

Effects of age and other factors on overall stress scores

The results showed stress scores vary among age groups. Dentists over 40 years old reported less stress than other age groups. Dentists with underlying diseases, with income equal to expenses, or who worked in the public sector reported more stress than others in every age group. Divorced and bereaved status induced high stress in dentists in 30-39 years old group and divorced status induced high stress in dentists over 40 years old group. Participation in further coursework after graduation from dental school induced low stress among dentists in the 20-29 years old group. Working in non–hometown cities induced high stress in dentists in 20-29 years old group. And owning a dental clinic could induce or reduce stress based on age group.

Table 1: Number and percentage of respondents group by level of overall stress and occupational stress

Level of overall stress	Number (percentage) of respondents	Level of occupational stress	Number (percentage) of respondents
mild stress[1]	49(8.5)	normal stress [a]	254(44.1)
moderate stress[2]	206(35.8)	low stress [b]	235(40.8)
high stress[3]	213(37.0)	high stress [c]	85(14.8)
severe stress[4]	108(18.7)	severe stress [d]	2(0.3)
Total	576(100.0)	Total	576(100.0)

[1] had SPST scores 0-23, [2] had SPST scores 24-41, [3] had SPST scores 42-61, and [4] had SPST scores more than 61, [a] had WSID score ≤ mean, [b] had WSID score between mean and mean + SD, [c] had WSID score from mean + SD to mean + 2SD, and [d] had WSID score mean + 2SD and above

Table 2: Number and percentage of respondents group by personal and work-related factors compared between high to severe level of SPST scores and high to severe level of WSID scores

Demographics	Number (percentage) of respondents		
	Overall (n=576)	High to severe level of SPST scores (n=321)	High to severe level of WSID scores (n=87)
Personal factors			
1. Gender			
Male	189(32.8)	106(33.0)	27(31.0)
Female	387(67.2)	215(67.0)	60(69.0)
2. Age (years)			
20-29	152(26.4)	113(35.2)	32(36.8)
30-39	198(34.4)	118(36.8)	29(33.3)
40-49	123(21.3)	51(15.9)	15(17.3)
≥50	103(17.9)	39(12.1)	11(12.6)
3. Having underlying disease			
Yes	118(20.5)	78(24.3)	19(21.8)
No	458(79.5)	243(75.7)	68(78.2)
4. Exercise frequency			
No exercise	126(21.9)	78(24.3)	25(28.7)
1-2 times/week	256(44.4)	148(46.1)	35(40.2)
≥3 times/week	194(33.7)	95(29.6)	27(31.1)
5. Marital status			
Single	343(59.5)	210(65.4)	62(71.3)
No single but unmarried	25(4.4)	18(5.6)	1(1.1)
Married	200(34.7)	88(27.4)	22(25.3)
Divorced	4(0.7)	4(1.3)	2(2.3)
Bereaved	4(0.7)	1(0.3)	0(0.0)
6. Income per month (Baht)			
≤30,000	16(2.8)	11(3.4)	4(4.6)
30,001-50,000	119(20.7)	80(24.9)	22(25.3)
50,001-70,000	137(23.8)	87(27.2)	27(31.0)
70,001-100,000	162(28.1)	73(22.7)	18(20.7)
> 100,000	142(24.6)	70(21.8)	16(18.4)
7. Number of persons under care			
None	183(31.8)	102(31.8)	32(36.8)
1-2	270(46.8)	155(48.3)	37(42.5)
3-4	101(17.6)	50(15.5)	13(15.0)
>4	22(3.8)	14(4.4)	5(5.7)
8. Financial status			
Income > Expense (≥50%)	200(34.7)	90(28.0)	25(28.7)
Income > Expense (<50%)	287(49.8)	168(52.4)	47(54.1)
Income = Expense	69(12.0)	48(14.9)	13(14.9)
Income < Expense (<50%)	14(2.5)	12(3.8)	2(2.3)
Income < Expense (≥50%)	6(1.0)	3(0.9)	0(0.0)
9. Graduate qualifications			
General practitioner	305(53.0)	189(58.9)	61(70.1)
Postgraduate	92(15.9)	53(16.5)	11(12.7)
M.D./Ph.D.	108(18.8)	46(14.3)	5(5.7)
Resident	71(12.3)	33(10.3)	10(11.5)
Work-related factors			
10. Sector of practice	405(70.3)	240(74.8)	69(79.3)
Public	171(29.7)	81(25.2)	18(20.7)
Private			

11. Location of practice (work at hometown)			
Yes	280(48.6)	138(43.0)	44(50.6)
No	296(51.4)	183(57.0)	43(49.4)
12. Years of practice			
<5	114(19.8)	81(25.2)	24(27.6)
5-9	181(31.4)	124(38.7)	30(34.5)
10-19	106(18.4)	43(13.4)	13(14.9)
≥20	175(30.4)	73(22.7)	20(23.0)
13. Type of practice			
Dental Practitioner	464(80.6)	264(82.2)	72(82.8)
Teacher	55(9.5)	30(9.4)	6(6.9)
Dental Public Health Administrator	38(6.6)	16(5.0)	6(6.9)
Public Health Administrator	13(2.3)	8(2.5)	2(2.3)
Researcher	4(0.7)	3(0.9)	1(1.1)
Others	2(0.3)	0(0.0)	0(0.0)
14. Hours of working per week			
≤35	184(31.9)	102(31.8)	26(29.9)
35.1-42	210(36.5)	121(37.7)	35(40.2)
≥42	182(31.6)	98(30.5)	26(29.9)
15. Ownership of dental clinic	127(22.0)	57(17.8)	12(13.8)
Yes	449(78.0)	264(82.2)	75(86.2)
No			

Table 3: Average mean for each domain.

Occupational stressors: Five domains	WSID score ($\bar{x}$±SD)
1. Patient-related stressors	3.61±0.67
2. Time-related stressors	3.12±0.82
3. Staff-related or technically related stressors	2.83±0.73
4. Income-related stressors	2.59±0.88
5. Job- related stressors	1.92±0.75

Table 4: The 10 most stressful of occupational stressors rated by respondents

Occupational stressors	n (%)
1. Patient having a medical emergency in the surgery (P)	498(92.0)
2. Risk of medicolegal complications (P)	464(86.1)
3. Actually making clinical mistakes (P)	403(70.8)
4. High patient expectations (P)	339(59.1)
5. The possibility of making mistakes (P)	326(58.2)
6. Running behind schedule (T)	246(42.9)
7. Working quickly to see as many patients as possible (T)	220(41.3)
8. Cross-infection risk (S)	228(40.9)
9. Maintaining high levels of concentration for long periods with few breaks (T)	231(40.5)
10. Equipment breakdown and defective materials (S)	232(40.4)

P = Patient-related, T = Time-related, I = Income-related, J = Job-related, S = Staff/technically related

Table 5: The difference in SPST scores and WSID scores according to personal and work-related factors (N=576)

Demographics	n(%)	Overall stress		Occupational stress	
		SPST scores (mean ± SD)	*p*-value	WSID scores (mean ± SD)	*p*-value
Personal factors	189(32.8)	45.53±16.98	0.929	73.94±18.34	0.426
1. Gender	387(67.2)	45.45±17.27		74.90±18.77	
Male					
Female					
2. Age (years)	152(26.4)	52.43±15.62	<0.001*	80.28±15.54	<0.001*
20-29	198(34.4)	47.50±16.38		76.57±16.11	
30-39	123(21.3)	39.92±16.50		69.30±21.33	
40-49	103(17.9)	37.95±16.75		68.67±20.65	
≥50					
3. Having underlying disease	118(20.5)	48.23±16.60	0.040*	74.90±18.50	0.462
Yes	458(79.5)	44.77±17.25		73.36±19.09	
No					
4. Exercise frequency	126(21.9)	47.52±16.62	0.026*	77.78±17.71	0.094
No exercise	256(44.4)	46.39±16.96		74.72±17.35	
1-2 times/week	194(33.7)	42.94±17.56		72.34±20.50	
≥3 times/week					
5. Marital status	343(59.5)	47.68±16.69	<0.001*	76.79±17.90	0.001*
Single	25(4.4)	48.84±19.64		75.36±18.02	
No single but unmarried	200(34.7)	40.96±16.80		70.42±19.29	
Married	4(0.7)	62.75±6.45		91.75±14.10	
Divorced	4(0.7)	43.75±20.53		72.00±18.62	
Bereaved					
6. Income per month (Baht)	16(2.8)	51.88±16.50	<0.001*	80.00±14.54	0.039*
≤30,000	119(20.6)	48.81±16.20		77.82±17.79	
30,001-50,000	137(23.8)	48.31±17.49		76.12±19.09	
50,001-70,000	162(28.1)	42.84±16.16		73.04±18.01	
70,001-100,000	142(24.6)	42.23±17.85		71.55±19.44	
> 100,000					
7. Number of persons under care	183(31.8)	47.15±18.68	0.263	76.86±17.63	0.198
None	270(46.8)	45.56±16.38		73.89±18.82	
1-2	101(17.6)	42.12±16.16		72.42±18.56	
3-4	22(3.8)	45.95±16.75		74.18±23.37	
>4					
8. Financial status	200(34.7)	42.14±18.24	<0.001*	71.47±20.00	0.006*
Income > Expense (≥50%)	287(49.8)	45.78±16.24		75.10±17.88	
Income > Expense (<50%)	69(12.0)	52.53±16.08		79.57±17.80	
Income = Expense	14(2.5)	52.00±15.25		83.21±13.18	
Income < Expense (<50%)	6(1.0)	45.83±12.53		76.33±11.34	
Income < Expense (≥50%)					
9. Graduate qualifications	305(53.0)	47.91±17.29	0.001*	76.29±18.95	0.024*
General practitioner	92(15.9)	46.04±17.15		75.23±15.67	
Postgraduate	108(18.8)	40.58±16.14		70.21±18.86	
M.D./Ph.D.	71(12.3)	41.70±16.23		73.07±19.50	
Resident					
Work-related factors	405(70.3)	46.90±16.56	0.001*	75.18±18.70	0.278
10. Sector of practice	171(29.7)	42.09±18.10		73.18±18.41	
Public					
Private					

11. Location of practice (work at hometown)	280(48.6)	43.38±16.93	0.002*	73.24±18.80	0.037*
Yes	296(51.4)	47.45±17.17		75.86±18.39	
No					
12. Years of practice	114(19.8)	52.08±15.85	<0.001*	79.75±15.60	<0.001*
<5	181(31.4)	49.64±16.25		78.85±15.06	
5-9	106(18.4)	41.43±15.88		71.58±19.51	
10-19	175(30.4)	39.31±17.03		68.63±21.11	
≥20					
13. Type of practice	464(80.6)	46.29±17.08	0.208	75.34±17.78	0.491
Dental Practitioner	55(9.5)	42.85±17.84		71.33±19.77	
Teacher	38(6.6)	39.87±15.22		71.11±20.74	
Dental Public Health Administrator	13(2.3)	45.54±20.98		71.46±29.68	
Public Health Administrator	4(0.7)	47.25±16.74		84.25±7.14	
Researcher	2(0.3)	30.50±6.36		55.50±51.62	
Others					
14. Hours of working per week	184(31.9)	44.54±17.98	0.385	72.88±19.60	0.295
≤35	210(36.5)	46.85±17.32		75.74±19.45	
35.1-42	182(31.6)	44.84±16.10		74.98±16.48	
≥42					
15. Ownership of dental clinic	127(22.0)	42.19±16.97	0.006*	69.65±19.16	0.001*
Yes	449(78.0)	46.41±17.12		75.98±18.24	
No					

The statistical analysis was performed by Mann-Whitney U test and Kruskal-Wallis H test, *p<0.05

Table 6: The results after adjusting for influence of the confounding variables of demographic and work-related information which significantly resulted in different overall and/or occupational stress scores using multiple regression analysis.

	Regression coefficients (B)		**Standard error**		***t*-value**		***p*-value**	
	SPST	WSID	SPST	WSID	SPST	WSID	SPST	WSID
(Constant)	49.70	1.71	6.95	0.25	7.15	6.79	0.000	0.000
Age	-3.66	-0.03	1.47	0.06	-2.50	-0.46	0.013*	0.643
Sector of practice	-2.38	-	1.67	-	-1.43	-	0.154	-
Location of practice	1.24	0.02	1.41	0.06	0.88	0.32	0.378	0.753
Having underlying disease	5.31	-	1.69	-	3.14	-	0.002*	-
Marital status	0.11	-0.02	0.79	0.04	0.14	-0.58	0.891	0.561
Graduate qualifications	-0.64	-0.04	0.69	0.03	-0.92	-1.48	0.356	0.138
Income per month	0.13	-0.01	0.72	0.03	0.18	-0.17	0.855	0.864
Financial status	2.78	0.04	0.89	0.04	3.13	1.16	0.002*	0.247
Exercise frequency	-0.45	-	0.95	-	-0.47	-	0.639	-
Years of practice	-1.14	-0.04	1.42	0.06	-0.80	-0.70	0.424	0.486
Ownership of dental clinic	-0.94	0.12	1.84	0.08	-0.51	1.49	0.612	0.136

*p<0.05

Stress-coping strategies

The most common coping strategies which respondents selected were 'spend time with hobbies' (n=510; 87.6%), followed by 'resting/sleeping' (n=464; 79.7%) and 'eating some delicious foods and beverages' (n=398; 68.4%). The least common strategy was 'take some medication to relief stress/anxiety/depression' (n=38; 6.5%) as shown in figure 1.

Discussion

Dentists' stress and correlation between overall and occupational stress

The study found that dentists had a mean SPST score of 45.48±17.16 which indicates a high level of stress, close to the scores of nurses (39.48-49.73±16.21-19.19)[17-19] and bank employees (47.24±0.98)[20], but lower than civil servants in the Revenue Office (54.76±21.17).[21] Considering the proportion of overall stress levels, it was similar to that of the staff at Maharaj Nakorn Chiang Mai Hospital and public sector dentists in Chiang Mai province, as most of the staff members and dentists had moderate to high levels of overall stress.[12,22]

Dentists had moderate to high levels of overall stress, but normal levels of occupational stress. According to Farmer *et al.*[23], there are four main sources of stress: personal, financial, relational, and occupational stress. As a result, it is possible that a dentist who experiences high levels of overall stress also experiences normal levels of occupational stress. However, this study also found a significant, positive correlation between overall stress and occupational stress, similar to previous studies[2-3] (r=0.34-0.68, p<0.001), and it can be said that occupational stress was associated with overall stress in a dentist's life, with work stressors contributing highly to overall stress.[3]

The most stressful stressors for dentists were patient-related, followed by time-related and staff-related or technical-related stressors, similar to Choy & Wong's study.[11] However, the result was different from Myers & Myers's study,[3] which found that the most of stressors were time-related, followed by patient-related and income-related stressors. In contrast, Bhat & Nyathi's study[2] found that the most stressors were job-related, followed by patient-related, income-related, and time-related stressors. In addition, 'patient having a medical

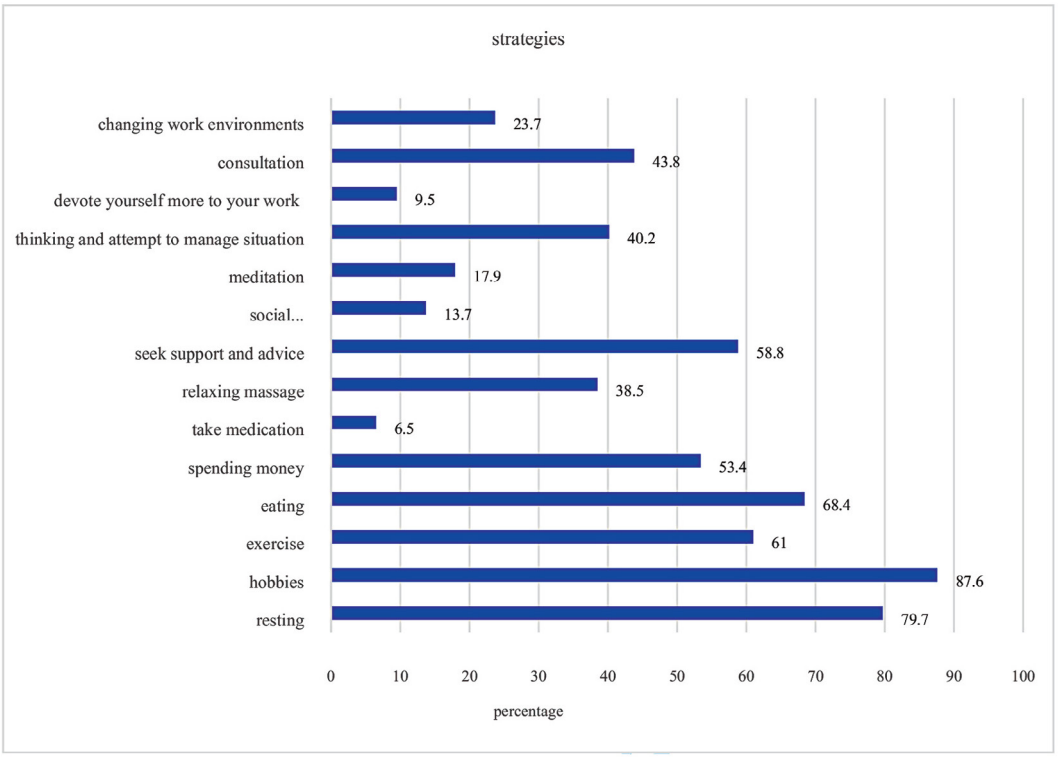

Figure 1. Strategies for coping with stress among dentists (N = 576).

emergency in the surgery' 'risk of medicolegal complications' and 'actually making clinical mistakes' were rated as most stressful by 70.8-92.0% of dentists, which were more than previous studies.[2,3,11] These stressors were shown to be the ones that affected dentists in this study the most.

As explained previously, we will notice that dentists in different countries placed different emphasis on each of the five domains of occupational stressors, depending on several factors or conditions in their countries, including the dental service system, political system, socioeconomic system, law and regulations, morals and beliefs, and social norms, as listed in Robbin's stress model.[24] Therefore, studying stress in dentistry within the context or condition of the country will lead to finding an efficient, direct solution to the issues and an impact at the macro level.

Factors affecting overall and occupational stress

Age was a significant factor affecting overall stress levels among dentists. Each age group of dentists experiences unique life characteristics. According to previous studies, younger dentists have reported being focused on striving to build their skills, knowledge, and confidence. These dentists frequently feared making mistakes, maintained a high standard, and sought to perform all tasks correctly, which required them to work at a slower pace, perhaps at the risk of upsetting patients or colleagues, and have a lower income due to the lower work volume. Most younger dentists thus tended to experience high levels of occupational stress. Younger dentists who worked outside of their hometown also tended to experience high levels of overall stress because they lacked the supportive bonds of family and friends, which made them feel isolated, insecure, and lonely. In addition, younger dentists might experience high levels of occupational stress due to either working in the public sector, which is characterized by strict regulations, low flexibility of work, limited career progression opportunities, and additional tasks beyond treating patients, or being the owner of a dental clinic, which requires management and problem-solving skills.[6,8-11,25] Although dentists who were married reported less stress than dentists who were single[26], but family problems could induce high overall stress levels if these problems resulted in a divorced or bereaved status. In contrast, most dentists who were older had high incomes and a secure financial status, which were two elements that reduced overall stress. Most older dentists had high professional positions, strong decision-making abilities, extensive experience, and the capacity to handle work stressors or unfavorable situations. As a result, most older dentists reported lower occupational stress levels and higher job satisfaction levels. However, most older dentists also reported higher levels of musculoskeletal pain, eye fatigue, and chronic diseases.[8,9,11,25,26] Stress and multi-site musculoskeletal pain often lead to poor sleep, and these three elements together can affect dentists' quality and quantity of work. Older dentists with health problems thus reported experiencing high levels of stress.[4,27]

Having underlying disease was affected in personal life, the results of the current study found that dentists who had underlying disease in every age group reported more stress than dentists without such diseases similar to Meyer's study.[9] One of the factors that influenced how people perceived stress was their current state of physical and mental health. Perceptions of stress and levels of stress tolerance also had an impact on how people reacted to stress, including the coping strategies they chose. Exercise was one of health behaviors that correlated with healthy physical and mental health.[28] There was a study found correlations between health behaviors and occupational stress indicated that high occupational stress was associated with less exercise[3], However, the current study found that exercise frequency was significant to effect overall stress but after adjusting for influences of the confounding variables, there was no correlation between these two factors.

Unhealthy financial status could induce high stress in personal life. Although high-income dentists reported less stress than low- to middle-income dentists[2,9], but the important thing was maintaining a secured financial status, so dentists who had expenses equal to or more than income tended to suffer significant levels of stress. Dentists, who had many children or persons in family under care reported significantly more overall stress than for those who were just caring for a few or none.[2,3] However, the current study, similar to Miron & Colosi's study[28], found that there was no significant correlation between number of persons under care and stress.

According to the findings of the current study discussed above, stressors varied depending on the age group of dentists. Understanding the relationship between age

and other factors could be useful for developing more effective strategic planning to reduce stress in dentists by age group that could more directly resolve this issue. Continuing study after graduated was the factor that reduced occupational stress in younger dentists similar to previous studies.[3,6,8,9,15] Therefore, motivating younger dentists to continue studying after graduated and assisting them to attend seminars, academic conferences, or regular workshops to develop knowledges and skills were effective methods for reduce occupational stress, and could help younger dentists worked confidently, efficiently, and happily. Motivating dentists, especially older dentists and dentists with underlying disease, to exercise or engage in sport activities was one of interesting strategies to help these dentists to be healthy, relief stress, and work happily. Additionally, encouraging dentists of all age groups to have financial literacy was the other one of interesting strategies that could help them maintain a healthy financial status and reduce the stress that comes with financial problems.

Coping strategies used among dentists

The results of a study on coping strategies used among dentists showed that over 50% of dentists use emotional-focused coping strategy similar to previous studies[2,6,28], reported that dentists tended not to apply problem-focused coping strategies for stress management. In contrast to Choy & Wong's study[15] found that the most prevalent method of coping with stress was 'try to control one's own working situation/condition' which was problem-focused coping strategy. However, there were only a few percentages of dentists in the current study selected 'take some medication to relief stress/anxiety/depression' and 'social gathering/smoking/alcohol consumption' as their coping strategy similar to previous studies.[6,16] According to previous studies[1,8,29], dentists should recommended to learn how to concentrate and pay attention to other things, participate in sports and relaxing activities, and strategies for stress prevention and management programs should be provided to dentists, and could be starting early as being a dental student. Providing consultation channels by psychologists was also an interesting strategy that could be used to reduce stress among dentists with severe level of stress.

Limitations and suggestions for future studies

The response rate of the current study was low (<30%) due to challenges in reaching the target population. Online surveys conducted through private dental groups on Facebook or Line may not accurately determine the receivers who have been approached, and online surveys sent to private chats could only be sent to people who have already been contacted. Additionally, the contact information from the Dentistry CMU Alumni Association, including email and postal addresses, was outdated, potentially resulting in some recipients not receiving the survey. To improve the likelihood of reaching the target population and obtaining more precise data, future studies should reassess the methods used to access dentists.

The current study was conducted in context of the COVID-19 pandemic, which has had a profound impact on society, the economy, and people's way of life. So, a follow-up study can be carried out to obtain more accurate results. Moreover, to enable better measures to be developed to address stress at the national level, the future study's scope should be expanded to cover all practicing dentists in Thailand, and to gain a deeper knowledge of the stress and coping mechanisms used by dentists in Thailand, a qualitative study should also be carried out.

Conclusions

The majority of dentists had normal levels of occupational stress, moderate to high levels of overall stress, and occupational stress significantly correlated with overall stress. There were a few factors that affect overall stress after adjusting for influences of the confounding variables. And there were a variety of stress coping strategies that dentists used for stress management. The findings of this study could be useful for strategic planning to prevent and resolve dentists' stress issues in the future.

Acknowledgments

We would like to thank the staff of the Dentistry CMU Alumni Association, all of the quality test experts, and all members of the research ethics committee for their assistance in this study. We would also like to thank all the dentists who participated in the survey.

Conflicts of Interest

The authors declare no conflicts of interest.

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