Prevalence of Burnout and Associated Factors Among Family Medicine Residency in Thailand

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ABSTRACT

OBJECTIVES: To assess the prevalence of burnout and associated factors among family medicine residents in Thailand.

MATERIALS AND METHODS: This cross-sectional study was conducted by all Thai Family Medicine residents year 1 to 3 during February 2019. Self-reported questionnaires, including demographic data, and the Thai version of the Maslach Burnout Inventory were distributed to 703 residents via electronic transmissions, including e-mail, Facebook, and Line instant communication application. Burnout was diagnosed by the following criteria: high-level emotional exhaustion, high-level depersonalization, and low-level personal accomplishment. Factors associated with burnout were explored by the univariate logistic regression model. Multivariate logistic regression analysis was applied to examine the independent risk factors of burnout among Thai Family Medicine residents.

RESULTS: There were 149 residents who participated in this study, with a response rate of 21% (n = 703). As no residents diagnosed with burnout using the proposed criteria, burnout was, therefore, redefined as residents reporting high-level emotional exhaustion and high-level depersonalization. The prevalence of burnout in family medicine residents in this study was 10.74% (95% confidence interval [CI]: 6.26%-16.85%). Our study found that having relationship problems with patients, having relationship problems with colleagues, and having thought of resigning from the training program were independently associated with burnout with odds ratios of 6.93 (95% CI: 1.64-29.27), 6.31 (95% CI: 1.89-21.12), and 4.16 (95% CI: 1.09-15.81), respectively.

CONCLUSIONS: Burnout at high level in emotional exhaustion and high level in depersonalization can occur among family medicine residents. Concerning factors were found to be patient and colleague relationship problems and having thought of resigning from the residency program. Other factors that may contribute to burnout were type of training programs, insufficient income, and family relationship. We recommend that the training institute should be able to monitor residents' stress level and to help prevent those who have burnout and reduce its impact.

KEYWORDS: Burnout, family medicine, residency training

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Introduction

Exhaustion from work or burnout is an emotional condition presented in 3 dimensions: (1) emotional exhaustion (EE): a feeling of exhaustion due to work overload, (2) depersonalization (DP): a sense of inattention and being aloof to the clients or the job and isolation, (3) reduced personal accomplishment (PA): a reduction of the feeling of competency and efficiency at work, a feeling that one is unable to assist or service the clients.[1,2] A past study showed that burnout usually exists in the group of persons who provide social or health care services, eg, health care workers, social workers, police officers, teachers, lawyers, and managers.[3] Medicine is an occupation with a risk of burnout, and its consequence affects the personnel, patients, and organizations. Undergraduate medical training and residency training are high-risk periods for burnout worldwide.[4,5] A study of burnout in pediatrics residency training in England found that trainees with burnout condition had suboptimal patient care attitudes and behaviors which were discharging patients to make the service more manageable, not thoroughly discussing treatment options or answering questions, making treatment or medication errors, ignoring the social or personal impact of an illness and feeling guilty about how a patient was treated.[6]

In Thailand, the research of Srikam et al[7] found that 5.63% of residents had burnout condition. Also, residents who practiced in specialties, ie, internal medicine, pediatrics, surgery, obstetrics and gynecology, and orthopedics, were found to have high risk at burnout than those in others specialties, ie, ophthalmology, otolaryngology, radiology, rehabilitation medicine, anesthesiology, psychiatry, pathology, forensic medicine, preventive and social medicine, and outpatient clinic. The family medicine residency

training program in Thailand differs in educational systems. There are 3 pathways to obtain Diploma of the Thai Board of Family Medicine which are (1) formal family medicine residency training, for which the trainees study formal training program; (2) in-service training, for which the trainees parallelly study while practicing medicine; and (3) physician practicing in primary care for a period of 5 years may apply for the examination. Regarding the first 2 pathways, the trainees must enter the training program, which is different in teaching and mentoring. Family medicine training in Thailand is not popular among newly graduated physicians due to reasons such as acceptance, income, and job description. Also, the trainees need to study a range of disciplines because of the need to care for patients of different background, age groups, and cultures requiring a lot of knowledge and skills. Residents rotate in many departments as assigned by institute and usually are in contact with other specialist physicians who sometimes had high expectation for family physician trainees to practice like them. These learning may unintentionally pressure trainees. Furthermore, the Ministry of Public Health has been instructed to accelerate the production of family doctors to serve the general population at the country. New training institutes have been opened with a limited resources which include number of staffs. One qualitative research surveyed family medicine residents in Canada, using the Maslach Burnout Inventory (MBI), indicated that contributory factors were high workload, burnout colleagues, perceived undervaluing of family medicine, lack of autonomy, and inability to achieve work-life balance.[8] Therefore, our research aimed to study burnout and its associated factors for family medicine residents in Thailand which included physicians in formal family medicine residency training and physicians in in-service training for family medicine diploma to find out the burnout condition and its related elements to be used as a guideline for improvement of the family medicine training system and prevention of problems of the family medicine residents, training institutes, and the patients.

Materials and Methods

This study had received ethical approval by the Committee for Research, Faculty of Medicine, Ramathibodi hospital, Mahidol University (COA. NO. MURA2018/1000). This cross-sectional study had been conducted in family medicine residents of 2 pathways, including both formal and in-service training programs. Residents during the academic year of 2018 were eligible for this study, excluding those who were not willing to participate. Data were collected using self-reported questionnaires via electronic transmissions which were e-mail, Facebook, and Line instant communication application from February 1 to 14, 2019. Demographic data, including age, sex, marital status, and history of depression; academic information, including grade point average (GPA), training institute, graduated institute; and the number of years of practice following obtaining Doctor of Medicine degree were collected. Information about workload (weekly working hours, extra weekly working hours, studying/academic hours during nonoffice hours, and daily sleeping hours), problems about expense, personal relationship and training program (reasons for study selection, training obstacles, and thought of resigning from family medicine residency program) were also obtained.

Burnout during the residency training program was assessed using Maslach Burnout Inventory–Human Services Survey (MBI-HSS) which is reliable and widely used, Thai translation version by Sammawart.[9] This survey consists of 22 questions in 3 dimensions, including (1) EE, (2) DP, and (3) PA. Each question was graded in 7 levels using the Likert-type scale, ranging from 0 to 6 points. Points of each dimension were accumulated and then were classified as low, medium, and high tiers. Emotional exhaustion was classified as low ($<$17 points), medium (17-26 points), and high ($\geq$27 points). Depersonalization was classified as low ($<$7 points), medium (7-12 points), and high ($\geq$13 points). Personal accomplishment was classified as high ($<$32 points), medium (32-38 points), and low ($\geq$39 points). Burnout was defined as having high EE score and high DP score combined with low PA score. If there were no residents diagnosed with burnout using the proposed criteria (high EE and DP and low PA), burnout was, therefore, redefined as having high EE and DP points. As in the study by peer-reviewed reporting, primary data on burnout among residents indicated that a high subscale in EE or DP is considered indicative of clinically significant burnout.[10] Other previous study considered using validated 2-item measure for the EE and DP items[11] showed a strong correlation with the overall MBI and it can differentiate burnout person.[12]

Statistical analysis

Continuous data were presented as mean and standard deviation if the data were normally distributed; otherwise, they were presented as median and range. Categorical data were presented as frequency and percentage. The prevalence of burnout and a 95% confidence interval (CI) among family medicine residents were estimated by dividing the number of residents having burnout with the number of total participants.

Possible factors associated with burnout (eg, demographic data, history of depression, GPA, workload, financial, relationship, and training problems) were explored using the univariate logistic regression analysis. Factors having a *P* value of less than .1 from univariate logistic regression were considered in multivariate logistic regression analysis to assess the independent association between those factors and burnout. A *P* value of less than .05 was considered as the level of significance. STATA program version 15 was used for all statistical analyses.

Results

The questionnaires of demographic data and Thai MBI-HSS were distributed to a total of 703 residents of both formal (252 physicians) and in-service (451 physicians) family medicine trainees, of which 149 (21%) responded and were willing to participate the study. Demographic data of participants in the study are presented in Table 1.

Table 1. Demographic data of participants.

FACTORS	N	%
Gender		
Male	46	30.87
Female	100	67.11
Unspecified	3	2.01
Age, y	28.29 (2.59)[a]	
Status		
Single	56	37.58
Dating/in a relationship	70	46.98
Married without children	18	12.08
Married with children	5	3.36
Divorced/widowed	0	0
Training program		
Formal family medicine residency training	88	59.06
In-service training for family medicine diploma	61	40.94
Year		
1	26	17.45
2	60	40.27
3	63	42.28
Grade point average		
2.00-2.49	4	2.68
2.50-2.99	44	29.53
3.00-3.49	83	55.70
3.50-4.00	18	12.08
Years of practice after obtaining Doctor of Medicine degree	3 (0-7)[b]	
Average hours of work per week	40.47 (15.40)[a]	
Average extra hours of work per week (on duty)	16 (0-90)[b]	
Studying/academic hours during nonoffice hours	5 (0-40)[b]	
Average hours of sleep per day	6.54 (0.96)[a]	
The problem of insufficient income against family burden/debt		
Without the problem	76	51.01
With the problem	73	48.99
Small problem	48	32.2
Moderate problem	24	16.1
Severe problem	1	0.7
Relationship/personal problem		
Without the problem	92	61.70
Problem with executive/supervisor/teacher/advisor	17	11.41
Problem with colleague	29	19.46
Problem with patient	14	9.40
Problem with family member/spouse/lover	28	18.79
Thought of resigning from residency program		
No	85	57.05
Yes	64	42.95
Depression history		
No	132	88.59
Yes	17	11.41
Overall life happiness points (%)	73.23 (14.02)[a]	

[a]Mean (SD).
[b]Median (range).

Most of the participants were women (67%), and the mean age was 28.29 (SD: 2.59) years. Marital status of most participants was described as dating/in a relationship, while being single, married with no children, and married with child(ren) are minor groups. Most of the participants were in formal family medicine residency training (88 participants [59.06%]), with a majority being third-year trainees. Most of their graduated GPA was in the range of 3.00 to 3.49 (55.7%). The average hours of work per week were 40.47 (SD: 15.40) hours, average extra hours of work per week (on duty) were 16 (range: 0-90) hours, and average hours of sleep per day were 6.54 (SD: 0.96) hours. The problem of insufficient income against family burden/debt with moderate to severe problems was 16.8%. Relationship/personal problem was 38.3%, 64 physicians had thought of resigning from the residency program, and overall life happiness points were 73.23%.

Prevalence of burnout

The percentages of the burnout level of each category are illustrated in Table 2. The participants scored high EE (33.56%), high DP (14.09%), and low PA (1.34%). As there were no residents diagnosed with burnout using the proposed criteria (high EE and DP and low PA), burnout was, therefore, redefined as having high EE and DP points. There were 16 of 149 residents who were diagnosed with burnout. Accordingly, the prevalence of burnout among family medicine residents was 10.74% (95% CI: 6.26%-16.85%).

Burnout-associated factors

According to the univariate logistic regression analysis (Table 3), in-service training program, having relationship problems with advisors, having relationship problems with colleagues, having relationship problems with patients, having relationship problems with family members, having financial problem, extra hours of work per week, having thought of

Table 2. Three dimensions of burnout.

DIMENSIONS OF BURNOUT	BURNOUT LEVEL			MEAN (SD)	MEDIAN (RANGE)
	LOW	MEDIUM	HIGH		
	N (%)	N (%)	N (%)		
EE	53 (35.57)	46 (30.87)	50 (33.56)	21.68 (10.80)	–
DP	87 (58.39)	41 (27.52)	21 (14.09)	–	6 (0-28)
PA	2 (1.34)	4 (2.68)	143 (95.97)	–	11 (0-45)

Abbreviations: DP, depersonalization; EE, emotional exhaustion; PA, personal accomplishment.

Table 3. Factors affecting burnout through univariate logistic analysis.

FACTORS	OR	95% CI	*P* VALUE
Gender			
Male	1		
Female	0.66	0.21-1.98	.434
Unspecified	3.33	0.26-42.65	
Age	0.91	0.72-1.14	.373
Status			
Single	1		
Dating/in relationship	1.50	0.47-4.78	.734
Married	0.97	0.17-5.41	
Training program			
Formal family medicine residency training	1		
In-service training for family medicine diploma	3.70	1.20-11.11	.017
Year			
1	1		
2	5	0.61-41.28	.126
3	2.16	0.23-19.40	
Grade point average			
2.00-2.49	1		
2.50-2.99	0.67	0.05-6.28	.207
3.00-3.49	0.19	0.02-2.20	
3.50-4.00	0.60	0.05-3.20	
Years of practice after obtaining Doctor of Medicine degree	0.89	0.56-1.41	.621
Average hours of work per week	1.00	0.97-1.04	.924
Average extra hours of work per week (on duty)	1.02	1.00-1.05	.121
Studying/academic hours during nonoffice hours	0.96	0.87-1.06	.383
Average hours of sleep per day	1.07	0.61-1.88	.803

(Continued)

Table 3. (Continued)

FACTORS	OR	95% CI	*P* VALUE
The problem of insufficient income against family burden/debt			
Without the problem	1		
With the problem	5.27	1.44-19.36	.005
Relationship/personal problem			
Without the problem	1		
Problem with executive/supervisor/ teacher/advisor	3.08	0.87-10.94	.104
Problem with colleague	10	3.25-30.73	.000
Problem with patient	9.38	2.72-32.37	.001
Problem with family member/spouse/lover	3.03	1.00-9.19	.061
Thought of resigning from residency training			
No	1		
Yes	4.67	1.43-15.27	.006
Depression record			
No	1		
Yes	3.08	0.87-10.94	.104
Overall life happiness points (%), mean (SD)	0.97	0.94-1.00	.044

Abbreviations: CI, confidence interval; OR, odds ratio.

resigning from the training program, history of depression, and the level of overall life happiness score of *P* value less than .15 were considered in multivariate logistic regression (Table 4).

Having problems with patients, having problems with colleagues, and having thought of resigning from the training program were found to be independently associated with burnout from multivariate logistic regression analysis with odds ratios (ORs) of 6.93 (95% CI: 1.64-29.27), 6.31 (95% CI: 1.89-21.12), and 4.16 (95% CI:1.09-15.81), respectively. The results suggested that residents who reported relationship problems with patients and relationship problems with colleagues were 6.93 and 6.31 times more likely to have burnout than residents who did not report these problems. In addition, residents who had thought of resigning from the training program had 4.16 times higher chance of having burnout than residents who did not have this thought.

Discussion

The results of our study show that the prevalence of burnout in family medicine residents in Thailand was 10.74% (95% CI: 6.26%-16.85%). In addition, our study found that having relationship problems with patients, having relationship problems with colleagues, and having thought of resigning from the training program were independently associated with burnout with ORs of 6.93 (95% CI: 1.64-29.27), 6.31 (95% CI: 1.89-21.12), and 4.16 (95% CI:1.09-15.81), respectively.

Our findings differed from the research of Srikam et al[7] that studied the prevalence of burnout in all residency training programs at King Chulalongkorn Memorial Hospital, Thailand. This study found that the prevalence of burnout in residents was 5.63%, which was lower than the prevalence of burnout in family medicine residents found in our study. This difference may come from the different criteria used to diagnose burnout between researches. In the previous study, all 3 dimensions were applied to indicate burnout, whereas our study used only 2 dimensions due to no participant met all criteria. Consequently, our study found more prevalence of burnout than the previous study, which applied more strict criteria than our study. Also, our study collected the data from only family medicine residents, whereas the previous study considered residents from all specialties training programs. The average working hours per week of our study were at 40.47, which is close to the number 46.03 in the previous study.[7] As for extra working hours (on duty) of 16 hours per week, such number was a result of differences in learning schedules among hospitals and training institutes. Sleep hours in our study were at an average of 6.54 hours per day, which may slightly low.

However, our result is similar to the finding in one research in Europe,[13] "Burnout in European family doctors: the EGPRN study," which found 12% of all participants scored high for all 3 dimensions of burnout. Among the family medicine residents from 12 European countries participating in the research, had worked 45.9 hours per week and 2.3 nights per

Table 4. Factors affecting burnout through multivariate logistic analysis.

FACTORS	OR	95%CI	*P* VALUE
In-service training for family medicine diploma	2.66	0.63-11.15	.180
Average extra hours of work per week (on duty)	1.01	0.97-1.04	.698
The problem of insufficient income against family burden/debt	2.55	0.48-13.60	.272
Problem with executive/supervisor/ teacher/advisor	0.79	0.13-4.74	.797
Problem with colleague	6.31	1.89-21.12	<.001
Problem with patient	6.93	1.64-29.27	<.001
Problem with family member/spouse/lover	1.20	0.27-5.32	.813
Thought of resigning from residency training	4.16	1.09-15.81	<.001
Depression record	1.46	0.25-8.70	.676
Overall life happiness points	1.00	0.95-1.05	.936

Abbreviations: CI, confidence interval; OR, odds ratio.

month. There were 86.1% of the participants who had less than 8 hours sleep per day. These might be the trend of burnout in family medicine training in many areas.

According to low response rate, the lowest responders were first-year residents which had only 26 participants. They might face higher workload and stress and have higher risk for burnout than the residents of other years. The results had a possibility that residents experiencing greater burnout were less likely to respond to questionnaire, and therefore it was likely that generalizability was low for family medicine residents. In our research, most participants (59.06%) were physicians in formal family medicine residency training and were mostly third-year trainees. Most participants had been practicing medicine for 3 years following obtaining a Doctor of Medicine degree. The years of internship work depended on each training institute needed. In-service training for family medicine diploma had a higher possibility of burnout when compared with formal training with OR of 3.70 (95% CI: 1.20-11.11) but not significant in the multivariate logistic analysis. The reasons for high proportion may come from different working experiences, learning curriculum, mentoring and supporting systems. Most participants (88.59%) did not have a history of depression. It was a trend similar to the data of life happiness points, which were at an average of 72.23%, which was supposedly well. On the contrary, it means that the remaining participants had depression, which is a condition that needs close monitoring as it can lead to burnout. However, in this study, we are unable to identify the causation, depression symptom, its severity, type, and level.

As for problem and relationship data, most of the participants had neither a problem of insufficient income against family burden/debt nor personal or relationship problems. Such evidence confirms with the study of Srikam et al,[7] which found that most residents had sufficient income and saving with a little family burden.

According to the univariate logistic regression analysis (Table 3), in-service training program; having relationship problems with advisors, colleagues, patients, or family members; having financial problem; extra hours of work per week; having thought of resigning from the training program; history of depression; and the level of overall life happiness score of *P* value less than .15 were considered in multivariate logistic regression (Table 4). However, these were not statistically significant in multivariate logistic regression. These might be caused by participants being too low in number, or the persons who had burnout syndrome did not want to participate in this study.

Comparing with the research of Srikam et al,[7] the result of multiple logistic regression analysis showed that factors significantly related to burnout were medium/high family burden, the first year in residency training, major specialties, feeling of too little/too much paperwork, insufficient sleeping hours, job dissatisfaction, thought of resignation from the residency training and on-duty hours. On the contrary, there is also a burnout study among medical doctors in the South Thailand Insurgency by J Pitanupong and C Jatchavala, which uses Maslach Burnout Criteria, which found out that there were up to 99.6% of burnout syndrome. Physicians in minor specialties had risk toward EE and DP more than those in major specialties.[14]

The ability to identify concerning factors, causes, or tendencies of occurrence will lead to monitoring, prevention, and timely provision of supports to suffering physicians. We see that there should be an assessment for burnout in residencies and general physicians, including public health personnel, who are prone to burnout, so that when burnout occurs, the mitigation of effects toward the physician himself or herself, colleagues, teachers, supervisors, and the patients become possible. According to the research, things to be cautiously monitored are as followings:

For training programs, relations between the training program and burnout were found. Physicians in in-service training for family medicine diploma were 3.70 times more at risk of

having burnout than those in formal residency training (OR: 3.70; 95% CI: 1.20-11.11). The result indicates that the program has an effect on burnout condition and that instructors need to observe, monitor, and assess both their residents and the curriculums designed.

For the problem of insufficient income against family burden/debt, relations between the existence of insufficient income against family burden/debt problem and burnout were found. Participants with insufficient income against family burden/debt problems are 5.27 times more at risk of having burnout than those without the problem (OR: 5.27; 95% CI: 1.44-19.36). Being a doctor is one of the professions with most income in Thailand, but some family medicine trainees are still suffering financially which may be due to financial management or insufficient remuneration.

A problem with surrounding people, such as colleagues, patients, instructors, or supervisors, bears relation to burnout. A practice of communication and social skills during training may help the trainees to adjust themselves better.

The assessments of life happiness and thought of resigning from the training can be simple questions that indicate burnout as statistical relations exist. The reasons behind thought of resigning varied, eg, disliking the field of study, disliking the class atmosphere, having relationship problems with colleagues or family members, and burnout which is also an important reason. Having thought of resigning from the program may be a first sign indicating that a physician is suffering from burnout.

Strength

This research collected data from all family medicine trainees in Thailand. They may access the questionnaire from the Internet at all times. The standard MBI-HSS was used. No previous data of burnout in this field of training were shown.

Limitation

In this research, 149 participants (21.19%) have responded to the questionnaires from a total of 703 participants. On comparison with the questionnaire response rate of 55.74% in the research of Srikam et al[7] in Thailand, we presume that the less response rate resulted from the use of electronic media, which was more difficult for the responders to provide detail and, also the requirement to fill out and transmit the questionnaires was time-consuming. Such evidence confirms with the finding in the research of Daikeler et al,[15] which found that web surveys questionnaire received only 13% response rate, which was the least number when compared with other means such as phone and letter questionnaires.

This research is a cross-sectional study, which collected data of the participants at a specified period. The identification for mutual causation was not possible, and there could be many confounding factors. The results may differ should there be an increase in response rate, a change in a data collection period, or utilization of test-retest reliability data collection approach.

Further researches

It might be an adjustment of the research approach from the cross-sectional study to the mixed-methods study, ie, by adding qualitative study such as personal information, depression record, relationship problem, financial problem so that qualitative analysis results are also gained. Alternatively, the prospective cohort study can be used to tell the relations of risk factors toward burnout. Additional points to be further studied are the relations between burnout and personality, burnout and learning environment, and the relations of burnout and the residency program in each medical specialist and each institution.

Conclusions

Burnout is a condition that possibly occurred among residencies. On considering the condition in the aspects of high EE and high DP levels, concerning factors were found to be personal/patient and colleague relationship problems and having thought of resigning from the residency program. Others possible concerning factors were training programs, insufficient income against family burden/debt, and family relationship. An ability to identify the related causes, factors, or the tendency for burnout will lead to monitoring, prevention, and timely support provision to physicians suffering so that the effect is reduced.

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Author Contributions

AC: conception or design of the work, data collection, data analysis and interpretation, drafting the article.
TA: conception or design of the work, data analysis and interpretation, drafting the article.
RK: data collection, data analysis and interpretation.
PP: conception or design of the work, data analysis and interpretation, drafting the article, Critical revision of the article, final approval of the version to be published.

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REFERENCES

1. Sereesitthipitak V. Burnout: definition, inventory, prevention and intervention. *J Somdet Chaopraya Inst Psychiatry*. 2007;1:121-130.
2. Maslach C, Jackson SE, Leiter MP. Maslach burnout inventory. In: Zalaquett CP, Wood RJ, eds. *Evaluating Stress: A Book of Resources*. 3rd ed. London, England: The Scarecrow Press; 1997:191-218.

3. Lastovkova A, Carder M, Rasmussen HM, et al. Burnout syndrome as an occupational disease in the European Union: an exploratory study. *Ind Health*. 2018;56:160-165.
4. Lyndon MP, Henning MA, Alyami H, Krishna S, Yu TC, Hill AG. The impact of a revised curriculum on academic motivation, burnout, and quality of life among medical students. *J Med Educ Curric Dev*. 2017;4:2382120517721901. doi:10.1177/2382120517721901.
5. Romcevich LE, Reed S, Flowers SR, Kemper KJ, Mahan JD. Mind-body skills training for resident wellness: a pilot study of a brief mindfulness intervention. *J Med Educ Curric Dev*. 2018;5:2382120518773061. doi: 10.1177/2382120518773061.
6. Baer TE, Feraco AM, Tuysuzoglu Sagalowsky S, Williams D, Litman HJ, Vinci RJ. Pediatric resident burnout and attitudes toward patients. *Pediatrics*. 2017;139:e20162163.
7. Srikam S, Jiamjarasrangsi W, Lalitanantpong D. Job burnout and related factors among residents of King Chulalongkorn Memorial Hospital. *J Psychiatr Assoc Thailand*. 2014;59:139-150.
8. Rutherford K, Oda J. Family medicine residency training and burnout: a qualitative study. *Can Med Educ J*. 2014;5:e13-e23.
9. Sammawart S. *Burnout among nurses in Ramathibodi Hospital* [master's thesis]. Bangkok, Thailand: Faculty of Medicine Ramathibodi Hospital, Mahidol University; 1989. [in Thailand]
10. Thomas NK. Resident burnout. *JAMA*. 2004;292:2880-2889. doi:10.1001/jama.292.23.2880.
11. West CP, Shanafelt TD, Kolars JC. Quality of life, burnout, educational debt, and medical knowledge among internal medicine residents. *JAMA*. 2011; 306:952-960. doi:10.1001/jama.2011.1247.
12. Shanafelt TD, Boone S, Tan L, et al. Burnout and satisfaction with work-life balance among US physicians relative to the general US population. *Arch Intern Med*. 2012;172:1377-1385. doi:10.1001/archinternmed.2012.3199.
13. Soler JK, Yaman H, Esteva M, et al. Burnout in European family doctors: the EGPRN study. *Fam Pract*. 2008;25:245-265.
14. Pitanupong J, Jatchavala C. A study on the comparison of burnout syndrome, among medical doctors in the restive areas and non-restive areas of the South Thailand insurgency. *J Health Sci Med Res*. 2018;36:277-289.
15. Daikeler J, Bosnjak M, Manfreda K. Web surveys versus other survey modes—a meta-analysis comparing response rates. http://rgdoi.net/10.13140/RG.2.1.2247.6402. Published March, 2016.