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## Stress and Stress Coping Strategies among Foreign Bachelor's Medical Interns in Bangkok Metropolitan Administration (BMA) Hospitals

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# Stress and Stress Coping Strategies Among Foreign Bachelor's Medical Interns in Bangkok Metropolitan Administration (BMA) Hospitals

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## Abstract

**Background:** Stress among medical personnel is crucial, as it can cause the adverse health outcome to individuals who suffer from the stress as well as their clinical practice performance, which may cause serious outcomes to patients. This study focuses on the interns who received their medical degree overseas because they may have more stress due to their required clinical work and license examination. We conducted our study to determine the stress level, coping strategies, and associated factors among foreign bachelor's medical interns in Bangkok, Thailand.

**Method:** A cross-sectional study design was conducted among 49 interns from Bangkok Metropolitan Administration Hospitals. Stress was assessed using the Suanprung stress test and the Brief COPE inventory (Thai version). Descriptive analysis, Chi-square tests, and multiple linear regression analysis were used to investigate the association between stress, coping strategies and other potential factors.

**Results:** The prevalence of problematic stress among foreign bachelor's medical interns was 69.4%. Factors associated with problematic stress were being female ( $p = 0.047$ ) and having a lower monthly income ( $p < 0.001$ ). These medical interns predominantly used adaptive coping strategies (acceptance, active coping, and planning), rather than maladaptive coping strategies (self-distraction, self-blame, and venting). Practicing religion and being on duty in certain departments had significant associations with adaptive coping strategies, whereas high stress levels were significantly associated with maladaptive coping strategies.

**Conclusion:** This is the first study in Thailand to evaluate coping strategies in these medical interns. These interns are recognized as vulnerable to the negative effects of stress.

**Keywords:** Foreign bachelor's medical interns, Stress, Coping strategies

## 1. Introduction

Stress is an emotional state that causes uneasiness in the face of problems, which can occur in everyday life [1]. Stress can be especially severe for medical-related professionals [2–4]. An appropriate stress level helps doctors or medical students be more motivated, encourages active learning, and promotes task achievement. On the contrary, accumulated unmanageable stress leads to various health problems such as headaches, chest tightness, abdominal pain, and sleeping difficulty. Moreover, unmanageable stress also brings severe health conditions such as hypertension, obesity and diabetes. Overwhelming

stress can also result in the occurrence of psychiatric disorders such as depression, anxiety, and lack of focus, which negatively affect learning and the ability to provide effective care for patients. In addition, intense stress leads to low self-esteem, lack of self-development, and problems in relationships with co-workers and family. However, appropriate coping strategies for stress can help doctors and medical students alleviate the tension, as well as mental and physical problems arising from stress. In contrast, if coping strategies are inappropriate, stress and its negative consequences can be more serious [5–7].

A study conducted in Bangladesh indicates that 55% of medical students suffer from high stress

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levels [8]. This finding is consistent with studies in Thailand which suggest that as many as 55.8% and 46.7% of medical students from the northeastern and southern regions of Thailand, respectively, encounter morbid stress [9,10]. According to previous studies, the major causes of stress in medical students include intense classes, long study periods, frequent examinations, highly competitive situations, and the absence of regular breaks [11,12]. In comparison, only 34.9% of junior doctors report experiencing high stress level during their internship training [13]. The leading causes of high stress levels in the latter population are heavy workloads, duties caring for critically ill patients, and insufficient sleep from continuous night shifts [14]. In both populations, being female is associated with high stress levels [15–17]. Fortunately, many doctors and medical students use adaptive coping strategies, such as active coping, planning, and use of emotional support, rather than maladaptive coping strategies to manage stress [17,18].

Medical interns who graduated from overseas and decided to return to practice medical professions in Thailand are a group of medical personnel with high stress levels. This stress occurs because they must pass the examination of knowledge and competency in medicine or the National Licensing Examination (NLE) according to the required standard of the Medical Council of Thailand similar to medical students who graduated in domestic Thai institutions. The 3-step examination includes basic medical sciences (NLE step 1), clinical sciences (NLE step 2), and clinical skills and procedure examination (NLE step 3). Step 3 includes an objective structured clinical examination (OSCE), long case examination, and modified essay questions. Domestically graduated Thai medical students take each examination after each learning course. Thai medical students take the NLE step 1 examination after finishing 3rd year pre-clinical classes. Then, they take the NLE step 2 examination during clinical years. Finally, they take the NLE step 3 examination after finishing the clinical years or in their 6th year. In contrast, internationally graduated medical interns must complete all three steps of NLE after graduation [19]. They are required to review pre-clinical and clinical courses and complete at least 1-year training at medical institutions in Thailand [20]. In addition, internationally graduated medical interns have to cope with socioeconomic conditions and differences in practice in new workplaces, which can lead to higher stress levels.

Coping strategy is important to help individual dealing with their stress. Improper coping strategy such as self-blame or substance use may cause

adverse consequence to intern as well as patient under their care. Nganvivattavorn et al. [21] found that 12.6% of foreign bachelor's medical interns in Thai Police General Hospital had high stress levels, as well as lack of clinical knowledge and skills. This study also found that poor relationships among co-workers was associated with high to severe stress levels. However, the study did not take the coping strategy into account. To our knowledge, there have been limited studies on coping strategies of this group, the highly crucial factors related to stress levels, or the mental and physical issues caused by stress. As a result, the purpose of this study is to investigate the prevalence of stress, coping strategies, and contributing factors among internationally graduated medical interns in Thailand. The results expected to be the baseline for further study and implementation of stress coping guideline for this group of population.

## 2. Methods

### 2.1. Study design and population

A cross-sectional study was conducted among foreign bachelor's medical interns from Bangkok Metropolitan Administration (BMA) hospitals. The target hospitals were purposively selected from 11 BMA hospital network. Among 11 BMA hospitals, there are 3 hospitals which provide an accredited 1-year training program for foreign bachelor's medical interns. They include Klang Hospital, Taksin Hospital, and Sirindhorn Hospital. Therefore, all foreign bachelor's medical interns in BMA hospitals are working in these 3 hospitals.

In total, there were 49 medical interns who received their medical degree overseas and were in training programs at BMA hospitals at the time of our study. The training period of all subjects started in November 2021. All medical interns were agreed to participate and complete the questionnaire. We conducted this study from April 2022 to May 2022.

The study protocol was approved by the Bangkok Metropolitan Administration Ethics Committee for Human Research (No. S004h/65\_EXP).

### 2.2. Data collection

All target population were included in the study and were made an appointment to be informed the purpose and objective of the study by the third person, who was no conflict of interest. Four to five medical interns were divided per appointment time in each hospital to reduce large group gatherings in accordance with the COVID-19 pandemic prevention

measures. We assured that the identities of all interns participating in this study would be kept anonymous and that all responses to the questionnaire would be confidential. Interns who gave consent to participate in the study were informed about the questionnaires' instructions and returning process.

The questionnaire comprised of demographic characteristics, the 20-item Suanprung stress test (SPST-20), and the Brief COPE (Thai version) to determine coping strategies.

*The Suanprung stress test (SPST-20)* was used to assess participants' stress levels for the last six months. The self-reported questionnaire consisted of 20 items, rated on a 5-point Likert scale: "1" (no stress) to "5" (extremely high stress). The total possible score was between 20 and 100. We classified the total score into four different levels: 20 to 23 as "mild," 24 to 41 as "moderate," 42 to 61 as "high," and more than 61 as "severe" stress. "high" to "severe" stress levels were classified as "problematic stress" because these stress levels cause physical and mental health problems that may require further assistance. "mild" and "moderate" stress levels were classified as "non-problematic stress". This questionnaire had an overall Cronbach's alpha greater than 0.7 [22].

*The Brief COPE inventory (Thai version)* was used to assess the different ways in which people responded to stress. The Brief COPE inventory has 28 items to identify distinct aspects of adaptive coping strategies and maladaptive coping strategies. The aspects were divided into 14 subscales, with 2 items in each subscale. Adaptive coping strategies involved flexible approaches to solve problems and manage related emotions. They include 8 subscales: active coping, planning, using instrumental support, acceptance, emotional support, positive reframing, humor, and religion. Adaptive coping strategies are associated with greater competence and fewer mental health problems. On the other hand, maladaptive coping strategies involved behaviors that are less constructive and fruitful. They include 6 subscales: denial, self-distraction, substance use, behavioral disengagement, venting, and self-blame. Maladaptive coping strategies are risk factors for poorer physical and mental outcomes. Each item was rated on a Likert scale ranging from 1 to 4, with 1 representing "I haven't been doing this at all" and 4 representing "I have been doing this a lot." Each subscale ranged from 2 to 8, with a higher score indicating a higher frequency of coping behaviors with stress. If the total score of the subscales of either adaptive or maladaptive coping strategies is higher, it indicates that the coping strategies are more frequently used in dealing with stress. Likewise, if the total score of the

subscales of any types of coping strategies is lower, it shows that the strategies are less frequently chosen. The Cronbach's alpha for this self-administered questionnaire was 0.7 [23].

### 2.3. Data analysis

Descriptive statistics were used to describe the demographic factors, stress levels, and coping strategies. The Chi-square test and Fisher's exact test were used to test for the association between stress levels and possible related factors including demographic characteristics. Simple linear regression analysis was used as the first step to assess whether any of demographics and stress levels associate with coping strategies score. The independent variables with statistical associations with coping strategies score of  $p < 0.2$  were then taken into the next step of analysis. Multiple linear regression was used to analyze the association between independent variables from the first step of the analysis and coping strategies score. The variables with an observed association of  $p < 0.05$  in multiple linear regression analysis were considered statistically significant. All statistical analyses were performed using the software program SPSS for Window version 18.0 (SPSS Inc., Chicago, Ill., USA).

## 3. Results

### 3.1. Demographic characteristics

A total of 49 foreign bachelor's medical interns participated the study (Table 1). A majority of the subjects were female (83.7%). Among participants, 38 (77.6%) were between 21 and 30 years old. About half (51%) were single. Most medical interns graduated from Asian countries (85.7%). Among these, 20 (40.8%) obtained medical degrees from China, and 16 (32.7%) from the Philippines (data not shown). A majority of interns (73.5%) had a cumulative GPA (GPAX) greater than 3. Regarding finances, these interns did not receive regular salaries because they were not permanent hospital personnel. Therefore, they received minimal monthly income compared to other hospital personnel. Our results suggested that slightly more than two-thirds of the participants (67.3%) had monthly income less than 15,000 Thai baht (THB) and a majority had financial liabilities in the form of debt (65.3%).

### 3.2. Stress level and related factors

The majority of foreign bachelor's medical interns (69.4%) had problematic stress (Fig. 1). The average

Table 1. Demographic characteristics of foreign bachelor's medical interns at Bangkok Metropolitan Administration (BMA) hospitals in 2022 (n = 49).

Demographic characteristics	Frequency (%)
<b>Gender</b>	
Male	8 (16.3)
Female	41 (83.7)
<b>Age (years)</b>	
21–30	38 (77.6)
31–40	11 (22.4)
<b>Religion</b>	
Buddhism	39 (79.6)
Christianity	1 (2)
Islam	8 (16.3)
Other	1 (2)
<b>Marital status</b>	
Single	25 (51)
In a relationship	22 (44.9)
Married	2 (4.1)
<b>Domicile</b>	
Bangkok	18 (36.7)
Provincial town	31 (63.3)
<b>Medical illness</b>	
No	38 (77.6)
Yes	11 (22.4)
<b>Psychiatric illness</b>	
No	45 (91.8)
Yes	4 (8.2)
<b>Country of medical graduation</b>	
Asia	42 (85.7)
Other	7 (14.3)
<b>Grade point average</b>	
≤3.00	13 (26.5)
>3.00	36 (73.5)
<b>Duration after graduation (years)</b>	
≤1	27 (55.1)
>1	22 (44.9)
<b>Monthly income (Thai Baht)</b>	
≤15,000	33 (67.3)
>15,000	16 (32.7)
<b>Indebtedness</b>	
No	17 (34.7)
Yes	32 (65.3)
<b>Result of National Licensing Examination Step1 (Basic Medical Sciences)</b>	
Passed	13 (26.5)
Failed	29 (59.2)
Unverified	7 (14.3)
<b>Result of National Licensing Examination Step 2 (Clinical Sciences)</b>	
Passed	7 (14.3)
Failed	17 (34.7)
Unverified	25 (51)
<b>Current working department</b>	
Internal medicine	9 (18.4)
Pediatrics	7 (14.3)
Obstetrics and gynecology	3 (6.1)
Surgery	5 (10.2)
Orthopedic	11 (22.4)
Other	14 (28.6)
<b>Institute</b>	
Klang Hospital	24 (49)
Taksin Hospital	9 (18.5)
Sirindhorn Hospital	16 (32.7)

stress score was  $53.79 \pm 18.06$  (mean  $\pm$  SD). We described the association between general demographic characteristics and problematic stress (Table 2). The results suggested that being female and having low monthly income were significantly associated with experiencing problematic stress among foreign bachelor's medical interns ( $p < 0.05$ ). Indebtedness showed a marginal association with problematic stress ( $p = 0.052$ ).

The participants also reported that their main sources of stress included lack of knowledge and clinical skills (57%), heavy and inflexible workload (22%), and poor relationships with colleagues such as medical staff, residents, and nurses (8%).

### 3.3. Coping strategies and related factors

According to their responses, the interns used various types of coping strategies, including both adaptive and maladaptive strategies, to deal with their stress. The average score of adaptive and maladaptive coping strategies were  $5.75 \pm 0.90$  and  $4.21 \pm 0.86$  (mean  $\pm$  SD), respectively. The adaptive type included acceptance, active coping, and planning, while the maladaptive type includes self-distraction. The maladaptive coping strategies such as substance use and denial were less common among the medical interns. More detail of each coping strategy is illustrated in Fig. 2.

Simple linear regression analysis was used to evaluate the preliminary association between demographic characteristics and coping strategies (Table 3). The variables with  $p < 0.2$  were chose to include in the multiple regression analysis.

Factors with initial positive correlation in choosing adaptive coping strategies included being Christian and Muslim and having underlying medical illnesses. The marital status of being married or in a relationship, having psychiatric conditions, failing NLE step 1 examination, and training in the department of pediatrics showed negative correlations with choosing adaptive coping strategies. On the other hand, factors with initial positive correlation in choosing maladaptive coping strategies included graduating medical school from countries outside of the Asian continent, having monthly income of greater than 15,000 THB, indebtedness, failing NLE step 1 examination, not attending NLE step 1 and 2 examinations, training in the department of obstetrics and gynecology, and having problematic stress. Meanwhile, having hometown in other provinces and training in Taksin Hospital and Sirindhorn Hospital had negative correlations with selecting maladaptive coping strategies.

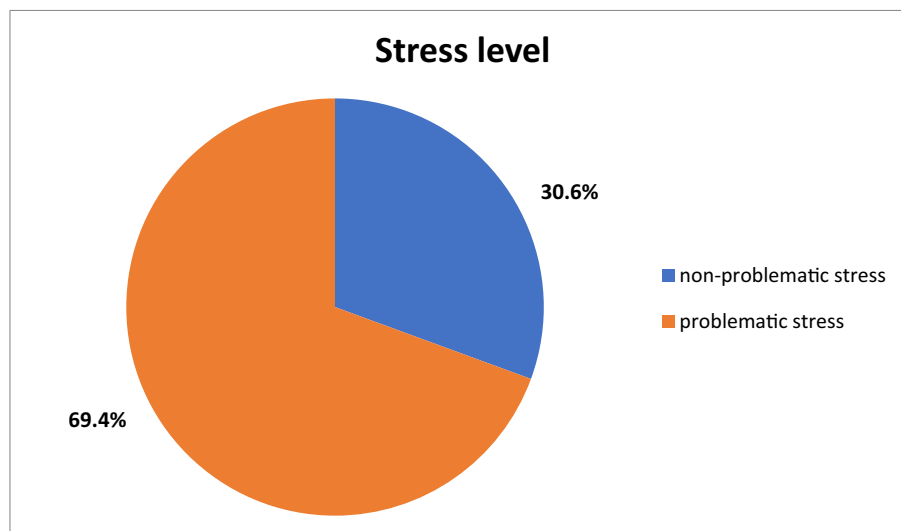


Fig. 1. Stress levels among foreign bachelor's medical interns ( $n = 49$ ) at Bangkok Metropolitan Administration Hospitals in 2022.

After including these potential predictors in multiple linear regression [Table 4](#), the results suggested that being Muslim showed a positive correlation with adaptive coping strategies. Being Christian was associated with choosing adaptive coping strategies in simple linear regression ( $p = 0.026$ ). However, this association decreased when further analyzed with multiple linear regression ( $p = 0.066$ ). Additionally, training in the department of pediatrics showed greater negative association with choosing adaptive coping strategies in multiple linear regression ( $\beta = -9.115$ ,  $p = 0.007$ ) than in simple linear regression ( $\beta = -6.667$ ,  $p = 0.057$ ).

On the other hand, the factor of “problematic stress” showed significant positive correlation with choosing maladaptive coping strategies ( $p = 0.013$ ). Training in the department of obstetrics and gynecology demonstrated borderline positive correlation with choosing maladaptive coping strategies ( $p = 0.077$ ).

#### 4. Discussion

This study found that 69.4% of foreign bachelor's medical interns reported having problematic stress (high to severe stress level), which is a high prevalence. Our finding was inconsistent with Nganvittavorn et al. [21], which suggested that the majority of foreign bachelor's medical interns training in Police General Hospital (87.3%) had mild to moderate stress level (non-problematic stress). Despite the larger size of Police General Hospital, medical services are limited only to patients who are covered by the Thai national social security scheme, as well as government or state enterprise officers. As

a result, Police General Hospital typically has a smaller number of patients. In contrast, BMA hospitals do not restrict their patients based on their insurance policy, resulting in a larger number of patients. The BMA hospitals were also smaller than Police General Hospital, in terms of physical size and number of beds, and less sophisticated in investigation and treatment options. Additionally, the number of foreign bachelor's medical interns at Police General Hospital (65 interns) was more than those training in all BMA hospitals (49 interns). Thus, the average workload for interns at BMA hospitals, in terms of number of patients to care for, was more than the workload for the interns training in Police General Hospital. This could explain why medical interns training at BMA hospitals had more problematic stress than the interns in Police General Hospital. Our finding was consistent with previous studies which found that heavy workloads were associated with high stress levels [14]. In addition, the prevalence of problematic stress in our study was also higher than the study by Hussein et al. [24], which found approximately 54% of high-stress prevalence among international postgraduate medical interns. The Malaysian study was conducted among foreign bachelor's medical interns training in the university-affiliated hospital which had more potential to provide supports for its trainees and this may explain why our stress prevalence was greater.

In this study, being female was related to problematic stress among foreign bachelor's medical interns. The result corresponded with many studies assessing stress levels among medical students and newly graduated doctors. These studies reported

Table 2. Association between demographic characteristics and problematic stress among foreign bachelor's medical interns (n = 49) at Bangkok Metropolitan Administration (BMA) hospitals using Chi-square test and Fisher's exact test.

Demographic characteristics	Problematic stress N (%)	Non-problematic stress N (%)	$\chi^2$	p-value
<b>Gender</b>				
Male	3 (37.5)	5 (62.5)	4.577 <sup>b</sup>	0.047 <sup>a</sup>
Female	31 (75.6)	10 (24.4)		
<b>Age (years)</b>				
21–30	26 (68.4)	12 (31.6)	0.074 <sup>b</sup>	1.000
31–40	8 (72.7)	3 (27.3)		
<b>Religion</b>				
Buddhism	26 (66.7)	13 (33.3)	4.079 <sup>b</sup>	0.253
Christianity	1 (100)	0 (0)		
Islam	7 (87.5)	1 (12.5)		
Other	0 (0)	1 (100)		
<b>Marital status</b>				
Single	16 (64)	9 (36)	1.340 <sup>b</sup>	0.512
In a relationship	17 (77.3)	5 (22.7)		
Married	1 (50)	1 (50)		
<b>Domicile</b>				
Bangkok	14 (77.8)	4 (22.2)	0.934 <sup>b</sup>	0.521
Provincial town	20 (64.5)	11 (35.5)		
<b>Medical illness</b>				
No	25 (65.8)	13 (34.2)	1.032 <sup>b</sup>	0.464
Yes	9 (81.8)	2 (18.2)		
<b>Psychiatric illness</b>				
No	31 (68.9)	14 (31.1)	0.065 <sup>b</sup>	1.000
Yes	3 (75)	1 (25)		
<b>Country of medical graduation</b>				
Asia	29 (69)	13 (31)	0.016 <sup>b</sup>	1.000
Other	5 (71.4)	2 (28.6)		
<b>GPAX</b>				
≤3.00	11 (84.6)	2 (15.4)	1.932 <sup>b</sup>	0.293
>3.00	23 (63.9)	13 (36.1)		
<b>Duration after graduation (years)</b>				
≤1	20 (58.8)	7 (46.7)	0.622	0.430
>1	14 (41.2)	8 (53.3)		
<b>Monthly income (Thai baht)</b>				
≤15,000	28 (84.8)	5 (15.2)	11.373	<0.001 <sup>a</sup>
>15,000	6 (37.5)	10 (62.5)		
<b>Indebtedness</b>				
No	19 (59.4)	13 (40.6)	4.353 <sup>b</sup>	0.052
Yes	15 (88.2)	2 (11.8)		
<b>Result of National Licensing Examination Step1 (Basic Medical Sciences)</b>				
Passed	7 (53.8)	6 (46.2)	2.482 <sup>b</sup>	0.289
Failed	21 (72.4)	8 (27.6)		
Unverified	6 (85.7)	1 (14.3)		
<b>Result of National Licensing Examination Step 2 (Clinical Sciences)</b>				
Passed	5 (71.4)	2 (28.6)	1.422 <sup>b</sup>	0.491
Failed	10 (58.8)	7 (41.2)		
Unverified	19 (76)	6 [24]		
<b>Current working department</b>				
Internal medicine	5 (55.6)	4 (44.4)	4.150 <sup>b</sup>	0.528
Pediatrics	4 (57.1)	3 (42.9)		
Obstetrics and gynecology	2 (66.7)	1 (33.3)		
Surgery	4 (80.0)	1 (20.0)		
Orthopedic	10 (90.9)	1 (9.1)		
Other	9 (64.3)	5 (35.7)		
<b>Institute</b>				
Klang Hospital	17 (70.8)	7 (29.2)	0.058 <sup>b</sup>	0.971
Taksin Hospital	6 (66.7)	3 (33.3)		
Sirindhorn Hospital	11 (68.8)	5 (31.3)		

<sup>a</sup> Statistically significant at p-value < 0.05.

<sup>b</sup> Fisher's exact test.

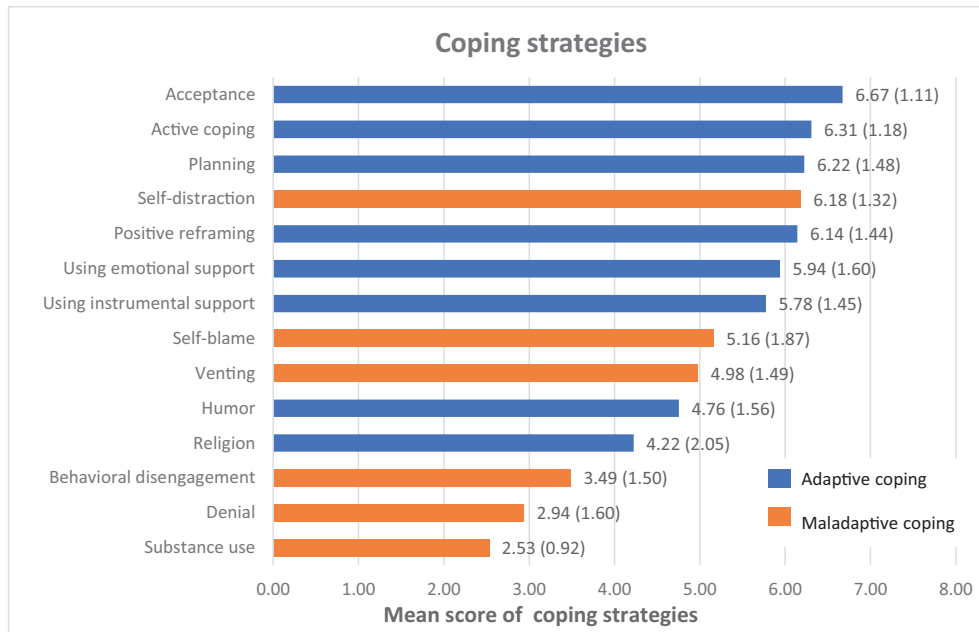


Fig. 2. Mean score for various components of adaptive and maladaptive coping strategies among foreign bachelor's medical interns ( $n = 49$ ) at Bangkok Metropolitan Administration (BMA) hospitals [mean (SD)].

that females had significantly higher perceived stress scores compared to their male counterparts [15–17]. Problematic stress among internationally graduated medical interns had statistically significant associations with lower monthly income and borderline association with indebtedness. It is worth noting that the Medical Council of Thailand required foreign bachelor's medical interns to complete at least 1-year training in its accredited hospitals. The fee for this one year of training fee is as high as 100,000 to 200,000 THB. However, medical interns often cannot perform additional work to earn extra income due to the exhaustion from their required training. Therefore, their families often bear the financial burden of both the hospital training cost and their living expenses. For these reasons, these medical interns may have felt that they were burdens on their families, which could be a contributing factor to stress.

Originally, we hypothesized that the country of the medical degree would be associated with stress levels because different countries have different teaching and training protocols. However, our results showed no relationship between country of training with prevalence of problematic stress among foreign bachelor's medical interns. This finding was consistent with a study at Police General Hospital [21]. This may result from the fact that all interns are Thai, and they had the ability to adapt

themselves with their colleagues, social conditions and cultures. Moreover, the results of NLE examination were not associated with problematic stress among the participants. This was also consistent with the study at Police General Hospital [21]. On the other hand, this study did not find any relation between the department the interns were training in and problematic stress. Our finding was different from a previous study [21] and study conducted among newly graduated doctors [13]. However, the smaller number of participants in our study could have limited our ability to assess the association between the department of training and prevalence of problematic stress.

The major sources of stress among these medical interns are clinical incompetence (57%), heavy assignments and workload (22%), and poor relationships with co-workers such as medical staff, residents, and nurses (8%). Our results were consistent with a study among medical interns in Police General Hospital that found that lack of clinical knowledge and skills, as well as miscommunication between colleagues were associated with the prevalence of high to severe stress levels [21]. Foreign bachelor's medical interns have to adapt to working in hospitals in Thailand. This adaptation requires a lot of medical knowledge and clinical skills, as well as meeting the high expectations from their colleagues. This situation can lead



Table 3. Simple linear regression results for association between demographic characteristics and coping strategies among foreign bachelor's medical interns (n = 49) at Bangkok Metropolitan Administration (BMA) hospitals.

Demographic characteristics	Adaptive strategies			Maladaptive strategies		
	$\beta$ Coeff.	Std. Error	p-value	$\beta$ Coeff.	Std. Error	p-value
<b>Gender</b>						
Male	Reference			Reference		
Female	-0.945	2.799	0.737	2.433	1.973	0.224
<b>Age (years)</b>						
21–30	Reference			Reference		
31–40	-3.100	2.440	0.210	-1.072	1.769	0.547
<b>Religion</b>						
Buddhism	Reference			Reference		
Christianity	15.385	6.696	0.026 <sup>a</sup>	2.538	5.302	0.634
Islam	6.760	2.566	0.012 <sup>a</sup>	-0.837	2.032	0.683
Other	0.385	6.696	0.954	-4.462	5.302	0.405
<b>Marital status</b>						
Single	Reference			Reference		
In a relationship	-9.727	5.207	0.068 <sup>a</sup>	-1.000	3.823	0.795
Married	-8.020	5.181	0.128 <sup>a</sup>	-2.480	3.803	0.518
<b>Domicile</b>						
Bangkok	Reference			Reference		
Provincial town	1.206	2.141	0.576	-3.237	1.462	0.032 <sup>a</sup>
<b>Medical illness</b>						
No	Reference			Reference		
Yes	3.464	2.430	0.161 <sup>a</sup>	-0.134	1.775	0.940
<b>Psychiatric illness</b>						
No	Reference			Reference		
Yes	-4.944	3.713	0.189 <sup>a</sup>	1.322	2.699	0.626
<b>Country of medical graduation</b>						
Asia	Reference			Reference		
Other	1.119	2.955	0.707	3.000	2.071	0.154 <sup>a</sup>
<b>GPAX</b>						
≤3.00	Reference			Reference		
>3.00	-2.038	2.327	0.385	-0.030	1.678	0.986
<b>Duration after graduation (years)</b>						
≤1	Reference			Reference		
>1	-2.301	2.055	0.268	-1.756	1.467	0.237
<b>Monthly income (Thai baht)</b>						
≤15,000	Reference			Reference		
>15,000	-1.053	2.203	0.635	2.188	1.547	0.164 <sup>a</sup>
<b>Indebtedness</b>						
No	Reference			Reference		
Yes	-2.134	2.153	0.327	3.706	1.460	0.014 <sup>a</sup>
<b>Result of National Licensing Examination Step 1 (Basic Medical Sciences)</b>						
Passed	Reference			Reference		
Failed	-3.533	2.374	0.143 <sup>a</sup>	3.289	1.632	0.050 <sup>a</sup>
Unverified	-0.154	3.334	0.963	5.604	2.293	0.018 <sup>a</sup>
<b>Result of National Licensing Examination Step 2 (Clinical sciences)</b>						
Passed	Reference			Reference		
Failed	-0.092	3.193	0.977	1.378	2.251	0.543
Unverified	-3.497	3.041	0.256	3.823	2.143	0.081 <sup>a</sup>
<b>Current working department</b>						
Internal medicine	Reference			Reference		
Pediatrics	-6.667	3.411	0.057 <sup>a</sup>	-2.587	2.422	0.291
Obstetrics and gynecology	-1.233	4.512	1.000	5.889	3.204	0.073 <sup>a</sup>
Surgery	4.467	3.775	0.243	4.756	2.681	0.083 <sup>a</sup>
Orthopedic	2.879	3.042	0.349	1.919	2.160	0.379
Other	-3.024	2.891	0.302	-0.230	2.054	0.911
<b>Institute</b>						
Klang Hospital	Reference			Reference		
Taksin Hospital	2.208	2.742	0.425	-5.167	1.882	0.009 <sup>a</sup>
Sirindhorn Hospital	4.625	2.264	0.047 <sup>a</sup>	-2.854	1.554	0.073 <sup>a</sup>

(continued on next page)

Table 3. (continued)

Demographic characteristics	Adaptive strategies			Maladaptive strategies		
	$\beta$ Coeff.	Std. Error	<i>p</i> -value	$\beta$ Coeff.	Std. Error	<i>p</i> -value
<b>Stress level</b>						
Non-problematic	Reference			Reference		
Problematic	1.116	2.241	0.621	4.351	1.477	0.005 <sup>a</sup>

<sup>a</sup> Significant at *p*-value  $\leq 0.2$ .

to stress among these medical interns. However, in a previous study, heavy and non-compromised workload were not associated with problematic stress [21].

In our study, the medical interns used adaptive coping strategies (acceptance, active coping, and planning) more than maladaptive coping strategies (self-distraction, self-blame, and venting). Despite the lack of data of coping strategies in this group of medical professions, the result of this study is consistent with many studies conducted among medical students and newly graduated doctors [17,25,26].

Foreign bachelor's medical interns who were Muslim chose adaptive coping strategies (especially in religious coping subscales) more frequently than interns of other religions. Our result corresponds with studies conducted in the southern part of Thailand [10] and in Malaysia [25]. This could be explained from the fact that Muslims had strong religious beliefs and actively put their doctrine into practice as part of their daily life, including solving problems and stress. Moreover, interns who were training in the department of pediatrics used adaptive coping strategies in dealing with stress less than interns training in other departments. The data for this study was collected during the phase of the

COVID-19 pandemic in which a majority of patients were infected with the Omicron variant. Infection with this variant was highly prevalent in children. Thus, interns training in the department of pediatrics had to deal not only with a large number of patients, but also the concerns of parents. This situation may have resulted in the interns having less ability to use adaptive coping strategies compared with interns in other departments.

Additionally, foreign bachelor's medical interns with problematic stress were more likely to select maladaptive coping strategies than those with non-problematic stress. This result was consistent with many previous studies conducted among newly graduated doctors and medical students which indicated that performance and coping skills were obviously compromised, if the person had high to severe stress levels [10]. Training in the department of obstetrics and gynecology showed borderline correlation in choosing maladaptive coping strategies to deal with stress. Because data was collected during the spread of COVID-19, interns training in this department were pressured by the complicated prevention measures during delivery procedures to care for both newborns and mothers. Interns also faced constant changes of the guidelines in managing COVID-19 patients or high-risk individuals in

Table 4. Multiple linear regression results for association between demographic characteristics and coping strategies among foreign bachelor's medical interns (*n* = 49) at Bangkok Metropolitan Administration (BMA) hospitals.

Demographic characteristics	Adaptive strategies				Maladaptive strategies			
	$\beta$ Coeff.	95%CI	Std. Error	<i>p</i> -value	$\beta$ Coeff.	95%CI	Std. Error	<i>p</i> -value
Constant	46.776	42.676, 50.876	2.029	<0.001	22.327	18.877, 25.776	1.709	<0.001
<b>Religion</b>								
Buddhist	Reference	–	–	–	–	–	–	–
Christian	12.003	–0.082, 24.827	6.345	0.066	–	–	–	–
Islam	8.017	3.110, 12.921	2.426	0.002 <sup>a</sup>	–	–	–	–
Other	7.339	–5.930, 20.607	6.565	0.270	–	–	–	–
<b>Current working department</b>								
Internal medicine	Reference				Reference			
Pediatrics	–9.115	–15.632, –2.598	3.224	0.007 <sup>a</sup>	–2.648	–7.237, 1.941	2.274	0.251
Obstetrics and gynecology	0.891	–7.255, 9.036	4.030	0.826	5.465	–0.614, 11.544	3.012	0.077
Surgery	–3.576	–10.397, 3.245	3.375	0.296	8.824	–1.306, 8.953	2.542	0.140
Orthopedic	1.221	–4.397, 6.839	2.780	0.663	0.571	–3.652, 4.795	2.093	0.786
Other	–3.851	–9.084, 1.382	2.589	0.145	–0.563	–4.462, 3.336	1.932	0.772
<b>Stress level</b>								
Non-problematic	–	–	–	–	Reference			
Problematic	–	–	–	–	3.812	0.862, 6.762	1.462	0.013 <sup>a</sup>

<sup>a</sup> Statistically significant at *p*-value  $\leq 0.05$ .

pregnancy. Our finding was similar to the study by Piccolo et al. (2021) which found that the COVID-19 pandemic situation contributed to psychological distress and the use of dysfunctional coping strategies among healthcare providers in the department of obstetrics and gynecology [27]. In addition, indebtedness had significant positive correlation in choosing maladaptive coping strategies, when compared with other independent variables in simple linear regression. However, this correlation lessened after further analysis with multiple linear regression. This result was inconsistent with other studies in which indebtedness was associated with psychological distress, which affected the ability to deal with stress [28,29]. The limited number of subjects in this study could explain why the association between indebtedness and choosing maladaptive coping strategies among foreign bachelor medical students was obscured.

## 5. Limitations

The generalizability of the results of this study is limited since the number of participants was small, and the participants were drawn from only BMA hospitals. A larger sample size of participants from different institutions should be surveyed. Our study did not assess many other variables associated with stress and coping strategies including family-related factors (such as relationship problems among family members or illnesses of family members) and duration of rest (such as average sleep each night, the average number of days off each month). Our study also did not evaluate the medical interns' expectations of their co-workers and medical staff. Moreover, this cross-sectional study design does not allow us to infer cause and effect. In the future, longitudinal studies should be conducted in order to identify causes, as well as explore the trends of stress and the selection of coping strategies.

## 6. Conclusions

Stress among medical personnel is important because it can cause adverse consequences to medical personnel and patient, especially the problematic level. In this study, nearly 70% of foreign bachelor's medical interns in BMA hospitals had problematic stress. Females and low monthly income play important roles in experiencing problematic stress. These medical interns predominantly used adaptive coping strategies, rather than maladaptive coping strategies. The religious beliefs and training in specific departments showed a greater association with adaptive coping strategies. Stress

and coping strategies are critical factors associated with physical and mental health, leading to medical practice quality among foreign graduate medical interns.

Therefore, we encourage those in charge of training foreign bachelor's medical interns to evaluate the stress and coping strategies that may lower harmful medical practices. To prevent stress related problems during internships, we recommend that the training hospitals should arrange an advisor for each foreign graduate medical intern to provide consulting services. In addition, organizing activities that encourage these interns to practice adaptive coping strategies may help minimize the negative effects of stress on physical and mental health.

## Conflict of interest

The authors declare no conflict of interest.

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