Factors Associated with Stress among Nursing Students at Boromrajonani Colleges of Nursing in Thailand Northern Region under the Jurisdiction of Ministry of Public Health

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Abstract

The stress of studying the nursing profession is recognized as one of the most important issues in the modern world. Educating nursing students often face challenges from their studies and learning abilities, which can be stressful. This research aimed to examine stress and factors related to stress among nursing students at Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health. The samples were 840 of the 1st to 4th year nursing students in academic year of 2019. The research instruments included questionnaires about the factors associated with stress, and Stress Test Questionnaire (ST-5). The statistical analyses in this study were performed with frequency, percentage, mean scores, standard deviation, correlation analysis, and multi regression analysis. The research findings revealed that almost half of the nursing students had stress at a low level (49.70 %), a good proportion had stress at a medium level (36.80), and a small minority at high and highest level (13.40 %); and the factors that could predict about the stress of the nursing students ($p <$ 0.05) included attitude toward nursing profession ($\beta = –0.199$, $p < 0.001$), sufficient sleep and rest ($\beta = –0.205$, $p < 0.001$), self-esteem ($\beta = 0.152$, $p < 0.001$), and the student services provided by the colleges ($\beta = –0.145$, $p < 0.001$). Meanwhile, the factor of grade point average, monthly income, interpersonal relationship, and teaching and learning management of the colleges were those which could not predict the stress of the nursing students.

Keywords: Factors associated with stress, Stress, Nursing students

Introduction

Nurse is such an important profession for health care sector and care giving for individuals, families, and communities because professional nurses are accounted to be the biggest group of authorities in the public health system of Thailand [17]. In addition, nursing profession functions mainly to provide health care closely for members of communities all the time [18] which applies theoretical principles into merciful practices for the most valuable merit and highest dignity of humanity [19]. Therefore, it is highly required for nurses to obtain precise knowledge and intensive training of nursing skill to establish values and professional ethic, understanding of working autonomy, and the professional commitment to sustain the respect of lawful privilege [16]. Moreover, it is the main accountability of professional nurses to be responsible for the needs of health care at the levels of individuals, families, and communities in terms of well-being, risks, and sickness by giving care and assistance, rehabilitation, prevention, promotion, and supporting doctors in treating diseases with specific medicinal knowledge in the work [15].

To study in the nursing program is a teaching and learning management that could cause high chances for stress, because it aims at training the students to apply theoretical knowledge into practical implementation with the patients or direct service receivers [20]. In these learning settings, the students are rapidly obliged to switch their roles from adolescence to adulthood and to adjust themselves in their new role of learners [10]. Moreover, this learning environment where they have to face is completely different from their previous experiences in high school settings, namely; interacting with new friends, adjustment to new society and instructors at the college, living in dormitory, following the college's regulations, and their responsibility in taking care of patients, and various unexpected conditions at medical wards, etc. [21]. From the previous researches, it was found that the predisposing factors causing

stress in nursing students were learning achievement ($r = -0.39$, $p < 0.001$) [10] sufficient sleep and rest ($r = -0.34$, $p < 0.01$), attitude toward nursing profession ($r = -0.53$, $p < 0.01$) [6], self-esteem ($\beta = -0.28$) [5]; the reinforcing factors were monthly income ($\beta = 0.20$) [5], interpersonal relationship ($r = -0.27$, $p = 0.01$) [1], and the enabling factors were the teaching management by the colleges ($r = -0.118$), and the student services provided by the colleges ($r = -0.143$) [4]. All of these factors were significantly associated with the stress in the nursing students. That is, it was reported that having low to medium levels of stress could enhance the students to learn better. At the same time, if the stress level became higher, the learning efficiency of them was likely to get worse which could result in the lower learning achievement, dropping out of study, bad performance in taking care of the patients, or in the worst case causing them to have mental problem eventually [9]. However, although studies on stress among nursing students have received great attention from academics, whether it is a survey of stress levels causes of stress and its effects on nursing students but a review of past studies shows that the study on stress among nursing students is post-stress, and no research has suggested a management approach to prevent or correct it. Problem of stress among nursing students from such importance, being aware of stress with stress screening and monitoring is essential. This is because stress screening and monitoring is the 1st step in knowing that a person is experiencing stress. And when the stress problem is known, then it will be able to deal with it appropriately and under the problem correctly and in a timely manner.

Accordingly, it is essential for the colleges of nursing to realize the problem of stress in the students, and establish a process to deal with the stress in the nursing students appropriately on the basis of the real conditions and needs of the students. Therefore, the researchers, as the instructors at Boromrajonani College of Nursing, perceived the realization of the problem and aimed to examined the factors associated with the stress in the nursing students so that this study could provide basic information to manage the prevention and solution by means of planning to give consultancy and providing programs to decrease the stress which was believed to improve the physical and mental health of the students and to produce effective professional nurses in the future.

Research objectives

To examine the stress of the nursing students at Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health; and to investigate the factors associated with stress in the nursing students at Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health.

Conceptual framework

The conceptual framework used in this study is adapted from various factors associated with stress in the nursing students according to the stress management concept of Lazarus and Folkman (1984) [22] together with a review of the literature related to stress 3 factors which are 1) Predisposing factors: Grade point average, attitude toward nursing profession, self-esteem, sufficient sleep and rest 2) Reinforcing factors: Monthly income, interpersonal relationship and 3) Enabling factors: Teaching and learning management, student services provision.

Materials and methods

This study was a descriptive and predictive research with its aim to examine the stress of the nursing students at Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health; and to investigate the factors associated with stress in the nursing students at Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health. This research determined and set up the independent variable which were 1) predisposing factors of grade point average, attitude toward nursing profession, and sufficient sleep and rest; 2) reinforcing factors of monthly income, and interpersonal relationship; and 3) enabling factors of teaching and learning management, and students' services provided by the colleges; and the dependent variable was the stress in the nursing students.

Population and samples

The population in this study was 3,546 nursing students at Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health.

The samples of this study consisted of 840 male and female nursing students who were studying in the 1st to 4th year in academic year of 2019 at at Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health. The inclusion criteria are is a student of the Bachelor of Nursing program willing to participate in research, and the exclusion criteria are missing classes on data collection day, have depression neurotic and mental symptoms. Stratified random sampling was applied to randomly select the samples from the seven of Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health. This sampling method was chosen so that the distributed samples could cover every college in the region and represent the similarities of the same stratified range and differences in different ranges. This procedure was described as below.

Step 1. Stratified ranges were determined on the years of study. (1st to 4th)

Step 2. Sample size from the seven of Boromrajonani Colleges of Nursing in Thailand northern region was determined on the proportion of the research population.

Step 3. Nursing students were selected with systematic random sampling according the sample size from Step 2.

Table 1 Numbers of selected nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health as the sample in this study.

Boromrajonani Colleges of Nursing in Thailand northern region	Numbers of the samples								
	1st Year		2nd Year		3rd Year		4th Year		total
	M	F	M	F	M	F	M	F	
Chiang Mai	3	34	5	28	2	31	4	26	134
Phayao	2	22	1	20	2	25	3	22	97
Nakhorn Lampang	5	46	3	38	3	34	4	36	168
Phrae	1	12	0	11	2	11	1	9	47
Uttaradit	3	21	3	24	1	29	3	27	110
Buddhachinaraj	4	29	5	27	5	30	5	29	134
Sawanpracharak Nakhornsawan	5	41	4	35	2	30	2	31	149
Total	23	205	23	183	15	190	21	180	840

Research instruments

The research instruments were questionnaires about the factors associated with stress, and Stress Test Questionnaire (ST-5). To implement the instruments, this stage was designed to investigate information in 3 parts as follows.

Part 1. The general information

Part 2. A 5-rating scale questionnaires of 165 statements about the factors associated with stress

Part 3. A revised version of stress evaluative test designed by Department of Mental Health (ST-5) by Silpakit [14] which consisted of five questions with 4 rating choices of frequently, often times, sometimes, unusually, or hardly ever, total score 20 points. The criterion of interpretation were 0 - 4 points referred as low level of stress, 5 - 7 points as medium level of stress, 8 - 9 points as high-level stress, and 10 - 15 points as highest level of stress.

The researchers created and develop the instruments from reviewing the literature related to the factors causing stress, and the stress of nursing students. The assessment of research tools was performed with content validity of the questionnaires by 5 experts in terms of language accuracy and reliability which was later calculated with Cronbach's alpha coefficient (0.97).

Data collection

As mentioned earlier, the research area of this study were the from the 7 of Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health, namely; Chiang Mai, Phayao, Nakhorn Lampang, Phrae, Uttaradit, Buddhachinaraj, and Sawanpracharak Nakhornsawan. The research team visited the research sites to collect the data during November, 2019. Prior to this, the research team issued for ethical conduct in human subject from Naresuan University Institutional Review Board and was granted with certification IRB No. 0097/62 on June 12, 2019. The research team clearly and sufficiently explained the rights, objectives, and research procedures to every subject of the study and asked for their signatures to join as samples of the research.

Data analysis
The research team analyzed the data with the statistical package by calculating the frequency, percentage, mean scores, standard deviation, correlation analysis, and stepwise multi regression analysis.

Results and discussion
This research was a predictive study with the aim to investigate the factor associated with the stress with nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health. The findings from this study were presented into 4 parts as below.

Part 1. The demographic information
It was found that the majority of this research sample was females (91.60 %) at 20.71 years of age. The youngest age among them was 18, while the oldest was 35. The average GPA was 2.95, the lowest GPA was 1.75, and the highest was 3.96. The proportion of the sample in terms of numbers was at the first year of study (30 %), the 4th year (24.20 %), the second year (24.10 %), and the third year (21.80 %) descendingly. Almost of them did not smoke (99.40 %) and did not drink alcohol (85.10 %). In addition, most of them averagely spent 5.57 h per day for sleep and rest as illustrated in **Table 2**.

Table 2 The general information of the sample (n = 840).

Demography	Numbers	Percentage
1) Genders		
- Female	767	91.31
- Male	73	8.69
2) Years of age		
($\bar{x}$ = 20.71, SD. = 2.16)		
(Min = 18, Max = 35)		
3) Grade point average		
($\bar{x}$ = 2.95, SD. = 0.39)		
(Min = 1.75, Max = 3.96)		
4) Year of study		
- First	228	27.14
- Second	206	24.52
- Third	205	24.40
- Fourth	201	23.93
5) Smoking habit		
- Smokers	5	0.60
- Non-smokers	835	99.40
6) Alcohol drinking habit		
- Drinkers	129	15.36
- Non-drinkers	711	84.64
7) Sufficient sleep and rest (h/day)		
($\bar{x}$ = 5.57, SD. = 1.36)		
(Min = 3, Max = 9)		

Part 2. The predisposing factors, reinforcing factors, and enabling factors associated with stress in nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health
It was found that the predisposing factors, reinforcing factors, and enabling factors were closely associated with stress in nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health. To elaborate, the findings revealed that the factors leading to stress in nursing students were the grade point average at medium level ($\bar{x}$ = 2.95, SD.= 0.39), attitude toward nursing profession at high level ($\bar{x}$ = 85.17, SD. = 10.24), self-esteem at medium level ($\bar{x}$ = 30.57, SD.= 5.08) , sufficient sleep and rest at medium level ($\bar{x}$ = 5.57, SD. = 1.36), monthly income at high level at average 4,479.95 baht/month, interpersonal relation at medium level ($\bar{x}$ = 53.71,

SD.= 16.06), satisfaction toward teaching and learning management by the colleges at high level ($\bar{x}$ = 155.01, SD. = 20.41), and satisfaction toward the student services provided by the colleges at high level ($\bar{x}$ = 143.23, SD. = 28.06) as shown in **Table 3**.

Table 3 The mean scores and standard deviation of the predisposing factors, reinforcing factors, and enabling factors were closely associated with stress in nursing students in overall (n = 840).

Factors	Mean scores ($\bar{x}$)	Standard deviation (SD)	Interpretation
Predisposing factors			
Grade point average	2.95	0.39	
Attitude toward nursing profession	85.17	10.24	High
Self-esteem	30.57	5.08	Medium
Sufficient sleep and rest	5.57 (h/day)	1.36	
Reinforcing factors			
Monthly income	4,479.95 (baht/month)	2,133.52	
Interpersonal relationship	53.71	16.06	Medium
Enabling factors			
Teaching and learning management by the colleges	155.01	20.41	High
The student services provided by the colleges	143.23	28.06	High

Table 3 Stress in nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health

The results from the stress evaluative test designed by Department of Mental Health (ST-5) with nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health showed that the nursing students had stress overall in a low level ($\bar{x}$ = 4.63, SD = 2.78). When considering on each level of stress they had, it was found that majority of the nursing students had stress in a low level (49.70 %), at medium level (36.80 %), and high to highest level (13.40 %) as shown in **Table 4**.

Table 4 Numbers, percentage, mean, and standard deviation of the stress in nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health (n = 840).

Levels of Stress	Numbers	Percentage
Low	406	48.33
Medium	318	37.86
High to highest	116	13.81
($\bar{x}$ = 4.63, SD = 2.78) score range of 0 - 15 points		

Part 4. The relation among the predisposing factors, reinforcing factors, and enabling factors associated with stress in nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health (n = 840)

The analysis of how the predisposing factors, reinforcing factors, and enabling factors were associated with stress in nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health were tested as the hypothesis of this study. That is, grade point average, attitude toward nursing profession, self-esteem, sufficient sleep and rest, monthly income, interpersonal relationship, teaching and learning management by the colleges, and the student services provided by the colleges were contributed for the stress in the nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health. The analysis was described below.

The 1st step was the analysis of relation among the predictors which were the grade point average, attitude toward nursing profession, self-esteem, sufficient sleep and rest, monthly income, interpersonal relationship, teaching and learning management by the colleges, and the student services provided by the colleges as associated with the stress in nursing from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health.

The 2nd step followed the first one which was carried out by selecting the predictors that were associated with the stress of the nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health with statistical significance ($p < 0.05$) to create predictive equation for the next step of analysis.

The 3rd step which was to assign predictive equation was presented in the following section.

First, Pearson's product moment correlation was chosen to calculate how predictors which were grade point average, attitude toward nursing profession, self-esteem, sufficient sleep and rest, monthly income, interpersonal relationship, teaching and learning management by the colleges, and the student services provided by the colleges were correlated to the stress in nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health. The findings from analyzing these of predisposing factors, reinforcing factors, and enabling factors revealed that the predictor which the correlation were positive with the stress in nursing students (level of statistically significant = 0.1) was self-esteem ($r = 0.095$, $p = 0.005$), while the predictor which the correlation were negative with the stress in nursing students (level of statistically significant = 0.1) were attitude toward nursing profession ($r = –0.247$, $p < 0.001$), sufficient sleep and rest ($r = –0.237$, $p < 0.001$), monthly income ($r = –0.074$, $p = 0.030$), teaching and learning management by the colleges ($r = –0.244$, $p < 0.001$), and the student services provided by the colleges ($r = –0.231$, $p < 0.001$). At the same time, predictors of grade point average and interpersonal relationship did not have correlation with the stress in nursing students ($r = –0.025$, $p = 0.459$) ($r = –0.008$, $p = 0.819$), respectively as shown in **Tables 5** and **6**.

Table 5 Metrix correlation of the predisposing factors, reinforcing factors, and enabling factors were associated with stress in nursing students (n = 840).

Predictors	GPA	ATN	SAF	SLP	ICM	RTP	STF	STS	STN
Grade point average	1								
Attitude toward nursing Profession	0.074*	1							
Self-esteem (SAF)	0.096**	0.233**	1						
Sufficient sleep and rest (SLP)	0.031	0.097**	–0.020						
Monthly income	–0.042	–0.092**	0.045	0.021	1				
Interpersonal relationship	0.210**	0.162**	0.413**	0.054	0.039	1			
Teaching and learning Management by the colleges	0.063	0.554**	0.156**	0.110**	–0.045	0.168**	1		
The student services Provided by the colleges	–0.001	0.442**	0.103**	0.067*	–0.077*	0.162**	0.650**	1	
Stress	–0.025	–0.247**	0.095**	–0.237**	–0.074*	–0.008	–0.244**	–0.231**	1

**p < 0.01, *p < 0.05

Table 6 Correlation of the predisposing factors, reinforcing factors, and enabling factors were associated with stress in nursing students (n = 840).

Predictors	Stress	
	Correlation Coefficient (r)	*p*-Value
Grade point average	–0.025	0.459
Attitude toward nursing profession	–0.247**	<0.001
Self-esteem (SAF)	0.095**	0.005
Sufficient sleep and rest (SLP)	–0.237**	<0.001
Monthly income	–0.074*	0.030
Interpersonal relationship	–0.008	0.819
Teaching and learning management by the colleges	–0.244**	<0.001
The student services provided by the colleges (STS)	–0.231**	<0.001

*p < 0.05, ** *p* < 0.0

Second, the predisposing factors, reinforcing factors, and enabling factors were analyzed to examine how these predictors affected the stress in the nursing students by selecting the predictors, that were correlated to the stress in nursing students with statistical significance ($p < 0.05$), from the prior step to create predictive equation.

The chosen predictors, with correlation to the stress in the nursing students with statistical significance ($p < 0.05$), were analyzed with stepwise multiple linear regression. The results showed that the predictors that could predict the stress in the nursing students ($p < 0.05$) were attitude toward nursing profession ($\beta = –0.199$, $p < 0.001$), sufficient sleep and rest ($\beta = –0.205$, $p < 0.001$), self-esteem ($\beta = 0.152$, $p < 0.001$), and the student services provided by the colleges ($\beta = –0.145$, $p < 0.001$). While the predictors such as grade point average, monthly income, interpersonal relationship, teaching and learning management by the colleges could not predict the stress in the nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health as shown in **Table 7**.

Table 7 The results from stepwise multiple linear regression on how predictors affected the stress in the nursing students.

Predictor variables	b	SEb	Beta	t	p
Constant	11.075	0.887	-	12.488	<0.001
Attitude toward nursing profession	–0.054	0.010	–0.199	–5.505	<0.001
Sufficient sleep and rest	–0.419	0.065	–0.205	–6.462	<0.001
Self-esteem	0.083	0.018	0.152	4.683	<0.001
The student services provided by the colleges	–0.014	0.003	–0.145	–4.116	<0.001
$R^2 = 0.146$, Adjusted $R^2 = 0.142$, F = 16.944, $p = < 0.001$					

Third, predictive equation was created. The predictive equation of stress in the nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health was performed by selecting the variables that could predict the stress in the nursing students from the prior step as mentioned above, and analyzing them with multiple linear regressions.

From **Table 7**, the development of predictive equation of stress in the nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health revealed that the variables of attitude toward nursing profession, sufficient sleep and rest, self-esteem, and the student services provided by the colleges had the size of influence or ability to co-predict the stress in the nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health at 14.20 % ($R^2 = 0.146$, Adjusted $R^2 = 0.142$). The equations of unstandardized score and standardized score were shown below.

Unstandardized score
Stress in nursing students = 11.075 – 0.054 (attitude toward nursing profession) – 0.419 (sleep and rest) + 0.083 (self-esteem) – 0.014 (student services at the colleges)

Standardized score
$\hat{z}_{(STN)} = –0.199Z_{(ATN)} – 0.205Z_{(SLP)} + 0.125Z_{(SAF)} – 0.145Z_{(STS)}$

Discussion

The research found that most of the nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health had stress overall in a low level ($\bar{x} = 4.63$, SD = 2.78). When considering on each level of stress, it was found that majority of the nursing students had stress in low level (49.70 %), at medium level (36.80 %), and at high to highest level (13.40 %). More than half of them had stress from medium to highest level (over 50 %). This is rational because studying in nursing program relies on theoretical knowledge and practical implementation that is aimed to prepare the students to be able to perform in the role and have characteristics of professional nurses. The emphasis of the program was placed upon the teaching and learning management that urged learners, class members, executives, service receivers, and the instructor team to interact continuously on the basis of giving care with heart of humanity. In this perspective, the nursing students were the center of learning and the instructor team function to support and facilitate the learning opportunities and

experiences for the students, which was believed to create the autonomy of critical thinking and rational decision-making and to allow the students to express and participate fully in the learning process. However, devotion to study by the students unarguably caused them stress. In the study by Khamwong [9], it was found that most of nursing students had regular stress level, some had slightly above regular stress level, respectively, while only 4.24 % of them had highly over regular stress level. Even though Khamwong's study showed that most of the nursing students in her work had stress in normal level, it was notable that regular individuals could adjust themselves with low to slightly above regular stress level and it would not affect their daily life so much. It was also mentioned that the nursing students in this study might reflect their stress in terms of anxiety and fear as well. It could be concluded that having stress in low and medium level could urge the students to be keen and interested in their study which accounted to be the academic motivation to success, and also help them to adjust automatically to being accustomed to and deal with stress. By the way, the results in our research showing that the nursing students had high to highest level of stress for 13.40 %. This is probable because the 2nd year nursing students was the stage of study where they had to perform at medical wards for the first time which required for them to deal with real service receivers. This could result in stress because they had to face with new environment such as professional nurse, advising instructors, doctors, health care staff, and most importantly the patients and their families. Moreover, the practical sessions of their study require a lot of preparation of knowledge in medical meetings before actual performance. They had to write nursing plans as assigned for each patient. Nursing students also had to practice nursing basis with principles of safety for the service receivers including the nursing procedures as a whole, usage of empirical evidence, and generosity in giving care with the heart of humanity and ethics. This was supported by the research findings by Homsombat *et al.* [7] showing that the factors affecting stress from medium to higher levels were the activities of Pre-Post Conference (45.4 %), writing nursing plan reports for individual patients (43.3 %), 3-week performance on medical wards (41.8 %), lack of deep knowledge in pathology (34.8 %), inability to understand medical terms (21.3 %), and lack of skills in writing nursing plan daily reports for each patient (18.4 %). These factors were accounted to contribute to higher stress in the second-year nursing students than other years of study.

The research findings revealed that the factors that could co-predict stress in the nursing students and had the size of influence or ability to co-predict stress the nursing students from Boromrajonani Colleges of Nursing in Thailand northern region under the jurisdiction of Ministry of Public Health accurately at 14.20 % ($R^2 = 0.146$, Adjusted $R^2 = 0.142$) were described as follow.

The attitude toward nursing profession was the factor that could co-predict stress in the nursing students with statistical significance ($\beta = -0.199$, $p < 0.001$). It was found that the nursing students participated in this study had positive attitude toward the nursing profession even if nursing was boring and hard profession that could affect their physical health. If the students had negative attitude toward the profession, it might cause higher stress. If they had positive attitude toward the profession, it might cause pride in their career and perform their work with joy. This agreed with the research by Khuariyakul, *et al.* [8] showing that the nursing students in the study had their attitude toward the nursing profession in the aspects of professional progress, professional traits, interpersonal relationship, professional organization, and social acceptance at a good level. The students also revealed that nursing profession is well-accepted by the society for their role in giving care to patients and public health care service receivers. Moreover, to perform as professional nurses requires interactive relationship from both health care team and patients. The cooperation broadened the nursing students' understanding and realization that involvement from every sector was important in the health care work. And most importantly, they understood that having positive attitude toward their profession would result in happier work performance and less stress from their duty.

Sufficient sleep and rest also another factor that could co-predict stress in the nursing students with statistical significance ($\beta = -0.205$, $p < 0.001$). In this research, it was obvious that having enough sleep and rest resulted in less stress. This is because the need of sleep and rest for individuals was different and depended on various aspects such as ages, physical condition, and health. Those with younger ages requires more time for sleep and rest than those who are older. Some require fewer hours than others and can still do their work well. Having insufficient sleep and rest could cause stress, anger, anxiety which would result in heart rate and increase brain activation. In accordance with the study by Yamma and Lueboonthavatchai [2], it was found that predictors of insomnia included stress in regular to highest level ($p < 0.05$), and that sleep problem and fatigue were related to efficiency of work performance ($p < 0.01$). Self-esteem was also another factor that could co-predict stress in the nursing students with statistical significance ($\beta = 0.152$, $p < 0.001$). The results from this study showed that the nursing students had self-esteem toward nursing profession because they realized the values in themselves which was important to

promote the health care and quality of life. Having low self-esteem could result in the lifestyle and lead to metal illness in the long run such as stress. Research by Jomsri [3] found that stress was associated with nursing students with statistical significance ($p < 0.001$) and correlation to stress ($\beta = -0.292$, $p < 0.001$) which means that having self-esteem is directly associated with stress. That is, the lower self-esteem the nursing students had, the higher stress it became.

The student services provided by the colleges was also another factor that could co-predict stress in the nursing students with statistical significance ($\beta = -0.145$, $p < 0.001$). In our study, it was shown that problem about the student services provided by the colleges such as learning environment, noises from outside of the classroom, too hot temperature, not enough light, outside pollution, or the students' safety. They all contributed to problems that could disturb the students and caused them stress. Wichairam and Sirikanchanatas [12] claimed that the factors of service management for learning and teaching environment were related to stress in the students in their study at medium level.

Conclusions

The research finding showed that the nursing students had stress at low level and medium to high level equally, the main factors associated to their stress included attitude toward nursing profession, sufficient sleep and rest, self-esteem, and the student services provided by the colleges. Boromrajonani Colleges of Nursing should consider the condition of stress in their students every year as evaluation for initial solution. If any of the students is found with high level of stress, the college should seek for solution to lessen the stress and prevent it from becoming worse. They should also establish the system that monitors and shuts out mental illness in their learning settings. Stress prevention program is recommended to be provided for the nursing students such as providing care and assistance and giving students the opportunity to express their feelings. Individual counseling for students with higher-than-normal stress levels includes support for students to cope with stress in many ways. Provide online counseling clinics using information technology such as LINE and Facebook so that students can easily access it as a channel for students to consult express feelings to reduce their own stress. It is noted that the program should be designed to suit with the contexts of the learners with accessible services to the students and instructors which could be inserted during meeting of class to help everyone relaxed and enhance the learning potential, quality of life and mental health of the students.

Acknowledgement

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