



## The correlation between stress level and eating disorder syndrome in preclinical medical students at Faculty of Medicine and Veterinary Medicine, University of Nusa Cendana, Kupang, East Nusa Tenggara

Marceline Consolatrix Cheyene Djema<sup>1\*</sup>, Sidarta Sagita<sup>2</sup>, Rahel Rara Woda<sup>3</sup>, Dickson Legoh<sup>4</sup>

<sup>1</sup>Study Program of Medical Doctor, Faculty of Medicine and Veterinary Medicine of Nusa Cendana University, <sup>2</sup>Department of Dry Land and Community Medical Science, Faculty of Medicine and Veterinary Medicine of Nusa Cendana University, <sup>3</sup>Department of Nutrition, Faculty of Medicine and Veterinary Medicine of Nusa Cendana University, <sup>4</sup>Mental Hospital Area Technical Implementation Unit, Naimata, Kupang

### ABSTRACT

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Nowdays with various kinds of needs and demands in life that must be met at any time can cause stress of someone. Medical students are often experience high level of stress due to the demands of high education standards requirements. Continous chronic stress can affect eating behaviour lead to the potential cause of eating disorder syndrome (EDS). This study aimed to evaluate the correlation between stress level and EDS in preclinical medical students of Nusa Cendana University, Kupang, East Nusa Tenggara. It was an analytic observational with a cross sectional design conducting on the preclinical medical students by filling out depression anxiety stress Scale (DASS-42) and eating attitude test (EAT-26) questionnaires. Respondents were selected by the probability sampling method with a stratifies random sampling technique. A total 141 respondents who met the inclusion and exclusion criteria were recruited. Bivariate analysis by using the Wilcoxon Theta correlation test was performed. Among respondents involved in this study, 13 (9.2%) respondents did not experience stress and 128 (90.8%) experienced stress including 43 (30.5%) mild stress, 68 (48.3%) moderate stress, and 17 (12.3%) severe stress. The EDS was observed in 15 (10.6%) respondents. A significant moderate correlation between stress level and EDS was indicated ( $\theta = 0.58$ ). In conclusion, there is correlation between stress level and EDS on preclinical medical students of Nusa Cendana University, Kupang.

### ABSTRAK

**Keywords:**  
stress level;  
eating disorder syndrome;  
medical student;  
behavior;  
eating

Di era sekarang, dengan berbagai macam kebutuhan dan tuntutan hidup yang harus dipenuhi setiap saat dapat menyebabkan seseorang mengalami stres. Mahasiswa kedokteran sering mengalami stres dengan level tinggi tuntutan persyaratan standar pendidikan yang tinggi. Stres kronis berkelanjutan dapat mempengaruhi perilaku makan yang berpotensi menimbulkan sindroma gangguan makan. Penelitian ini bertujuan mengkaji hubungan antara tingkat stres dengan sindroma gangguan makan pada mahasiswa preklinik kedokteran umum di Universitas Nusa Cendana, Kupang. Penelitian osersasional analitik dengan rancangan ptong lintang ini dilakukan pada mahasiswa preklinik kedokteran umum dengan mengisi kuesioner *depression anxiety stress scale* (DASS-42) dan *eating attitude test* (EAT-26). Subjek diseleksi dengan metode sampling probabilitas dengan teknik sampling bertingkat. Total 141 subjek yang memenuhi kriteria inklusi dan eksklusi dilibatkan penelitian. Analisis bivariat menggunakan uji korelasi Wilcoxon theta untuk mengkaji adanya korelasi. Diantara subjek yang terlibat dalam penelitian, 13 (9,2%) subjek tidak mengalami stres, 128 (90,8%) mengalami stres yang

\*corresponding author: cheyenedjema@gmail.com

terdiri 43 (30,5%) stress ringan, 68 (48,3%) stress sedang, dan 17 (12,3%) stress berat. Sindroma gangguan makan dialami pada 15 (10,6%) subjek. Hubungan secara nyata sedang antara tingkat stres dengan sindroma gangguan makan dilaporkan ( $\theta = 0.58$ ). Simpulan, terdapat hubungan antara tingkat stres dengan sindroma gangguan makan pada mahasiswa preklinik kedokteran umum, Universitas Nusa Cendana, Kupang.

## INTRODUCTION

The level of stress among medical students is higher compared to their compatriots the non health professional students. The curriculum budern that to be learned is high in order to graduate competent and professional medical doctor serve their community efficiently.<sup>1,2</sup> It was reported that the prevalence of stress among medical students is 28.5-78%. In six different medical colleges in Sudan, the prevalence of stress was 31.7%,<sup>3</sup> it was 63% in a colleges of medicine in Saudi Arabia,<sup>4</sup> 29.6% in a Malaysian medical students,<sup>5</sup> 44.9% in a Thai medical students.<sup>6</sup> Previous studies in Indonesia reported that the prevalence of stress among medical students from some universities is almost 100.0% with various stress levels.<sup>7-9</sup> A study in the Faculty of Medicine, University of Nusa Cendana, Kupang, East Nusa Tenggara in 2021 reported that the prevalence of stress among medical student is also 100.0%.<sup>10</sup>

Stress can cause a variety of symptoms that directly or indirectly affect the normal day-to-day lifestyle of a medical student. Sleep disturbance, worrying, agitation, and abnormal behavior are reported as symptom or sign of stress.<sup>3</sup> Stress can cause headaches, gastrointestinal disorders, coronary heart disease, impaired judgments, absenteeism, self-medication, and the consumption of drugs and alcohol.<sup>11</sup> Eating disorders are one of the signs of stress that is often reported among medical students. A global systemic review and meta-analysis reported that

10.4% of medical students are at risk of having eating disorders.<sup>12</sup> In addition, the prevalence of eating disorders among Lebanese medical students was 17%,<sup>13</sup> 22.75% in Karachi medical students,<sup>14</sup> and 13.9% in Malaysian medical students.<sup>15</sup>

This study aimed to evaluate the correlation between stress level and eating disorders syndrome (EDS) among preclinical medical students at Faculty of Medicine and Veterinary Medicine, University of Nusa Cendana, Kupang, East Nusa Tenggara.

## MATERIAL AND METHODS

### Respondents and design of study

It was an observational analytic study with a cross sectional design involving preclinical students at the Faculty of Medicine and Veterinary Medicine, University of Nusa Cendana, Kupang from three different school years i.e. 2019, 2020 and 2021. Respondents were selected by stratified random sampling and meet the inclusion and exclusion criteria. The inclusion criteria were the students who were willing to become repondents by filling out and signing the informed consent form. Exclusion criteria were the students having incomplete and irrelevant data, having chronic gastrointestinal disorders such as irritable bowel syndrome, gastroesophageal reflux disease, ulcers, gastroparesis, gastric outlet obstruction, and pancreatitis. A total 222 preclinical students consisting of 60 students from school year of 2019, 80 students from school year of 2020, and 82 students

from school year of 2021 were selected in this study.

### Protocol of study

The study was conducted on line via Zoom and Whatsapp applications between June 27<sup>th</sup> and June 30<sup>th</sup>, 2022. All participants were informed concerning the objectives of the study. The participants were assured of the confidentiality of the information provided. A written informed consent was obtained from the participants who agree to participate after explanation of the study. The protocol of the study was approved by the Research Ethics Committee, Faculty of Medicine, University of Nusa Cendana.

The level of stress was measured by using the Depression Anxiety Stress Scale (DASS-42).<sup>15</sup> The DASS-42 consisted of 42-item self-administered questionnaires to assess 14 signs of the negative emotional state of stress included nervous arousal, difficulty relaxing, impatient and being easily agitated, upset, over-reactive and irritable. Each response pertaining to the signs was rated according to the 4-point scale from 0 (did not apply to me at all) to 3 (applied to me very much or most of the time). Stress as independent variable was categorized into four levels i.e. normal (score of 0-14), mild (score of 15-18), moderate (score of 19-25), and severe (score of 26-34).<sup>16</sup>

The EDS was measured by using the Eating Attitudes Test (EAT-26).<sup>17</sup> The EAT-26 consisted of 26-item questionnaires to assess three subscales namely dieting, bulimia and food preoccupation, and oral control. Each response pertaining to the signs was rated according to the 4-point scale from 0 (never/rarely/sometimes happen) to 3 (always happen) except for item number 25 that has 3-point scale from 0 (always/usually/often happen) to 3 (never happen). The EDS as dependent variable was categorized dichotomously as negative (no EDS) and positive

(presence EDS). A total score of  $\geq 20$  indicates that the respondent is at risk to develop eating disorders.

Both of the DASS-42 and the EAT-26 instruments were translated into *Bahasa Indonesia* and a validity and reliability test was performed by using Pearson product moment formula to determine the consistency level of the questionnaire. The questionnaires are considered reliable or consistent if the Cronbach's  $\alpha$  value is  $> 0.6$ . The validity test showed that all questions on the DASS-42 and the EAT-26 questionnaires were considered valid and reliable with the Cronbach's  $\alpha$  value of 0.756 and 0.868, respectively.

### Data analysis

All data obtained in this study were served in the form frequency and percentage and analysed using the IBM SPSS®. Theta Wilcoxon correlation test was used to evaluate the relationship between stress levels and EDS. Furthermore, Guilford's criteria were used to evaluate the level of the correlation based on the theta Wilcoxon correlation coefficient ( $\theta$ ). A correlation was considered if the  $\theta$  value  $\geq 0.20$ .

## RESULTS

Among 222 preclinical students selected in this study, 141 students who meet the inclusion and exclusion criteria and were recruited become respondents. The characteristics of the respondents are presented in TABLE 1. Most of the respondents were female (81.6%) and most of the age of respondents were 19 y.o. (37.6%).

Among 141 preclinical medical students involved in this study, 90.8% (128 respondents) experienced stress with various different levels. Most of the students experienced moderate stress (68 respondents or 48.2%), followed by mild stress (43 respondents or 30.5%),

and severe stress (17 respondents or 12.1%). Only 13 respondents (9.2%) did not experience stress or normal (TABLE 2).

Furthermore, among 141 preclinical medical students involved in this study, 15 respondents (10.6%) suffer from

EDS and 126 respondents (89.4%) did not suffer from this syndrome (TABLE 3). Further statistical analysis using Wilcoxon theta showed that there was a moderate correlation ( $\theta = 0.58$ ) between stress level and EDS among respondents involved in this study (TABLE 4).

**TABLE 1. Characteristics of respondents (n = 141)**

Characteristic	Frequency [n (%)]
Gender	
• Male	26 (18.4)
• Female	115 (81.6)
Age	
• 18	24 (17.0)
• 19	53 (37.6)
• 20	45 (31.9)
• 21	16 (11.4)
• 22	3 (2.1)
School year	
• 2019	38 (26.9)
• 2020	51 (36.2)
• 2021	52 (36.9)

**TABLE 2. Stress levels distribution**

Stress level	n (%)
Normal	13 (9.2)
Mild	43 (30.5)
Moderate	68 (48.2)
Severe	17 (12.1)
Total	141 (100)

**TABLE 3. Distribution of EDS**

EDS	n (%)
Positive	15 (10.6)
Negative	126 (89.4)
Total	141 (100)

EDS: eating disorder syndrome

TABLE 4. Wilcoxon theta statistical test result

Stress level	EDS [n (%)]		Total [n (%)]	$\theta$
	Negative	Positive		
Normal	13 (9.2)	0	13 (9.2)	0.58
Mild	43 (30.5)	0	43 (30.5)	
Moderate	59 (41.9)	9 (6.4)	68 (48.2)	
Sever	11 (7.8)	15 (10.6)	17 (12.1)	
Total	126 (89.4)	15 (10.6)	141 (100)	

EDS: eating disorder syndrome

## DISCUSSION

This study found that most of respondents (90.8%) experience stress in various levels, with 48.2% respondents experience moderate stress. Stress among medical students in medical school in Indonesia have been reported with similar results in the previous studies. The prevalence of stress among first-year medical students in the Faculty of Medicine, University of Lampung was 100% consisting of 4.3% mild stress, 71.7% moderate stress, and 23.9% severe stress.<sup>7</sup> The same results also was reported in Faculty of Medicine, University of Andalas, West Sumatra. All of first-year medical students (100%) involving in the study experienced stress at various levels consisten of 11.2% mild stress, 48.4% moderate stress, and 40.4% severe stress.<sup>8</sup> In the Faculty of Medicine, Univesity of Riau, Sumatra, 100% of first-year medical students was also reported to have stress at various levels consisting of 22.9% mild stress, 57.2% moderate stress, 17.5% severe stress, and 2.4% very severe stress.<sup>9</sup> In Faculty of Medicine, University of Nusa Cendana, Kupang, East Nusa Tenggara, 100% of first- and second-year medical students was also reported to have stress at various levels consisting of 4.0% very low stress, 42.2 low stress, 46.8% moderate stress, 6.4% high stress, and 0.6% very high stress.<sup>10</sup> Stress among medical students was also reported in some other countries

in the world with varied prevalence such as Sudan (31.7%), Saudi Arabia (63%), Malaysia (29.6%), and Thailand (44.9%).<sup>3-6</sup>

Sources of stress among medical students generally grouped into three main areas i.e. academic pressures, social issues and financial problems.<sup>19</sup> The academic pressures is the main source of stress among the medical students including the heavier study load during the semester progress, the pressure felt during the mini objective structured clinical examination (OSCE), considerable quantities of difficult learning material and coursework that must be done, and many lectures that cause the students to have no spare time. During the teaching and learning process, lack of feedback from lectures and many assignments given with relatively fast submission dealines also contribute to stress. The small group discussion in tutorials and assignmnets in the groups can also contribute to stress.

Stress on medical students can have a negative impact and affect their performance during their study. Stress can reduce the levels of concentration and attention, inhibit individual decision-making processes, decrease motivation and interest and reduce students' ability to build good relationships with patients, resulting in disability and dissatisfaction from patients with the treatment and clinical practice of students in the future.<sup>20</sup>

One of the negative impact due to stress among the medical students is EDS. This study found that 15 (10.6%) respondents were at risk of having the EDS (TABLE 3). Previous studies conducted in Lebanon, Pakistan, and Malaysia reported that the prevalence of EDS among medical students due to stress is 17%, 23%, and 10.4%, respectively.<sup>21,22</sup> The EDS among medical students may not only be caused by stress but also by genetic factors. It is reported that the genetic factors contribute 40-60% of the EDS.<sup>23</sup> In this study, the symptoms experienced by students who at risk of developing EDS were fear of being overweight, avoiding meals when hungry, being preoccupied with food, cutting food into small pieces, being aware of calories in food, avoiding high-carbohydrate foods, feeling that others would prefer and pressure them to eat more, feeling guilty after eating, focusing on their desire to be thinner, thinking about burning up calories during exercise, whether other people perceived them as really thin, taking longer than others to eat their meals, being preoccupied with the thought of having fat on their body, avoiding foods with sugar and feeling uncomfortable after eating sweets, enjoying the emptiness in their stomach, eating diet food and engaging in dieting behaviour, displaying self-control around food, and rarely to never enjoy trying new rich foods. Each respondent displayed a different frequency of answers for the symptoms aforementioned. None of them had the impulse to vomit after eating or go on binge eating.

A positive correlation between stress level and EDS was observed in this study ( $r = 0.58$ ). Similar results also observed in the previous studies in some universities in Indonesia and United States.<sup>24-26</sup> However, the medical students with mild stress levels did not experience EDS in this study. Mild stress may not yet damage a person's physiological aspects because it only occurs for a short time

(acute stress). In contrast, long time stress (chronic stress) can have a negative impact. It can increase cortisol levels lead to increased dopamine levels and decrease serotonin hormones causing a person to acquire impulsive behavior. Furthermore, EDS is a collection of symptoms associated with behavioral/eating habit dysfunction, which can not occur immediately. The EDS only occurs after continuous stressor exposure over a long period or in chronic stress.

Acute stress can cause a decrease in appetite. It triggers the "flight or fight" response by activating the sympathetic nervous system. This activation stimulates cardiac activity, renal vasoconstriction, and skeletal muscle blood flow which require a lot of energy. Other behaviors such as eating, digesting, and reproduction which are included in parasympathetic activity will be inhibited to store energy resulting in the decrease of appetite and eating behavior. In contrast, chronic stress can cause the opposite eating behavior. The chronic stress plays an important role in coordinating the hypothalamic-pituitary-adrenal (HPA) axis, a hormone-triggers-hormone pathway. Chronic stress stimulates the release of corticotropin-releasing factor (CRF) from the paraventricular nucleus (PVN) lead to release of adrenocorticotrophic hormone (ACTH) from the pituitary gland and triggers glucocorticoids release, including cortisol from the adrenal cortex. Glucocorticoids can influence stress on CRF by acting on the hypothalamus. Under the chronic stress, the function of the HPA is disrupted which influencing glucose metabolism and insulin secretion.

This study raises awareness that the stress among medical students can cause EDS lead to psychological disorders, and other serious health problems which can be potentially fatal. It provides insights for medical institutions and medical educators to give attention to the

incidence of stress and EDS among their students. Therefore, early detection, prevention, treatment can be performed.

## CONCLUSION

In conclusion, there is a correlation between stress and EDS among preclinical medical students of the Faculty of Medicine, University of Nusa Cendana Kupang, East Nusa Tenggara. The institution should prepare a program for their students in order to early detect, prevent, and treat stress and EDS.

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