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Revealing Academic Stress in Medical Students of Cenderawasih University, Jayapura, Papua Province, Indonesia

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A B S T R A C T

The prevalence of stress experienced by Indonesian students is 36.7–71.6%. Academic stress also occurs in students in Papua. However, the causative factors have not been revealed. The aim of this study was to reveal the academic stress of medical students of Cenderawasih University and its related factors. The research used is cross-sectional, sampling technique uses purposive sampling, with a total sample of 188. The research was carried out in December 2023 at the Faculty of Medicine, Cenderawasih University, Jayapura. The result showed a significant and risky relationship with student academic stress are academic factors (p-value 0.018) RP=2,704, and health conditions (p-value 0.021) RP=5,143. All of these factors must be managed well by Medical education team management.

INTRODUCTION

Stress is a psychologically, physiologically & emotionally depressed condition. Stress can be caused by a variety of stimuli both intrinsic and extrinsic that elicit biological responses. The prevalence of stress according to WHO is quite high, which is experienced by 350 million people in the world and is ranked fourth disease in the world (Gazzaz et al., 2018)(Chaby et al., 2015).

Stressful conditions that are often experienced by students are referred to as academic stress. Research by Irlaks, et al (2020) stated that out of 100 final year medical students experienced moderate academic stress as many as 56 people (56%) and very severe levels as many as 4 people (4%) (Lee et al., 2012)(Gazzaz et al., 2018)(Cmha, 2008). Previous research in Papua, Jayapura by Samay, *et al* (2023) found that 114 medical faculty students during the pandemic experienced mild stress levels of 11.4%, moderate 22.8%, and severe 20.2% (Izak Samay & Dais Iswanto, 2021). Based on a survey of medical students of the Faculty of Medicine, Cenderawasih University, it was found that 150 preclinical medical students experienced difficulties in learning as much as 66.7%, and experienced pressure or stress as much as 19.6%.

There is a gap in the research before due to our medical students of Papua in pandemic Era with this New Era. There are still students have academic stress in this new Era but the causative factors are different. Academic stress that occurs over a long period of time can cause various problems in medical students, and will have an impact on the quality of doctors' human resources (HR). Therefore, the author conducted this study to determine the factors related to the academic stress level of medical students at the Faculty of Medicine, Cenderawasih University, which will then be data to evaluate and modify the lecture process to produce the best output of medical graduates in Papua, and in Indonesia.

THEORETICAL OVERVIEW

Stress is an inevitable part of life and will affect all groups regardless of gender, age, social strata, and educational status (Verma & Verma, 2020) Stress that is often experienced by medical students because it is related to learning is called academic stress. The definition of academic stress refers to the emotional tension and pressure on students because of their expectations and demands on their achievements and responsibilities in their place of study (Arellano et al., 2023) Another study stated that academic stress is a student's response to academic assignments that cause feelings of discomfort, tension and behavioral changes (Bayantari et al., 2023) Stress conditions can affect the physical and mental conditions (Nabila & Biromo, 2023) and emotions of medical students during the learning process (Andriana & Prihantini, 2021) This condition causes various negative impacts such as sleep quality disorders (Fauziah & Aretha, 2021) blood pressure abnormalities (8), emotional intelligence (9), insomnia (Fattah et al., 2023) acne vulgaris (Na'im & Meher, 2022) and hypertension (Ridha et al., 2023)

Stress can affect a person's condition physiologically, psychologically, and even behaviorally. The real reaction to stress is to feel restless, anxious, irritable, mood swings, depression and even suicidal thoughts (Ilham et al., 2020)

Academic stress is a stress condition that originates from the activities of the teaching and learning process on campus (Setiawati et al., 2022) Another definition of stress is a condition that arises due to environmental, social, and uncontrollable physical desires (Ambarwati et al., 2019; Clariska et al., 2019) The high number of cases of stress in students will interfere with the quality of learning so that they are late in completing lectures (Andriana & Prihantini, 2021) Stress and mental disorders are not considered part of normal behavior of human development (Ibrahim et al., 2021) Stress that receives the right action will get a degree of psychological health for the sufferers (18).

METHODOLOGY

Researchers used the population of Cenderawasih University Preclinical Medical Students Class of 2021-2023, with a population of 250 people. The sampling technique is purposive sampling with a total of 188 respondents. *Informed consent* has been carried out and received consent from respondents. The research was conducted at the Faculty of Medicine, Cenderawasih University, Jayapura, Papua Province, Indonesia. The study will be conducted in November – December 2023. The legality of research through *Ethical Clearence* is published by the Faculty of Public Health, Cenderawasih University. Questionnaire to measure stress level using *Depression Anxiety Stress Scale 42 (DASS-42) and* Questionnaire to measure academic factor variables using instruments that have been tested for validity and reality. Statistical Analysis used the *Chi-square* test on categorical variables to explain the characteristics of the study population. The data is then processed and presented into excel (Ms.Office 2017; Microsoft, Seattle, WA, USA) and statistical analysis using SPSS version 24.0 (SPSS Inc., Chicago, IL, USA). Statistical significance received for $p<0.05$.

RESEARCH RESULTS

The average age was 20.5 years out of 188 people, of which 146 (77.6%) were women and 42 (22.4%) were men. The ethnic origin is dominated by non-Papuan tribes, namely 116 people. Stress levels are highest at mild academic stress levels. A complete picture of the distribution of stress by characteristics of respondents is shown in table 1.

Table 1. Shows the distribution of stress by characteristics.

Variable	**Academic Stress Level**		***p-value***	**RP (CI 95%)**
	Heavy n=40	**Light n= 148**		
Age				
< 20 years	24 (19,7)	98 (80,3)	0,46	0,811
≥ 20 years	16 (24,2)	50 (75,8)		(0,46 – 1,41
Gender				
Woman	35 (24,0)	111 (76,0)	0,13	0,497
Man	5 (11,9)	37 (88,1)		(0.208 – 1,188)
Tribe				

Papua	14 (19,4)	58 (80,6)	0,71	0,836
Non Papua	26 (22,4)	90 (77,6)		(0.40 – 1.73)
Academic Factor				
Bad	33 (26,0)	94 (74,0)	0,018	2.708
Good	7(21,3)	54 (88,5)		(1.12 – 6.54)
History of Chronic Disease	5 (55,5%)	4 (44,4)	0,021	5.143
Exist	35 (19,6)	144 (80,4)		(1,312-20.15)
None				

Results are presented in frequency (%)
P-value of Chi Square test

The results of the study in table 1 showed that of 122 students aged < 20 years, there were 24 people (19.7%) with severe stress levels and 92 people (80.3%) with mild academic stress levels. While of the 66 students aged ≥ 20 years, there were 16 people (24.2%) with severe academic stress levels and 50 people (75.8%) with mild academic stress levels. The results of the *chi square statistical test* at a meaning value of 95% (= 0.05) obtained p valueα 0.46 or p > α (*0.05*), thus the age of students with academic stress levels was not significant. Value RP= 0.811; CI95% (0.46 – 1.41).

The gender variable showed that out of 146 female students, there were 35 people (24.0%) with severe academic stress levels and 111 people (76%) with mild stress levels. While of the 42 male students, there were 5 people (11.9%) with severe stress levels and 37 people (88.1%) with mild stress levels. The results of the *chi square* statistical test at 95% meaning (=α 0.05) obtained a p-value *of 0.13 or p* < α (0.05), thus the sex risk factor has an insignificant relationship with the academic stress level of FK Uncen students. RP value = 2.333; CI95% (0.85 – 6.39).

The variable of student ethnic origin showed that of the 72 students who were Papuans, there were 14 people (19.4%) experiencing severe stress and 58 people (80.6%) with mild academic stress. While of the 116 non-Papuan tribal students, there were 26 people (22.4%) (with severe stress levels and 90 people (77.6%) with mild stress levels. The results of the *Chi square* statistical test at a meaning value of 95% (=α 0.05) obtained *p-value of 0.71 or p* > α (0.05), thus the ethnic origin of students has an insignificant relationship with the academic stress level of FK Uncen students. RP value = 0.868; CI95% (0.486-1.548).

Academic factor variables showed that out of 127 students with poor academic factors, 33 people (26%) experienced severe academic stress and 94 people (74%) experienced mild academic stress. While of the 61 students with good academic factors, there were 7 people (11.5%) experiencing severe academic stress and 54 people (88.5%) experiencing mild academic stress. Chi square statistical test on meaning value 95% (= 0.05) obtained αp-value *0.018 or p* < α (0.05), thus student academic factors have a significant relationship with the academic stress level of FK Uncen students. When viewed from the Value RP=2,708; CI95% (1.12 – 6.54), which interpreted that poor academic factors had a 2.708 times higher risk of experiencing severe academic stress than students with good academic factors.

Health condition variables are assessed based on the presence or absence of chronic diseases. The results showed that out of 9 students who had a history of chronic disease, there were 5 people (55.6% with severe academic stress and 4 people (44.4%) experienced mild academic stress. Chi square statistical test on meaning value of 95% (α = 0.05) obtained p-value 0.021 *or p* < α (0.05), thus the health condition of students has a relationship with the academic stress level of FK Uncen students. When viewed from the Value RP= 5.143; CI95% (1,312-20.15), which interpreted that students with a history of chronic disease had a 5,143 times higher risk of experiencing severe academic stress than students with no history of chronic disease.

After conducting bivariate analysis, multivariate analysis was then carried out. Bivariate modeling using logistic regression tests begins with bivariate modeling using where each independent variable is tested against the dependent variable gradually with a p value of ≤ 0.25 which can be seen in the table. The variables of sex, academic factors and health conditions fall into the category of *p-value* < 0.25, so they are included in a multivariate model and tested together with the LR forward method logistics binary test.

Table.2 Bivariate Analysis between the dependent variable and the independent variable

No	Variable	*p-value*	RP	95% CI	
				Lower	Upper
1	Gender	0.13	2,333	0.85	6.39
2	Academic Factors	0.023	2.708	1.122	6.540
3	Health Conditions	0.022	5.143	1.312	20.152

p-value uji chi square

DISCUSSION

In this *cross-sectional study*, it was revealed that academic stress was found to occur in medical students of Cenderawasih University. Stress levels were measured using the DASS-42 questionnaire [6], which researchers then classified into two stress levels. Severe stress level with a total score of > 20, mild stress level with a total score of 0-20.

The results showed that the age of the most student respondents at the age of <20 years with a proportion of 122 people who experienced more mild stress, namely 92 people (80.3%). Likewise, students aged ≥ 20 experience more mild stress than severe stress. The results of the *chi square statistical test* at a meaning value of 95% (=α 0.05) obtained p value *0.46 or p > a (0.05).*

These results are in line with research by Casey (2008) and Gazzaz (20180) which found that adolescent college students are more susceptible to stress. According to Wong's & Hockenberry (2007), the age of late adolescence is 18-20 years old. At this age there is a rapid mental development. Physiologically, at the age of 14-24 years the prefrontal lobe is in the stage of developmental maturation especially in terms of rational thinking and adapting to various stressors (Gazzaz et al., 2018). *Adolescence* (adolescence) is a period characterized by suboptimal

decision-making and irrational actions, as well as lack of ability to cope with stress (Stanojlović et al., 2022)(Okechukwu et al., 2022).

In the gender variable, the results showed that the number of female students was more than male students. Female students who experience severe stress are more than men, namely 35 people (24.0) compared to men 5 people (11.9%) with severe stress levels. The results of the *chi square* statistical test at 95% meaning (=α 0.05) obtained *a p-value* of 0.13.

The results of this study are in line with several studies that found that gender differences play a role in coping stress (Keyes et al., 2023), Another study on medical students at Andalas University by Irlaks (2015). In line with research in Bandung, and research in Tangerang. African studies have also shown that women have higher cortisol levels than men, indicating chronic stress (Bangasser & Valentino, 2014)(Bangasser, 2013)(Nainggolan & Sukatendel, 2021)(Henley et al., 2014).

Sex differences can affect stress hormones *corticotropin releasing factor (CRF) and* glucocorticoids, *as* well as neurobiological conditions between men and women. In women who have stressors even in small levels will cause *the Hypothalamic Pituitary Adrenal* (HPA) *Axis* secretes *Adrenocorticotropic Hormone* (ACTH) with more levels than men so that it triggers an increase in cortisol production (Bangasser, 2013; Pardamean & Lazuardi, 2019; Suhandiah et al., 2021).

The ethnic origin variable showed that the ethnic relationship was not significant with students' academic stress levels. Value RP= 0.836; CI95% (0.40-1.73). The number of Papuan students who experience severe stress is 14 people (35%) less than students from non-Papuan tribes, namely 26 people (65%).

The results do not match those of African studies showing that sociocultural factors contribute to the chronic stress of sub-Africans. Each tribe or ethnicity has a different culture so that it can trigger certain problems both psychological, social and biological (Henley et al., 2014). Research in Saudi Arabia shows that indigenous Arab students experience more academic stress due to language barriers while studying medicine. While another study conducted by Sitepu, *et al* (2016) found that students from Papua studying at the University of North Sumatra have good socialization skills so as not to cause acculturation stress (Gazzaz et al., 2018)(Chaby et al., 2015).

On the variables of academic factors, the results showed that of 127 students with poor academic factors, there were 33 people (26%) experiencing severe academic stress and 94 people (74%) experiencing mild academic stress. Chi square statistical test on meaning value 95% (α= 0.05) obtained p-value α 0.018 or p < *a (0.05), thus student academic factors are significantly related to the academic stress level of medical students of Cenderawasih University.*

Furthermore, researchers conducted direct interviews ten students. The results of the interview are recorded and concluded as follows; most of what is stressful and less focused on the academic process is the condition of the few classrooms, so they have to alternate with other batch students if they will use classes during offline lectures. Competition in the classroom is also felt to have a considerable impact on their performance in the academic process. In addition,

the lack of practicum media, the absence of *cadavers* or mannequins, the lack of microscopes so that they have to take turns cause students to feel difficult in the academic process. The task load and tight schedule ranging from the schedule of *Problem Based Learning* (*PBL)* discussions , expert lectures, case presentations, group discussions, practicums and other tasks are stressors because they cannot manage time properly.

According to Sun, Dunne and Hou (2011) there are five aspects of academic stress, namely (Wicaksono & Pandjaitan, 2019); learning pressure, task load, concerns with grades, self-expectations, despair, interpersonal relationships, and conditions of facilities supporting the academic process. Research shows that the condition of facilities plays a role in poor academic factors that trigger stress, this is in line with other theories and research.

Finally, the dominant variable that has a significant relationship with students' academic stress levels is health conditions. The health condition of students in this study was assessed by the presence or absence of chronic diseases. Of the 9 students who had a history of chronic illness, 5 people experienced severe academic stress levels and 4 mild academic stress levels. Chi square statistical test at 95% meaning value (= 0.05) obtained p-value α 0.022 or p < α (0.05), RP value = 5.143; CI95% (1,312-20,15), interpreted that a history of chronic disease has a 5,143 times higher risk of experiencing severe academic stress.

From research, it is known that chronic diseases experienced include *tuberculosis*, autoimmune (*erythematous lupus syndrome),* and other diseases. Pulmonary tuberculosis is a chronic lung disease that affects the physical and psychosocial condition of patients (Rajeev & Pradeep, 2022; Suryani et al., 2016). Patients with pulmonary and extrapulmonary tuberculosis need psychological support to complete the treatment program and be accompanied in order to run a quality social life (Suryani et al., 2016). Likewise for other diseases such as autoimmune, treatment support and psychological education should be provided (Liu et al., 2023; Rajeev & Pradeep, 2022).

According to Fink (2016), stress is caused by excessive brain activity or work. The biological response to stress involves the activation of three major systems within the brain that are interconnected. Influential brain systems are brain sensory, homeostasis, and the hormone adrenalin (Connor-Smith et al., 2000) (Rajeev & Pradeep, 2022). Chronic disease in a person can cause an increase in cortisol and a decrease in dopamine due to the consumption of certain medications. In addition, the presence of chronic diseases such as hypertension and other cardiovascular diseases causes patients to experience depression, anxiety and stress (De Meester & Watson, 2015; Rajeev & Pradeep, 2022) . This is in line with research in America by Decker et al (Decker et al., 2021) which states chronic stress is a disease relevant to periodontal, covering 25%-28% of the population in the US (American Psychological Association 2015).

Academic stress and related factors are important to disclose, so that relevant agencies can provide full support, in terms of facilities, modification of learning methods, counseling psychologists, provision of psychiatrists, and treatment support for students who have health problems. Handling and

prevention of severe stress in students is carried out, for the quality of the best medical graduates in Papua.

CONCLUSIONS AND RECOMEMENDATIONS

Based on the results of the research and discussion, it can be concluded as follows:

1. There was an insignificant relationship between age and the level of academic stress of FK Uncen students, *(p-value* 0.46 or p > α (0.05), RP= 1.060; CI95% (0.90 – 1.24).
2. There was an insignificant relationship between gender and the academic stress level of FK Uncen students, obtained *a p-value* of 0.13 or p > α (0.05), RP= 2.333; CI95% (0.85 – 6.39) is interpreted as not significant gender.
3. There was an insignificant relationship between tribal origin and the academic stress level of FK Uncen students, *p-value* 0.71 or p > α (0.05), RP= 0.836; CI95% (0.40-1.73).
4. There was an insignificant relationship between residence status and the academic stress level of FK Uncen students, *p-value* 0.53 or p > α (0.05), RP= 0.965; CI95% (0.480-1.943)
5. There was a significant relationship between the quality of student sleep and the academic stress level of FK Uncen students, *p-value* 0.045 or p < α (0.05), RP= 3.677; CI95% (0.83 – 16.22).
6. There was a significant relationship between academic factors and the academic stress level of FK Uncen students, *p-value* 0.023 or p < α (0.05), RP=2.708; CI95% (1.12 – 6.54).
7. The relationship between financial factors and the level of academic stress of FK Uncen students was insignificant, *p-value* 0.418 or p >α (0.05), RP= 0.519; CI95% (0.146-1.843),
8. There was a significant relationship between student health conditions and the academic stress level of FK Uncen students, *p-value* 0.022 or p < α (0.05), RP= 5.143; CI95% (1,312-20,15).
9. The dominant variable had a relationship with the level of academic stress of FK Uncen students was health condition, *p value* 0.011; OR= 6,518; CI95% (1,542-27,556).

As a recommendation for the faculty of medicine and Cenderawasih University to improve the quality of medical education management, both in terms of innovating learning mechanisms, providing counseling centers, and improving the quality of new student input management in terms of screening health conditions such as by conducting examinations for tuberculosis, hepatitis, diabetes mellitus, hypertension, HIV and other chronic diseases. For students who are indicated to have health problems, complete medical counseling can be carried out before continuing the education process so as not to interfere with the quality of learning.

The limitation of this study is the factors obtained are still too broad and not explored in depth. For future research, it is hoped that the explanation of each factor that causes academic stress will be more in-depth in order to get more detailed solutions and problem solving.

FURTHER STUDY

Further research suggestions are to conduct more in-depth research to revealed and identify another factors of academic stress level in medical students, not only in medical faculty of Cenderawasih University, but also due to all University in Papua.

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