The Correlation of Insomnia and Anxiety in Students of The Faculty of Medicine, University of Pelita Harapan

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Abstract

Background and Aim: Insomnia and anxiety are common disorders with high prevalence rate especially in medical students. Moreover, many confounding factors playing a role in influencing anxiety. Most studies does not include or measure other confounding factors of anxiety into the analysis. This requires research which examines insomnia and anxiety assessing the contribution of the factors influencing anxiety.

Methods: A cross-sectional study methodology with linear regression analysis on a sample of students from the Faculty of Medicine, University of Pelita Harapan using the DASS-21 questionnaire to assess anxiety and ISI to assess insomnia.

Results: Prevalence rates of insomnia was 34.29% and anxiety 32.38% in Pelita Harapan University medical student. From the results of the bivariate linear regression, a weak relationship between insomnia and anxiety ($r = 0.322$; $p = 0.000$) is seen. In multivariate results, there were confounding stress variables ($r = 0.565$; $p = 0.000$) and trauma ($r = 0.250$; $p = 0.005$) which contributed greatly to anxiety (In order of largest).

Conclusion: There is a weak correlation and anxiety. Moreover, high prevalence rate of anxiety in medical students may be contributed heavily not only by insomnia but also stress and childhood trauma.

Introduction

Anxiety is the most common psychiatric disorder and arises because of tension, fear, or discomfort stemming from the anticipation of internal or external danger situations. In the world, anxiety has reached a prevalence rate of 13.6-28.8% and 15.2% in Indonesia alone which in a period of 5 years, the number of anxiety cases rose by 20% and is predicted to continue to increase.[1–3] However in medical students, anxiety rate reaches 35.2%; much higher than the general population.[4] The high prevalence of anxiety in the general population and medical students can be supported by the many precipitating factors or etiology of anxiety itself. This includes gender, chronic illness, personal and family depression, stress, grades, academic years and childhood trauma.[5,6]

Insomnia is a disorder of dissatisfaction with the quantity or quality of sleep due to difficulty or inability to maintain sleep, fall asleep or return to sleep.[7] Insomnia is the most common sleep disorder where as much as 10-15% of the world's adult population has been diagnosed with primary insomnia with 1/3 of reporting dissatisfaction with sleep. In Indonesia alone, 33.3% of the population suffers from mild insomnia and 11.0% of the population with clinically significant insomnia symptoms.[8,9] A prevalence of 60% in medical students in Indonesia was also found.[10]Increased risk of developing mental disorderssuch as GAD or depression; and chronic diseases, is also more visible in insomnia patients where coronary heart disease, hypertension, diabetes and obesity are among the biggest causes of death in Indonesia and in the world.[11]

There have been many studies that prove anxiety as a cause of insomnia [12,13] However, it is also known that insomnia can also cause anxiety, although research on this is still new and scanty.[14–16] Moreover, there are very few national studies addressing anxiety with insomnia in the medical student population. Even from several national studies that were found, no one had studied insomnia with anxiety in a multivariate manner to calculate anxiety confounding variables.

Due to doubts, lack of research and the magnitude of the impact of insomnia and anxiety on Indonesian medical students, researcher wanted to further dissect the correlation between insomnia and anxiety in medical student. This study is structured as a positive effort to increase the contribution and form a foundation for next research on insomnia with anxiety.

Methods

Ethical Considerations

Researchers maintain sample data confidentiality and apply for ethical permission to the ethics committee of the Faculty of Pelita Harapan University with protocol number 52122020.

Study Design and Sampling

A cross-sectional study of 105 medical students from the University of Pelita Harapan carried out in January 2021-March 2021. Samples are selected non randomly using purposive sampling.

Inclusion Criteria: Students of the Faculty of Medicine, Universitas Pelita Harapan batch2016-2020.

Exclusion Criteria: Long-term use of medication such as allergy medications, antipsychotics, antidepressants, cortico-steroids, or selective serotonin reuptake inhibitors (SSRIs).

Data Collection

Data is collected by self-administered questioner and phone interview (for DASS-21). Subject information about initial (Name), age, gender, medical year, GPA, chronic disease, family history of depression, childhood trauma and ISI (Insomnia Severity Index), are collected by self-administered questioner while DASS-21 which contains depression, anxiety and stress severity questions are phone interviewed after self- administered questioner is completed.

In Insomnia Severity Index (ISI), insomnia is categorized according to the severity scale into several categories. ISI contains only 7 question points which could easily be filled out and interviewed by researchers without a psychiatric or present. With a Cronbach value of 0.988, the ISI can be guaranteed its reliability and its validity has also been tested in the Indonesian population.[17] The ISI itself has 7 question points, each of which has 5 answers to choose from, namely: none, a little, moderate, severe, and very severe. each answer has a different value; none (0 points), little (1 point), moderate (2 points), severe (3 points) and very severe (4 points). From all the answers to the ISI questions, the scores are added up to produce a numerical value on a scale of 0-28. The higher the number, the more severe the degree of insomnia.[18]

Depression Anxiety Stress Scales (DASS) is a tool used to assess the depression, anxiety, and stress. DASS is often used for research due to its validity, reliability, ease of assessment or implementation.[19] Clinically, It can provide a complementary role in clinical diagnosis. DASS could help detecting the severity of depression, anxiety and stress in patients and progression of the disease, medication or treatment given. In research, the DASS can be used with both lay and professional examiners and is suitable for all ages.[20] There are 2 DASS questionnaires that have been translated into Indonesian, namely: DASS-21 and DASS-42. In addition to being tested for validity, DASS has a high reliability, Cronbach's alpha of 0.912 for DASS-21[21] and 0,948 for DASS-42[22]. DASS-21 contains 21 different questions with 7 questions assessing each scale. These scales are then added

together to produce numerical values that can be interpreted into 5 ordinal scales, namely, normal, mild, moderate, severe and very severe.[20,23]

Data Analysis

Statistical analysis is carried out using SPSS version 24. Sample descriptive of variables were shown using percentage (for prevalence), median and IQR (Interquartile Range). Insomnia and anxiety prevalence are calculated using descriptive data and summarized in percentage.

Bivariate analysis was conducted to determine correlation between insomnia and anxiety using simple linear regression determining r and r^2.

Multivariate analysis of variables uses multiple linear regression to determine cofounders and contribution size. However before determining cofounders, variables are eliminated from the highest partial significancy to meet statistical assumptions. This assumption includes model's total significance of <0.05 and variable partial correlation of <0.2. to determine contribution size of variable towards anxiety, partial correlation is used.

Linearity, homoscedasticity, collinearity, existence assumption are all met. However, normality and independence assumption are not met. Therefore, the author uses simple bootstrapping of 3000 sample using Meisner twister number generator to assume normality of data.

Results

Characteristics of participants

A total of 105 research samples met researchcriteria. Most of the study samples were women. Although relatively even distribution of academic year 1, 2, 3, only 10 (9.52%) samples came from year 4 and 6 (5.71%) from year 5. A median age of 20 (19–20) and an average GPA of 3.3 (3–3.5). This may indicate a relatively small spread or variation in age and GPA

in sample population. There were 6 (5.71%) students who suffered from chronic diseases and did not use medications as listed in the exclusion criteria. There are 5 (4.76%) samples who has depression in the family and 15 (14.29%) suffering from childhood trauma.

Table 1. Demographic Sample

	n	%	Median (IQR)
Gender			
Female	74	70.48%	
Male	31	29.52%	
Academic Year			
2020	28	26.67%	
2019	24	22.86%	
2018	37	35.24%	
2017	10	9.52%	
2016	6	5.71%	
Age			20 (19–20)
GPA			3.3 (3–3.5)
Chronic Disease			
No	99	94.29%	
Yes	6	5.71%	
Depression in Family			
No	100	95.24%	
Yes	5	4.76%	
Trauma			
No	90	85.71%	
Yes	15	14.29%	

Prevalence of Insomnia and Anxiety

Of the 105 research samples, there were 36 samples (34.29%) affected by insomnia and 34 samples (32.38%) affected by anxiety.

Table 2. Prevalence of Insomnia and Anxiety

		n	%
Insomnia			
ISI 0-7 (-)		69	65.71%
ISI 8-28 (+)		36	34.29%
Anxiety			
DASS-21 Anxiety 0-3 (-)		71	67.62%
DASS-21 Anxiety 4-21 (+)		34	32.38%

Relationship between Insomnia and Anxiety

To find out the conclusion of the research hypothesis, it is necessary to do

a bivariate linear regression analysis between insomnia and anxiety. Seen in the summary model table, correlation coefficient R is 0.322 with p-value of 0.000. This indicates a weak degree of correlation between insomnia and anxiety. This statistical model accounts for 10.4% of anxiety cases.

Table 3. Bivariate Regression Summary Model

Model[b]	R	R^2	Sig.
1	.322[a]	.104	.000

a. Predictors: (Constant), Insomnia
b. Dependent Variable: Anxiety

Multivariate Linear Regression

After removing variables from the highest partial correlation, confounding variables were obtained namely stress and trauma variables. Other variables such as age, gender, batch, GPA, chronic illness, depression in the family and depression are eliminated due to not meeting multivariate regression criteria.

As seen in multivariate model, the correlation coefficient R is 0.598. This shows a moderate level of correlation between predictors (Stress, Trauma, Insomnia) and levels of anxiety. This statistical model of stress, trauma, and insomnia can only explain 33.8% of anxiety.

Table 4. Multivariate Regression Summary Model

Model[a,b]	R	R^2	Adj R^2
3	.598[a]	.357	.338

a. Predictors: (Constant), Stress, Trauma, Insomnia
b. Dependent Variable: Anxiety

From the Partial Correlation of each variable, it can be seen the influence of these variables on anxiety. Stress, trauma and insomnia respectively have the largest contribution of all the variables studied.

Table 5. Partial Correlation of Variables

Model		Partial Correlations
3	Insomnia	.104
	Stress	.475
	Trauma	.221

In Pearson's table, r coefficient on stress variable is 0.565 with a p-value of 0.000 (significant). The r trauma coefficient is 0.250 with a p-value of 0.005 (significant).

From the coefficient of r variable, it can be determined that stress is moderately correlated, and trauma is weakly correlated with anxiety.

Table 6. Pearson Correlation of Cofounders

Var[a]	r	Sig	BCa 95% CI[b]	
			Lower	Upper
Stress	.565	.000	.440	.678
Trauma	.250	.005	.021	.471

a. Dependent Variable: Anxiety
b. Unless otherwise noted, bootstrap results are based on 3000 bootstrap samples

Discussion

Prevalence of Insomnia and Anxiety

Globally, Anxiety has reached a prevalence rate of 13.6-28.8% and 15.2% in Indonesia.[1–3] Medical students however, reaches 35.2%.[4] these results are similar to the prevalence obtained.

Around 44.3% of indonesians suffers from insomnia.[8,9] Research from Other University medical students reported a higher prevalence of insomnia reaching the majority of medical students.[10] This could be caused by differences in sampling time of the study where the comparison study may take samples on the days before or during the exam. As a result, most students experienced higher mental stress and insomnia than usual. Although to confirm and prove, the need for information on time of data collection which is not explained further by the comparative study.[24]

Relationship between Insomnia and Anxiety

On bivariate analysis, another study using bivariate analysis and the same questionnaire, found similar results (r=0.655; p=0.000).[25] A relatively large difference in r when compared to the results of the study is seen. However, comparative studies were conducted in another country with different population characteristics and different ways of interpreting the DASS-21 questionnaire. This makes the prevalence of anxiety and insomnia also different in the two studies, making the correlation coefficient results different between the two studies. This is evident in the very high prevalence of anxiety in supporting studies (66.9%) and relatively different insomnia (27.7%).[25]

Multivariate Linear Regression

Anxiety is a multifactorial disorder which is greatly impacted by many variables not only insomnia. This needed a more holistic approach to measure the impact of insomnia after correcting for other confounding variables. Multivariate linear regression is the great tool needed to assess the weight of these multiple cofounders affecting anxiety directly.

On multivariate analysis, comparison study found that there was a moderate correlation (r=0.512; p<0.000) between stress and anxiety and a weak correlation (r=0.25; p<0.05) was also found in trauma with anxiety.[26,27] When compared with R from the combined model regression table, it can be seen that r stress value is close to the R value of the combined model. This can indicate a large contribution of the stress variable alone when compared to other variables in the combined regression model. Moreover, results of the multivariate regression coefficient of the partial correlation section conclude that stress is the biggest contributor to anxiety.

Other variable not included in the final multivariate regression such as: age,gender, batch, GPA, chronic illness, depression in the family and depression could be regarded not as cofounders but as variables which doesn't affect anxiety significantly.

Limitations

Although this research benefits from controlling confounders and uses interview to obtain DASS data from samples, cross-sectional study is used as this research's methodology. Thus, could not clearly determine cause and effect. Moreover, this research uses purposive sampling which potentially cause selection bias. With this, more research will be needed to address other cofounders of anxiety such as: diet or exercise which may contribute to anxiety in medical students.

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