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## **The Relationship Between Anxiety Levels and Blood Pressures of Laboratory Practicum Participants Among Medical Students in University of Tadulako**

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### **Abstract**

University students are potentially to suffer academic related stress or other psychological problems. Anxiety is a term used for some disorders which cause nervousness, worry, fear, and apprehension. Student may suffer different levels of anxiety in different period including exam period or test period. this condition can lead to overload and certain health problems. This is a cross sectional study involving 128 medical students attending biochemistry laboratory practicum in Faculty of Medicine Tadulako University. Automatically tensimeter was applied to measure the blood pressure and HARS was used to measure anxiety levels. There is a correlation between anxiety and blood pressure with  $p=0.005$  and coefficient correlation 0.247.

**Keywords:** Anxiety; Blood Pressure; Exam Anxiety.

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## **1. Introduction**

University students are potentially to suffer academic related stress or other psychological problems [1]. For example, medical study has very busy schedules and consists of many learning process including lectures, clinical skills, tutorials, and laboratory activities. In some university including University of Tadulako, all medical students need to attend pre test as a preparation before attending the laboratory practicum to measure their understanding of theory of subjects which will be conducted in the laboratory. Anxiety is a term used for some disorders which cause nervousness, worry, fear, and apprehension. Student may suffer different levels of anxiety in different period including exam period or test period [2]. Test anxiety is a negative emotional inducing cognitive and physiological changes before, during, or after an exam [1]. Exam anxiety is also defined as emotional reaction of student encountering exams. This is not irritative but excessive fear. Some experts believe that such condition is good to boost student effort and spirit to work on task and study more [3]. However, this condition can lead to overload and certain health problems. University students are one of vulnerable group which easily to suffer hypertension as they encounter various challenges both academics and personals. Those challenges can lead to a vulnerability of clinical hypertension [4]. Hypertension has multifactor etiologies including genetics, eating behavior, mental health psychosocial factors and environmental conditions. [5-7] Stress and Anxiety are major contributors to clinical hypertension. For example, examination or pre test is one of external stressor which can lead the students to serious mental health problem such as anxiety. Both hypertension and anxiety become significant public health concern globally which currently attracts big attention across the globe. A number of epidemiological studies indicated a consistent correlation both diseases [5]. Anxiety activates the autonomic nervous system through hypothalamo-pituitary axis which can increase circulating catecholamines. This is also linked to coronary heart disease [4, 8]. Anxiety also directly influences visceral organ, motoric, neurology, perceptions, and learning process [9, 10]. Therefore, this study aims to seek the correlation between anxiety and blood pressures among students who will attend pretest for chemical laboratory practicum.

## **2. Methodology**

### **2.1. *Subjects and Methods***

The study is a descriptive analysis with cross sectional approach to seek the relationship between anxiety levels and blood pressures of student who attend a chemistry laboratory practicum among medical students in Faculty of Medicine, Tadulako University, Indonesia. One hundred and twenty eight medical students were involved in the study with age ranging from 17 to 20 years old. The study has been approved by medical ethic commission of Faculty of Medicine, Tadulako University.

### **2.2. *Anxiety and Blood Pressure Measurement***

Two main data were collected including blood pressures and anxiety levels which were collected during waiting time in the waiting room before they get their turn for pre test for chemistry practicum. Blood pressures were measured using automatically tensimeter while the anxiety levels were measured using Hamilton Rating Scale for Anxiety (HARS). The study involved 128 students. Purposive sampling method was applied to find the

specific characteristics of the participants. The study was conducted in November 2018. The collected data were analyzed on Statistical Package for the Social Sciences. Univariate analysis was conducted to look at the frequency of each variable and Spearman test was done to find correlation both variables and the strength of their correlation.

### 3. Result

**Table 1:** Blood Pressure Based on Gender

Gender		Normal	Pre hypertension	Stadium 1
Male	n=34	12	18	4
	%	35.29	52.94	11.77
Female	n=94	32	58	4
	%	34.04	61.70	4.26

Sources: Primary Data

The number of participants in the study was 128 students, 34 male (27%) and Female 94 (73%) with age ranging from 17 to 20 years old. Both man and woman generally suffered pre hypertension, 52.94% of male and 61.70% of female. Moreover, 11.77% of men got stadium 1 of hypertension and 4.26% of that on women.

**Table 2:** Anxiety Level Based on Gender

Gender		Mild Anxiety	Moderate Anxiety	Severe Anxiety
Male	n=34	31	1	2
	%	91.17	2.94	5.89
Female	n=94	62	22	10
	%	65.96	23.40	10.64

Sources: Primary Data

The result reveals that females were more likely to suffer anxiety compared to men. The statistical analysis shows that 23.40% of women suffered moderate anxiety, 10.64 % experienced severe anxiety. On the other hand, the percentage of men diagnosed with moderate and severe anxiety were much lower than women, 2.94% and 5.89% respectively.

**Table 3:** Correlation between Anxiety level and Blood Pressures

Spearmen analysis	P Value	Correlation	Coefficient Correlations
Anxiety Blood Pressure	0.005	Positive	0.247

Sources: Primary Data

Correlation analysis between anxiety and blood pressure revealed in tabel 4 shows that P=0.005 and coefficient

correlation is 0.247. This means that there is a correlation between anxiety and blood pressure with weak correlation.

#### 4. Discussion

Academic activities during the college bring variety of challenges and sources of stress that can lead to some psychological problems including anxiety. Some studies have proved that examinations, pre test, papers and studying become the major sources of considerable stress in university life [1, 11]. The study aimed to look at the relationship between anxiety and blood pressures among medical students enrolling chemistry module and attending pre test for laboratory practicum. Pre test or any kind of examination commonly causes examination stress or anxiety. It commonly appears shortly before the examination time [3]. The spearman analysis in the study found that there is a correlation between anxiety and blood pressures among students who were waiting for a pre test of chemistry laboratory practicum with  $p=0.005$  meaning that the hypothesis is accepted. However, the relationship between the variables is weak because of its  $r=0.247$ . The percentage of students who were suffering high blood pressures (stadium 1) and those were reported anxiety wereslightly similar. 8% of participants were suffering stadium 1 hypertension, while analysis from HARS showed that just below 10% of the student suffered severe anxiety. As a consequence, long-term anxiety can implicate to a potential failure of cardiovascular systems and blood pressures. Mild anxiety is vague and unsettling and severe anxiety can adversely affect our daily lives [2]. Blood pressure is used to describe the pressure of circulating blood in the blood vessels. The inner surfaces of the blood vessels are affected by the pressure which can be measured by sphygmomanometer. When diastolic pressure is more than 140 mm/Hg and systolic pressure exceed 80mm/ Hg, this is classified as abnormal blood pressure [12]. Study conducted by Oliveira and team revealed that both systolic arterial pressure and cardiac frequency levels were higher in exam period compared to non exam period. Diastolic arterial level also showed the same pattern. The study measured the blood pressure in three different period; exam period, class period and holiday period. The study found that the majority of the participants both men and women showed an increasing blood pressure level before attending the pretest for chemistry laboratory practicum, 52.94% of men and 61.70% of women experienced pre hypertension. Blood pressure can be influenced by many factors including anxiety. The increase of blood pressure is a physiological and psychological response of anxiety. This is related as a consequence of psychological changes which affect physiology or the other way [13]. Response mechanism of human body to anxiety or stress starts with stimulation from external or internal factors. Individual body was passed through limbic system (thalamus, hypothalamus, amygdale, hippocampus, and sputum). Hypothalamus has strong correlation with visceral system that can respond psychological and emotional stimulation. Hypothalamus has four main role in stress or anxiety; initiating the activity of autonomic nerves system, stimulates the anterior pituitary producing the ACTH hormone, produces ADH or vasopressin, and stimulates the thyroid gland to produce the thyroxine hormone. Anxiety stimulates hormone from hypothalamus which secretes CRF (*Corticotropin-Releasing Factor*) which causes secretion of pituitary hormone. One of those hormone is ACTH (*Adreno-Corticotropin Hormon*). This hormone will stimulate the adrenal cortex to secrete cortisol into the blood circulation. Increased cortisol levels will increase plasma renin, angiotensin II and increase the sensitivity of blood vessels to ketacolumine, resulting in an increase in blood pressure [14]. The study limitation includes that the study did not identify external factors of hypertension such as asking the participants whether they had physical activity within 3 hours before

the testing as well as identifying other risk factors of high blood pressures.

## **5. Conclusion**

In conclusion, the spearman analysis reveals that anxiety level is linked to the increase of blood pressure among students who are attending a pre test for biochemical laboratory practicum in Faculty of Medicine, Tadulako University.

## **6. Recommendations**

The study recommends that there must be future research which address all risk factors of blood pressure among examination participants. The university and other educational institutes need to take the issue of anxiety and blood pressures among students. The government and other parties need to take action to prevent the increase of high blood pressures among youngsters.

## **7. Conflict of Interest**

There is no potential conflict of interest of this paper

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