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**2023**

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# DEPsy Model

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**Abstract**—Depression is one of the most common mental disorders, affecting most people directly or indirectly in their lives, including university students. Assessment methods and factors contributing to depression have been consistently studied throughout to improve the life of a university student. However, a continuous and independent monitoring method has not yet been developed. Therefore, this innovation was developed to put the power of mental health assessment firmly into the hands of university students by considering several common causes of depression, including demographics, academic performance, finances, and social support. A cross-sectional study was conducted on a sample of university students in Negeri Sembilan using a stratified sampling method that consisted of 370 students as a sample. The students need to complete the survey, which measures the variables stress (Inventory of College Students' Recent Life Experiences), depressive symptoms (Center for Epidemiologic Studies Depression Scale), and social support (Multidimensional Scale of Perceived Social Support). This model was created using the multiple linear regression method to estimate the depression symptoms of the students. This innovation serves as a light hope for university students in monitoring their depression symptoms. This encourages a proactive and healthy culture for the student to act immediately at the first sign of depression, such as doing recreational activities, having counseling sessions, and taking a healthy diet. This innovation is not only beneficial to the student for better mental health outcomes, improved academic performance, and a more positive university experience but also translates into university management that prepares a healthier campus environment and a strong reputation for prioritizing student well-being. These potential benefits work together to create a community where students can succeed academically and emotionally.

**Keywords**—*depression, stress, mental health, university students*

## I. INTRODUCTION

In recent years, mental health awareness has taken center stage as societies grapple with the alarming rise of mental health issues, particularly among students. Concern has been raised about the prevalence of depression and other mental health issues among students around the world due to the pressure of academic success, social dynamics, and the difficulties of making the transition to adulthood. According to World Health Organization (WHO) data, depression is the leading cause of disability and ill health among adolescents globally. In 2019, 280 million people lived with depression, including 23 million children and adolescents [1]. Based on National Health and Morbidity Survey 2019, 2.3% of the adults in Malaysia were found to have depression [2]. This alarming statistic underscores the urgent need for novel approaches to identify signs of depression in students during their early stages.

Recognizing these serious problems, this study diligently attempts to create innovative tools that can proactively spot signs of mental health difficulties, enabling early intervention and treatment. This initiative is the development of health assessment tools for the early detection of depression, specifically within the student population. The model seeks to leverage the power of data analysis to identify subtle behavioral patterns that might indicate the presence of depression among students. By analyzing multiple factors such as gender, faculty, working part-time, academic performance, monthly expenses, stress, and social support, the model aims to build a comprehensive profile of each student's mental well-being.

The prospective benefits of such early detection are diverse. Not only does it have a high potential to reshape the landscape of student mental health support, but it also allows university management to tailor their support systems to address individual needs. Through personal counseling, therapy, or other appropriate interventions, the model holds the potential to significantly alleviate the suffering experienced by students dealing with depression. This strategy holds the promise of identifying at-risk students before their mental health issues worsen and opening the door for prompt intervention and enhanced general well-being.

## II. OBJECTIVES

To ensure that students know how to monitor their depression symptoms independently using the DEPsy model, there are three objectives to be fulfilled in this innovation.

- a) To find out what factors influence depressive symptoms in university students based on demographic factors, social support, stress, finances, and academic performance.
- b) To build a model of the factors that influence depressive symptoms using a multiple linear regression model.
- c) To estimate depressive symptoms of university students of a new user.

## III. METHODOLOGY

### A. Research Design

This study was conducted by using probability sampling at one of the universities in Negeri Sembilan. The total population of students in this university is 5388, which consists of three faculties. The sample size needed is at least 361 students for the total population [3]. A stratified sampling technique was used to select the sample in this study.

### B. Data Collection Method

Primary data was used in this study to collect data from the students in the university. An online survey refers to a list of questions that are specifically designed to be answered by the respondent without the involvement of researchers. The researchers constructed an online survey using Google Forms. Then, the link to Google Forms is spread to all the selected students through an online platform.

### C. Research Instrument

The development of the DEPsy Model was constructed by using questions adapted from [4] which consists of four sections, as explained in Table 1.

Table 1. Research instruments.

Section	Variables	No. of Questions
A	Demographic	10
B	Factor of Stress (ICSRLE)	36
C	Social Support (MSPSS)	12
D	Depressive Symptoms (CES-D)	20

### D. Multiple Linear Regression

Multiple linear regression was used to build a model based on the value of a dependent variable which is depression symptoms and seven independent variables (gender, faculty, working part-time, academic performance, monthly expenses, stress, and social support). All the assumptions of multiple linear regression were tested and fulfilled. Based on the analysis, only two variables were significant. Stress and social support stress influence depressive symptoms.

## IV. RESULTS AND FINDINGS

### A. Significant Factors and DEPsy Model

As mentioned earlier, multiple linear regression is used to identify the variables that contribute most to depression symptoms of seven independent variables involved in the model fitting, namely gender, faculty, working part-time, academic performance, monthly expenses, stress, and social support, only two were found statistically significant to the depression symptoms. Stress and social support were found to be important variables in explaining depression symptoms. Equation (1) shows the DEPsy model that has successfully been fitted using the empirical data.

$$Y = 1.896 + 0.359 (\text{Stress}) - 0.99 (\text{Social Support}) \quad (1)$$

From the model, stress has a positive relationship with depression symptoms. The higher the stress, the more depression symptoms increase. For each additional stress score, the score of depression increases by 0.359. In contrast to the support system, depression symptoms decrease when students have a good support system. This shows that depression symptoms and support systems are negatively related. Depression symptoms decreased by 0.99 for each social support score they had. In conclusion, the analysis results show that stress is the most important additional factor for depression symptoms [5]. In addition, students certainly need social support to reduce their stress levels, which can reduce their depression risk [6].

### B. Novelty

The DEPsy model is very comprehensive, as it was based on a study conducted specifically for university students, regardless of gender, race, or religion, as there are insignificant factors in this study to determine depressive symptoms. In addition, this model also uses established questionnaires to measure depressive symptoms, social support, and stress. These questionnaires have been used and tested by other studies and researchers. This model is also based on the characteristics and

situations that are appropriate in Malaysia. With the help of this model, every Malaysian university student can better manage their depression and stress.

This model is very easy to use, and users can determine the level of depressive symptoms. The total score ranges from zero to 60, and the cutoff score is 16 or higher, which helps identify students at risk for clinical depression. Users can use this model whenever needed, and it can improve healthcare coordination.

### C. Commercialization Potential

This model can benefit and be commercialized for 1,200,000 students of all higher education in Malaysia. Using this model is a screening for mental health in more than 590 higher education institutions, such as universities and colleges, in addition to individual use. An individual can evaluate their own mental health without being influenced by people around them or external factors.

### D. Feedback from the User

This model has been tested and received feedback from 30 users. The results of the study are presented in Fig. 1.

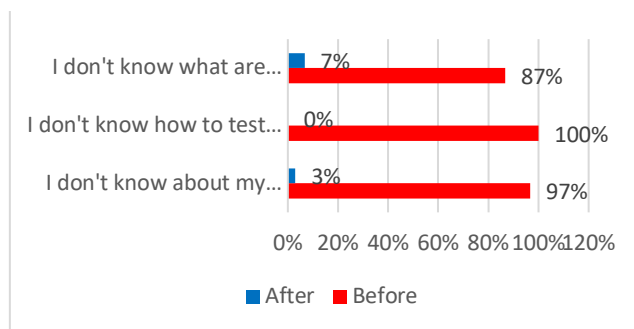


Fig. 1. Comparison of use DEPsy model.

According to Fig. 1, 87% of users don't know the factors that contribute to depression symptoms. After using this model, the percentage declined to 7%. All students don't know how to assess their depression symptoms. With the help of this innovation, students are able to test this symptom by answering the given set of questions. Students are guided with an appropriate assessment of depression by using an established questionnaire. The implementation of this model can reduce self-monitoring and testing of depression symptoms of students from 100% to 0%. They are also able to know their depression symptoms.

## V. CONCLUSIONS

This innovation offers some hope for students in observing their depression symptoms. The model promotes a more proactive and healthy culture for students to take action right away at the first symptom of depression appears. More practicable actions can be implemented, such as having counseling sessions and doing more recreational activities to gain social support and reduce stress levels probably can be implemented. The benefits of this innovation extend beyond the student, who will experience better mental health outcomes and improved academic performance but also extend to university management. The university management will create a healthier campus environment and build a solid reputation for prioritizing student well-being. These potential advantages combine to create a setting where students can achieve both intellectual and emotional success. Moreover, the innovation can be beneficial to more than a million students in higher education institutions (HEI) each year. Each student can employ the DEPsy model for mental health screening with their study time. The model gives a student a chance to assess their own mental health level without being influenced by people around them or external factors.

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