



Prevalence and Risk Factors of Stress, Anxiety and Depression among Medical Students of a Private Medical University in Malaysia

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ABSTRACT

Introduction: Medical school expected to be a time of personal development, achievement, and well-being. However, research shows that there are many negative effects on students' mental health due to the current educational process. **Objective:** This research aimed to determine the prevalence and risk factors of depression, anxiety, and stress among medical students of a private medical university in Malaysia. **Method:** Cross sectional study was conducted using self-administered questionnaires including socio-demographic factors, DASS-21 and MSSQ-40 questionnaires. **Result:** Prevalence of stress, anxiety, and depression were 46.9%, 76.2% and 60.2% respectively. Multiple logistic regression analysis showed that academic related stressors were only associated with stress [adjusted OR 1.78, 95% CI (1.23, 2.58), $p=0.002$]. Group activities related stressors were significantly associated with stress [adjusted OR=1.45, 95%CI (1.20, 1.75), $p<0.001$] and depression [adjusted OR 2.54, 95% CI (2.01, 3.20), $p<0.001$]. On the other hand, derive and desire related stressors were significantly associated with stress [adjusted OR=1.76, 95%CI (1.28, 2.58), $p<0.001$], anxiety [adjusted OR 2.54, 95%CI (2.01, 3.20), $p<0.001$], and depression [adjusted OR 2.54, 95% C.I. (2.01, 3.20), $p<0.001$]. Indian students had increased anxiety [adjusted OR=2.25, 95%CI (1.40, 3.60), $p=0.001$]. Availability of financial support protected against depression [adjusted OR=0.44, 95% CI (0.25, 0.77), $p=0.004$]. Similarly, fourth year medical students were at lower risk for developing anxiety [adjusted OR=0.43, 95%CI (0.25, 0.75), $p=0.003$] and depression [adjusted OR 0.59, 95%CI (0.36, 0.97), $p<0.036$]. **Conclusion:** Important risk factors were identified which will help in future development of stress management programs at the university.

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Introduction

Medical education aims to produce future doctors who are equipped with adequate knowledge, competency, in order to care for their

patients, contribute to the development of the art of medicine, and to promote public health. Prospective medical professionals undergo highly selective procedures by the medical schools which aim to recruit brilliant and

empathic students who are committed to these aims and willing to dedicate four years to establish them [1].

The U.S. and Canadian systems of medical education starts with students who have gained a bachelor's degree that minimally consists of basic training in biology, chemistry, and physics, as well as training in the humanities. Applicants usually have experience caring for patients through employment or volunteer work before joining medical school and must undergo comprehensive tests and a rigorous application and interview process. These processes are established to scrutinize individuals who intend to establish a future career in medicine. Once selected, medical schools and the students will work together to prepare students for a useful and fulfilling career at both individual and community levels [2].

Based on the above, we may expect that medical school would be a time of personal development, achievement, and well-being. However, research shows that there are many negative effect on students' mental health due to the current educational process which may have led to high prevalence of depression, anxiety, and stress among medical students [3]. It has also been theorized that burnout, a measure of distress common among residents and physicians in practice originates in medical school [1]. Many factors are thought to contribute to this decline in students' mental health including academic pressure, workload, financial concerns, sleep deprivation, exposure to patients' suffering and deaths, student and abuse [4]. Some have suggested that psychological distress among students may adversely influence their academic performance [5], contribute to academic dishonesty [6], and play a role in alcohol and substance abuse [7]. Student distress has also been reported to be associated with cynicism, an unwillingness to care for the chronically ill [8], and decreased empathy [9].

Psychological distress mainly depression is an increasing problem worldwide; the prevalence varies from country to country as well as from institution to another. Among those students with

psychological disorders such as depression a very small percentage seeks treatment and only a fraction of them actually receives it. (Less than 25% of depression patients have access to psychiatric care and treatment in the world). Depression is predicted to be the leading cause of disease burden by 2030 [10]. Medical education, due to its structure, it is considered to be very stressful with a high proportion reaching up to 40% affected with psychological distress. Medical school is a time of significant psychological distress for physicians-in-training. Currently available information is insufficient to draw firm conclusions on the causes and consequences of student distress [11].

This study aimed to identify the prevalence of psychological distress (stress, anxiety and depression) among preclinical medical students and to explore the possible causes of stress by identifying the main stressor factors. The selection of the preclinical students is determined to identify the problem at an early stage in order to help the students to cope with their future stress in clinical years as the studies showed that the stress levels as persistent throughout the years of medical education as well as in physicians under training [12, 13].

Method

Study design and population

A cross sectional study to determine the prevalence and risk factors of psychological distress in medical students of a private University.

Methods of data collection

A questionnaire was distributed to the students which included 3 sections. Section one includes the demographic factors of the students and specific risk factors which include residence, accommodation, religion, financial support, and love relationship. Section two includes the DASS-21 questionnaire which is made of three domains namely stress, anxiety and depression. Section three includes the MSSQ-40 questionnaire which was used to determine the stressors that affect the students. Using the MSSQ [14], the stressors will be grouped into 6

main domains namely: 1) Academic related stressor, 2) Inter/Intrapersonal Related Stressor, 3) Teaching and Learning Related Stressor, 4) Social Related Stressor, 5) Drive & Desire Related Stressor, and 6) Group Activities Related Stressor.

Statistics

Data were entered and analyzed using statistical packages for social sciences (SPSS) version 20. The distribution and frequencies were examined. The continuous variables were expressed as mean and standard deviation. The frequencies and percentages for categorical variables were described. Simple and multiple logistic regression were used to determine the risk factors of psychological distress.

Result

Characteristics of subjects

A total of 762 students were enrolled in the study. The response rate was 100%. The mean age of the respondents was 22.24 years with a standard deviation of 2 years. Thirty four percent were preclinical students and 77% were female. Majority of the students were Malay (67%). Most of the students live in urban area. 69% were Muslims. Other factors are shown in table 1.

Prevalence of Psychological distress

Table 2: Prevalence of Psychological distress using DASS-21 (n=743)

DASS	Category	n	Prevalence%
Depression	Yes	447	60.2
	No	295	39.8
Anxiety	Yes	567	76.2
	No	177	23.8
Stress	Yes	347	46.9
	No	393	53.1

Using DASS-21, the prevalence of stress was 46.9%, anxiety was 76% and depression was 60% (Table 2).

Table 1: Respondent profile (n=762)

Variable	Mean (SD)	N (%)
Age	22.24 (2)	-
Year of study		
Year 1	-	152(20)
Year 2	-	105(14)
Year 3	-	193(25)
Year 4	-	177(23)
Year 5	-	135(18)
Gender		
Male	-	175 (23)
Female	-	587 (77)
Race		
Malay	-	510 (66.9)
Chinese	-	32 (4.2)
Indian	-	194 (25.5)
Others	-	26 (3.4)
Batch		
Pre-clinical	-	257 (33.7)
Clinical	-	505 (66.3)
Highest educational level		
SPM/O-Level	-	44 (5.8)
Matriculation	-	473 (62.4)
Diploma	-	59 (7.8)
Bachelor degree	-	178 (23.5)
Other	-	4 (0.5)
Religion		
Islam	-	527 (69.2)
Buddhist	-	20 (2.6)
Hindu	-	172 (22.6)
Christian	-	44 (5.6)
Financial Support		
Yes	-	673 (88.3)
No	-	89 (11.7)
Relationship		
Yes	-	194 (25.7)
No	-	560 (74.3)

SD = standard deviation

Risk factors of psychological distress

Univariate analysis of the risk factors of stress ,using simple logistic regression, shows that being a year 3 medical students associated with 1.65 increase in the odds of stress compared to year 1 [OR 1.65, 95% CI (1.07, 2.55), *P*-value 0.023]. All domains of the MSSQ-40 show a significant association with stress. Results are shown in table 3.

Table 3: Risk factors of stress using DASS-21 for medical students of MSU (n=743)

Variables	Categories	OR ^a	95% CI ^b	P value ^c
Year of study	Year 1	1	-	-
	Year 2	1.29	(0.78 , 2.14)	0.317
	Year 3	1.65	(1.07, 2.55)	0.023
	Year 4	0.97	(0.63, 1.51)	0.906
	Year 5	0.79	(0.63, 1.51)	0.340
Age	-	0.94	(0.88 , 1.00)	0.061
Gender	Male	1	-	-
	Female	1.28	(0.91 , 1.81)	0.158
Batch	Pre-clinical	1	-	-
	Clinical	1.02	(0.75 , 1.38)	0.920
Race	Malay	1	-	-
	Chinese	1.004	(0.49 , 2.06)	0.991
	Indian	0.76	(0.68 , 1.33)	0.758
	Others	1.71	(0.75 , 3.87)	0.201
Highest educational level	SPM/O-Level	1	-	-
	Matriculation	0.94	(0.50 , 1.78)	0.846
	Diploma	0.88	(0.39, 1.97)	0.747
	Bachelor degree	0.95	(0.487 , 1.87)	0.873
	Other	0	(0.00 , NA)	0.999
Religion	Islam	1	-	-
	Buddhist	0.92	(0.38 , 2.26)	0.856
	Hindu	0.96	(0.68 , 1.37)	0.966
	Christian	1.45	(0.70 , 2.97)	0.315
	Others	0.42	(0.11, 1.61)	0.206
Financial Support	No	1	-	-
	Yes	0.80	(0.51 , 1.26)	0.337
Love	No	1	-	-
	Yes	0.93	(0.67 , 1.29)	0.655
Academic related stress	-	3.43	(2.65 , 4.43)	<0.001
Inter/Intrapersonal Related Stressor	-	2.24	(1.86 , 2.70)	<0.001
Teaching and Learning Related Stressor	-	2.55	(2.05 , 3.18)	<0.001
Social Related Stressor	-	2.82	(2.21 , 3.58)	<0.001
Drive & Desire Related Stressor	-	2.07	(1.76 , 2.44)	<0.001
Group Activities Related Stressor	-	2.99	(2.42 , 3.71)	<0.001

^aOdds ratio, ^b95% Confidence Interval, ^cSimple Logistic Regression Analysis

Regarding anxiety, Univariate analysis, using simple logistic regression, shows that all the domains of the MSSQ-40 have a significant

association with anxiety. Also being in clinical years shows a 50% reduction in the odds of anxiety. Results are shown in table 4.

Table 4: Risk factors of anxiety using DASS-21 for medical students of MSU (n=743)

Variables	Categories	OR ^a	95% CI ^b	P Value ^c
Year of study	Year 1	1	-	-
	Year 2	1.58	(0.79 , 3.15)	0.197
	Year 3	1.40	(0.79, 2.50)	0.246
	Year 4	0.46	(0.27, 0.76)	0.002
	Year 5	0.49	(0.27, 0.76)	0.010
Age	-	0.92	(0.85 , 0.99)	0.020
Gender	Male	1	-	-
	Female	1.28	(0.87 , 1.28)	0.215
Batch	Pre-clinical	1	-	-
	Clinical	0.56	(0.38 , 0.82)	0.003
Race	Malay	1	-	-
	Chinese	1.22	(0.52 , 2.91)	0.648
	Indian	1.53	(1.006 , 2.323)	0.047
	Others	2.74	(0.81 , 9.26)	0.106

^aOdds ratio, ^b95% Confidence Interval, ^cSimple Logistic Regression Analysis

Table 4: Continued

Variables	Categories	OR ^a	95% CI ^b	P Value ^c
Highest educational level	SPM/O-Level	1	-	-
	Matriculation	1.79	(0.91 , 3.52)	0.090
	Diploma	1.48	(0.62 , 3.57)	0.379
	Bachelor degree	1.27	(0.62 , 2.60)	0.519
	Other	0.48	(0.06 , 3.79)	0.489
Religion	Islam	1	-	-
	Buddhist	2	(0.58 , 6.92)	0.275
	Hindu	1.56	(1.004 , 2.431)	0.048
	Christian	2.47	(0.85 , 7.16)	0.097
	Others	0.42	(0.13 , 1.41)	0.161
Financial Support	No	1	-	-
	Yes	0.80	(0.51 , 1.26)	0.337
Love	Yes	1	-	-
	No	1.03	(0.70 , 1.52)	0.871
Academic related stress	-	3.10	(2.37 , 4.05)	<0.001
Inter/Intrapersonal Related Stressor	-	2.23	(1.80 , 2.77)	<0.001
Teaching and Learning Related Stressor	-	2.34	(1.85 , 2.96)	<0.001
Social Related Stressor	-	3.30	(2.49 , 4.38)	<0.001
Drive & Desire Related Stressor	-	1.89	(1.56 , 2.30)	<0.001
Group Activities Related Stressor	-	2.45	(1.97 , 3.06)	<0.001

^aOdds ratio, ^b95% Confidence Interval, ^cSimple Logistic Regression Analysis

Table 5: Risk factors of Depression using DASS-21 for medical students of MSU (n=743)

Variables	Categories	OR ^a	95% CI ^b	P Value ^c
Year of study	Year 1	1	-	-
	Year 2	1.57	(0.919 , 2.69)	0.099
	Year 3	1.22	(0.78 , 1.92)	0.377
	Year 4	0.61	(0.39 , 0.95)	0.028
	Year 5	0.88	(0.55 , 0.95)	0.603
Age	-	0.97	(0.91 , 1.04)	0.361
Gender	Male	1	-	-
	Female	0.99	(0.70 , 1.40)	0.946
Batch	Pre-clinical	1	-	-
	Clinical	0.73	(0.53 , 0.99)	0.047
Race	Malay	1	-	-
	Chinese	0.74	(0.36 , 1.52)	0.417
	Indian	1.02	(0.72 , 1.44)	0.916
	Others	1.05	(0.47 , 2.36)	0.908
Highest educational level	SPM/O-Level	1	-	-
	Matriculation	0.85	(0.44 , 1.65)	0.633
	Diploma	0.67	(0.29 , 1.52)	0.335
	Bachelor degree	0.88	(0.44 , 1.78)	0.726
	Other	0.19	(0.02 , 1.94)	0.159
Religion	Islam	1	-	-
	Buddhist	1.002	(0.40 , 2.49)	0.997
	Hindu	1.09	(0.76 , 1.55)	0.655
	Christian	1.47	(0.68 , 3.17)	0.326
	Others	0.17	(0.04 , 0.79)	0.024
Financial Support	No	1	-	-
	Yes	0.50	(0.30 , 0.82)	0.006
Love	Yes	1	-	-
	No	1.03	(0.73 , 1.44)	0.869
Academic related stress	-	2.43	(1.93 , 3.06)	<0.001
Inter/Intrapersonal Related Stressor	-	2.02	(1.68 , 2.43)	<0.001
Teaching and Learning Related Stressor	-	2.28	(1.85 , 2.81)	<0.001
Social Related Stressor	-	2.62	(2.06 , 3.33)	<0.001
Drive & Desire Related Stressor	-	2.16	(1.82 , 2.57)	<0.001
Group Activities Related Stressor	-	2.45	(2.01 , 3.00)	<0.001

^aOdds ratio, ^b95% Confidence Interval, ^cSimple Logistic Regression Analysis

Univariate analysis for risk factors of depression using simple logistic regression shows that students in clinical years are protected against depression [OR 0.73, 95% C.I. 0.53, 0.99], *P*-value <0.047]. Similarly, having financial support also protect against depression [OR 0.50, 95% C.I. (0.30, 0.82), *P*-value 0.006]. Similar to stress and anxiety, all the domains of MSSQ-40 show a significant association with depression (Table 5).

Multiple logistic regression analysis (table 6) showed that academic related stressors were only associated with stress [adjusted OR 1.78, 95% CI (1.23, 2.58), *p*=0.002]. Group activities related stressors were significantly associated with stress [adjusted OR=1.45, 95%CI (1.20, 1.75),

p<0.001] and depression [adjusted OR 2.54, 95% CI (2.01, 3.20), *p*< 0.001]. On the other hand, derive and desire related stressors were significantly associated with stress [adjusted OR=1.76, 95% CI (1.28, 2.58), *p*<0.001], anxiety [adjusted OR 2.54, 95% CI (2.01, 3.20), *p*<0.001], and depression [adjusted OR 2.54, 95% CI (2.01, 3.20), *p*< 0.001]. Indian students had increased anxiety [adjusted OR=2.25, 95% CI(1.40, 3.60), *p*=0.001]. Availability of financial support protected against depression [adjusted OR=0.44, 95% CI (0.25, 0.77), *p*=0.004]. Similarly, fourth year medical students were at lower risk for developing anxiety [adjusted OR=0.43, 95% CI (0.25, 0.75), *p*=0.003] and depression [adjusted OR=0.59, 95% CI (0.36, 0.97), *p*<0.036].

Table 6: Risk factors of stress, anxiety and depression using DASS-21 for medical students of MSU (n=743)

No.	Variables	Adj. OR ^a	95% CI ^b	P Value ^c
Stress				
	Academic related stress	1.78	(1.23, 2.58)	0.002
	Group Activities Related Stressor	1.45	(1.20, 1.75)	<0.001
	Drive & Desire Related Stressor	1.76	(1.28, 2.58)	<0.001
Anxiety				
	Year of study	Year 1	1	
		Year 2	1.67	(0.80, 3.48)
		Year 3	1.36	(0.74, 2.48)
		Year 4	0.43	(0.25, 0.75)
		Year 5	0.59	(0.33, 1.05)
	Race	Malay	1	
		Chinese	1.91	(0.70, 5.17)
		Indian	2.25	(1.40, 3.60)
		Others	2.89	(0.80, 10.46)
	Drive & Desire Related Stressor	2.54	(2.01, 3.20)	<0.001
Depression				
1.	Year of study	Year 1		
		Year 2	1.51	(0.84, 2.73)
		Year 3	1.17	(0.71, 1.91)
		Year 4	0.59	(0.36, 0.97)
		Year 5	0.921	(0.54, 1.56)
2.	Financial Support	No	1	
		Yes	0.44	(0.25, 0.77)
3.	Drive & Desire Related Stressors	2.54	(2.01, 3.20)	<0.001
4.	Group activities related stressors	2	(1.59, 2.51)	<0.001

^aAdjusted odds ratio, ^b95% Confidence Interval, ^cMultiple Logistic Regression Analysis

Discussion

This study shows that there is a considerable amount of stress, anxiety and depression in medical students. This is similar to other studies conducted in other Malaysian universities as well as in other parts of the world [15-19].

Prevalence of stress was 47% which is higher than that reported by Maher et al [19] which reported 17%. The reason for this could be related to a program held by UPM to enhance the students coping strategies toward stress which is usually conducted at the end of year 1.

Our study shows that the main risk factors that contribute to stress include academic related stress, group activities related stressor, and drive & desire related stressor. Group activities related stressors were also identified as one of the risk factors by the study conducted in UPM [19].

The prevalence of anxiety was 76% which is supported by the finding of another study conducted in Pakistan, Karachi [20] and another conducted in USM in 2012 [21]. After controlling for confounders the main factors contributing to anxiety among the medical students of drive and desire related stressors, and Indian race. On the other hand year 4 and 5 students are protected against anxiety which could be due to maturation of the students.

Depression, on the other hand, had a prevalence of 60% which is similar to that reported by Inam et al. [22]. The main factors that seem to contribute to depression in our study include derive and desire related stressor, and group activities related stressor and not having a financial support. Similar to anxiety, year 4 and 5 students seems to be protected when compared to year 1.

Group activities related stressor found to be as a major factor contributing to the students' mental health which needs further exploration and research to identify their role.

The generalizability of the study results is limited by the characteristics of the sample and we would recommend a major study that includes more than one university to be conducted to further examine the risk factors of stress, anxiety and depression in order to find a proper and generalized solution suitable for Malaysian students.

Conclusion

In this study, the need for complete and integrated strategy to prevent medical students' negative psychological problems has been highlighted. Although the prevalence is based on a screening tools (i.e. questionnaires), it does not affect the importance for further exploration and

further research to improve self-reported negative emotion by the future medical professionals. A comprehensive collaboration between stakeholders in the government and medical schools should be implemented in order to improve medical students' psychological health.

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