

Determining Predictors of Depression and Anxiety for Prevention of Common Mental Illness among Staff of an Academic Institution in Malaysia

Salmi Razali^{1,2}, Chua Yung-An²,
Mohd Izwan Mat Nazali¹, Hapizah M Nawawi²

¹ Department of Psychiatry,

² Institute of Pathology, Laboratory and Forensic Medicine (I-PPerForM),
Faculty of Medicine,

Universiti Teknologi MARA, 47000 Sungai Buloh, Selangor, Malaysia

drsalmi@gmail.com; yungan.chua@gmail.com; dr.izwan.pro@gmail.com; hapizah.nawawi@gmail.com

Abstract

Information on depression, anxiety and predictors for these mental illnesses among the staff of the academic institution is sparse. Hence, this study aimed to determine the prevalence of these mental illnesses and investigate possible predictors. Depression, Anxiety and Stress Scale 21-item and pro forma questionnaires were used to assess the presence of depression, anxiety, sociodemographic, personal and job-related factors. Of 278 participants, 27.7% had depression, and 26.7% had anxiety. Predictors for depression include inadequate workplace facilities, low-tier job category, working in urban campus and low income. Predictors for clinical anxiety were high workplace responsibility and low-tier job category.

Keywords: Depression; Anxiety; Academic Institution; Staff

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1.0 Introduction

While Malaysia is soaring ahead in various sectors, the country's education system has a long way to go to ensure excellence in academia. Malaysian academic institutions rarely ranked among the world's top universities. Various challenges and gaps must be addressed to achieve superiority status. To maintain the advancement in the pursuit of academic excellence and the promulgation of optimum quality of life, maintaining healthy in various aspects of life among both the staff and the students of the academic institutions is essential. The staff and students must maintain healthy not only in terms of physical health but also mental health.

2.0 Literature Review

Emotions come in the continuum between normal and abnormal emotional state. A person may have normal emotions such as feeling sad, despair, anxious and fearful. When the emotions continuous for a certain period and bring about impairment in function, risky or harming behaviour, and socially unacceptable behaviour, the person is considered to have abnormal emotional states such as depression or anxiety. These abnormal emotions required further clinical attention to prevent further complications such as suicide and psychosis. When these abnormal emotions fulfil a set of criteria, such as the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), the condition is known as mental illness or disorder. The two most common mental illnesses are depressive disorder and anxiety disorder. According to DSM-5, a few diagnoses (such as major depressive disorder, dysthymia and adjustment disorder) can be considered when someone has clinically significant depression. For those having clinically significant anxiety, he or she can be diagnosed with mental illness such as generalized anxiety disorder, panic disorder, a specific phobia or posttraumatic stress disorder.

Globally, the World Health Organization (2019) estimated that more than 300 million people worldwide are currently suffering from depression and many more having anxiety. Within a decade, from 2005 until 2015, WHO showed a striking 18% leap of the global prevalence of depression. In a recent systematic review of the prevalence of anxiety disorders in adult populations, experts reported the prevalence of anxiety disorders among general population ranging between 3.8% and 25%. It mainly occurs among women (5.2–8.7%) and young adults (2.5–9.1%) (Remes, Brayne, Van Der Linde, & Lafortune, 2016).

In Malaysia, the National Health and Morbidity Survey (NHMS, 2015) reported almost a threefold increase in mental health issues among adult Malaysians between 1996 until 2015. Citing a relatively recent review on depression by Ng (2014), Clinical Practice Guideline (CPG) of the management of the depressive disorder, Ministry of Health Malaysia (2019) showed that the percentage of depression in Malaysia varies from 8% to 12%. While mental health issues are increasing nationwide, a local study by Noor and Ismail (2016) showed depression among academic staff in the higher institution are three times higher than the local population, which is about 35.4% of these staff have depression (Noor & Ismail, 2016).

It is a concern that consequences of depression and anxiety on the mental health status of the staff in higher education are likely to cause damaging effects not only to the quality of

life of the staff and students, but also the success of the institution (January et al., 2018). Depression and anxiety result in absenteeism and presenteeism; in both situations, the total effects are a reduction in job performance and work productivity (Lerner & Henke, 2008). Furthermore, intricate effects of personal issues and continuous exposure to job stress, work-life imbalance and poor access to appropriate intervention may worsen depression, leading to severe complications such as suicide and psychosis (Milner, Witt, LaMontagne, & Niedhammer, 2018).

Both depression and anxiety are believed to be attributable to the interaction between complex biological, psychological, social and environmental factors (Lammerts et al., 2016). Hence, these psychological disturbances which common among academic staff should not merely be regarded as a workplace or job stress issues (Noor & Ismail, 2016). Workers have their personal and family issues which could additionally precipitate depression and anxiety at work (Fan, Blumenthal, Watkins, & Sherwood, 2015). In the working environment, disturbance in the dynamic of interaction between job demand, control and support plays a crucial role in the genesis of psychological and emotional disturbances among workers (Karasek Jr, 1979; Van der Doef & Maes, 1999).

In Malaysia, despite the increase in the local prevalence of depression and anxiety resulted in overwhelming negative consequences, there is still sparse of knowledge of the level of depression and anxiety among academic staff and their contributing factors. Most previous local research on academic staff have focused mainly on job stress, job satisfaction and burnout, but little on depression and anxiety (Ahsan, Abdullah, Fie, & Alam, 2009; Ismail, Yao, & Yunus, 2009; Mustapha, 2013; Noordin & Jusoff, 2009). Previous local studies among staff in academic institutions also focused only on academicians without investigating the non-academic and support staff. Moreover, little is known regarding the contributions of personal and family matters on depression among them. Hence, this study aimed to investigate the prevalence of clinical depression and anxiety among staff at various levels of work positions in the academic institution. The objective of the study would also to determine the possible contributing factors (including personal, family as well as job-related factors) that could be the predictors of depression among the staff in academic institutions.

3.0 Methods

3.1 Study design

This was a cross-sectional study conducted in a selected public, academic institution in Malaysia. There were about 17488 academic and non-academic staff working in this institution which serves to teach and provide services for students allocated in one satellite campus and another 34 campuses spreading all over Malaysia.

3.2 Selection criteria

The participants were selected conveniently among the staff of this academic institution from four different campuses situated in urban areas (3 campuses) and suburban area (1 campus). They should be able to communicate in English or Bahasa Malaysia and aged

between 18 years old and above. Those who gave written informed consent were enrolled in the study.

3.3 Data source

Participants who gave informed consent were assessed using self-report Pro-forma questionnaire. It measures their sociodemographic factors (gender, age, marital status, educational level, level of income), personal factors (personal issue, physical illness and family issue and job-related factors (campus location, job category, duration of service, work promotion, work responsibility, issue with clients or students, level of satisfaction with the superior, conflict with the workmate and condition of workplace facilities).

The level of depression and anxiety were measured using the depression subscales and anxiety subscales of the Depression, Anxiety, Stress Scale (DASS-21 item), respectively. DASS is a self-report questionnaire which has excellent internal reliabilities with Cronbach's alpha of 0.88 for Depression subscale and 0.74 for Anxiety subscale (Musa, Fadzil, & Zain, 2007), which has been used in many studies of academic staff in this country (Mukhtar & Oei, 2011; Noor & Ismail, 2016). In this study, we defined participants with clinical depression as those who have moderate to very severe depression, and clinical anxiety is those who have severe and very severe anxiety.

3.4 Data analysis

Data were analysed using Statistical Package for the Social Sciences (SPSS) Version 24. Differences between sociodemographic factors, personal factors and job-related factors of staff with and without clinical depression or clinical anxiety were analysed using Pearson's Chi-Square Test. Simple and multiple logistic regressions were used to determine the possible contributing factors or predictors for depression.

3.5 Ethical consideration

This study was approved by the Institutional Ethics Committee. All participants are anonymous and gave consent for participation without coercion.

4.0 Results

4.1 Background of Participants

A total of 278 staff (Mean \pm SD age: 38.84 \pm 7.85 years; 44.2% males) participated in the study. Of the total participants, 173 (62.3%) were from three campuses located at urban areas in Selangor and 98 (35.3%) were from campus in the suburban area in Johore. The participants were those working at high levels of job position (premier, professional and management) (n=94; 33.8%), and the remaining were support staff and general workers. About two-thirds of the participants (n=188; 67.6%) had less than ten years' duration of service. Of the total participants, 76 (27.7%) had clinical depression, and the remaining had normal or non-clinical depression. An almost similar percentage of participants had clinical anxiety; n=74 (26.7%) (Figure 1).

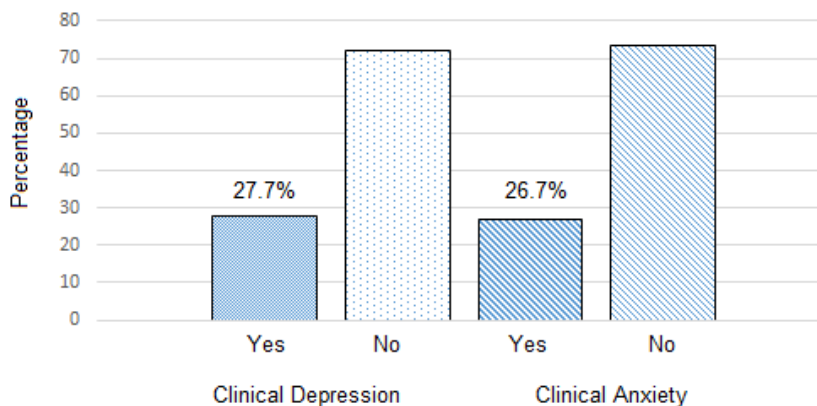


Figure 1: Percentages of Clinical Depression and Clinical Anxiety among Staff of an Academic Institution (n=278)

4.2 Differences between participants with and without clinical depression

Significant differences between those who were clinically depressed and not clinically depressed include level of income ($X^2(1)=4.962$, $p=0.026$), physical illness ($X^2(1)=3.971$, $p=0.046$), campus location ($X^2(1)=13.252$, $p=0.000$), job category ($X^2(1)=8.263$, $p=0.004$), work responsibility ($X^2(1)=8.153$, $p=0.004$), level of satisfaction with the superior ($X^2(1)=6.728$, $p=0.009$) and inadequate workplace facilities ($X^2(1)=7.441$, $p=0.006$). The details of differences between participants with and without clinical depression in association with their sociodemographic backgrounds, personal factors and job-related factors are elaborated in Table 1.

4.3 Differences between participants with and without clinical anxiety

Significant differences between those who had clinical anxiety and had no clinical anxiety include level of income ($X^2(1)=5.383$, $p=0.020$), family issues ($X^2(1)= 5.332$, $p=0.021$), job category ($X^2(1)= 4.999$, $p=0.025$), work responsibility ($X^2(1)= 8.038$, $p=0.005$), level of satisfaction with the superior ($X^2(1)= 6.417$, $p=0.011$) and issues with client or students ($X^2(1)=6.468$, $p=0.011$). Table 1 shows details of differences between participants with and without clinical anxiety in association with their sociodemographic backgrounds, personal factors and job-related factors.

4.4 Predictors for depression

Multiple logistic regressions showed that inadequate workplace facilities, job category, campus location and total household income were the predictors for depression among the staff of the academic institution. Even though the presence of physical illness was significantly different between the staff with and without clinical depression, this factor was excluded from the model development because its inclusion resulted in the model became

insignificant. We found that inadequate workplace facilities as the strongest predictor for depression (AOR=9.120; p=0.041; 95%CI=1.099-75.668), followed by low-tier job category which had almost four times odds of having clinical depression (AOR=3.924; p=0.001; 95%CI=1.727-8.915). Staff working in the urban area had higher odds of having clinical depression and working in suburban was protective of clinical depression, but the odds were very low (AOR=0.151; p=0.000; 95%CI=0.065-0.352). Higher household income was a protective factor for clinical depression (AOR=0.422; p=0.041; 95%CI=0.184-0.965). The model is significant as reported by the Omnibus Test ($\chi^2=54.224$, df=6, p=0.000); Nagelkerke R Square test equals to 0.303; Cox & Snell R Square test equals to 0.212, and Hosmer & Lemeshow test equals to 0.252. It has a specificity of 89.6% and sensitivity of 52.3% (Table 2).

4.5 Predictors for anxiety

The predictors for anxiety among the staff were work responsibility and job category. We found that work responsibility had the highest odds in which those with high workplace responsibility had almost three times higher odds to have clinical anxiety than those perceived of having low workplace responsibility (AOR=2.993; p=0.017; 95%CI=1.212-7.394). Another crucial predictor was the job category of the participants. Staff who were among those at low work tier had two times odds of having clinical anxiety than other workers (AOR=2.185; p=0.035; 95%CI=1.057-4.517). The model is statistically significant (Table 3).

Table 1: Differences in sociodemographic backgrounds, personal factors and job-related factors in relation to the status of clinical depression and anxiety

Characteristics	No Depression	Clinical Depression	X ²	P-value	No Anxiety	Clinical Anxiety	X ²	P-value
Sociodemography								
Gender								
Male	89 (73.6%)	32 (26.4%)	0.180	0.671	94(76.4%)	29(23.6%)	1.111	0.292
Female	109 (71.2%)	44 (28.8%)			109(70.8%)	45(29.2%)		
Age								
≤45 years	165 (74.3%)	57 (25.7%)	1.926	0.165	170(75.9%)	54(24.1%)	3.353	0.067
>45 years	33 (64.7%)	18 (35.3%)			33(63.5%)	19(36.5%)		
Marital Status								
Single/ Divorce/ Widow	33 (70.2%)	14 (29.8%)	0.107	0.743	33(70.2%)	14(29.8%)	0.256	0.613
Married	164 (72.6%)	62 (27.4%)			169(73.8%)	60 (26.2%)		
Education								
Primary/ Secondary	53 (67.9%)	25 (32.1%)	0.965	0.326	54(68.4%)	25(31.6%)	1.318	0.251
Tertiary	144 (73.8%)	51 (26.2%)			148(75.1%)	49(24.9%)		
Total Household Income								
≤RM5000	51 (63.0%)	30 (37.0%)	4.962	0.026*	53(63.9%)	30(36.1%)	5.383	0.020*
>RM5000	147 (76.2%)	46 (23.8%)			150 (77.3%)	44(22.7%)		
Personal Factors								

Physical Illness								
Yes	40 (62.5%)	24 (37.5%)	3.971	0.046*	44(69.8%)	19(30.2%)	0.494	0.482
No	158 (75.2%)	52 (24.8%)			159(74.3%)	55(25.7%)		
Personal issue								
Yes	48 (70.6%)	20 (29.4%)	0.127	0.722	45(67.2%)	22(32.8%)	1.691	0.193
No	150 (72.8%)	56 (29.4%)			158(75.2%)	52(24.8%)		
Family issue								
Yes	26 (74.3%)	9 (25.7%)	0.820	0.775	20(57.1%)	15(42.9%)	5.332	0.021*
No	172 (72.0%)	67 (28.0%)			183 (75.6%)	59(24.2%)		
Job Factors								
Campus location								
Urban	112 (64.7%)	61 (35.3%)	13.25 2	0.0001***	121(69.5%)	53(30.5%)	3.352	0.067
Suburban	86 (85.1%)	12 (14.9%)			82(79.6%)	21(20.4%)		
Job category								
Premier, professional & management	78 (83.0%)	16 (17.0%)	8.263	0.004**	77 (81.1%)	18(18.9%)	4.999	0.025*
Support & general workers	104 (66.2%)	53 (33.8%)			107(68.2%)	50(31.8%)		
Duration of current service								
<10years	138 (73.4%)	50 (26.5%)	0.389	0.533	142(74.7%)	48(25.3%)	0.651	0.420
>10 years	60 (69.8%)	26 (30.2%)			61(70.1%)	26(29.9%)		
Work promotion								
Yes	123 (71.9%)	48 (28.1%)	0.025	0.874	133(76.0%)	42(24.0%)	1.789	0.206
No	75 (72.8%)	28 (27.2%)			70(68.6%)	32(31.4%)		
Work responsibility								
High	149 (68.3%)	69 (31.7%)	8.153	0.004**	152 (69.4%)	67(30.6%)	8.038	0.005**
Low	49 (87.5%)	7 (12.5%)			51(87.9%)	2(12.1%)		
An issue with client/ students								
Yes	127 (68.6%)	58 (31.4%)	3.712	0.054	126 (68.5%)	58(31.5%)	6.468	0.011*
No	71 (79.8%)	18 (20.2%)			77(82.8%)	16(17.2%)		
Dissatisfied with superior								
Yes	115 (66.9%)	57 (33.1%)	6.728	0.009**	117(68.0%)	55(32.0%)	6.417	0.011*
No	83 (81.4%)	19 (18.6%)			86(81.9%)	19(18.1%)		
Conflict with workmate								

Yes	53 (74.6%)	18 (25.4%)	0.272	0.602	49(68.1%)	23(31.9%)	1.359	0.244
No	145 (71.4%)	58 (28.6%)			154(75.1%)	51(24.9%)		
Inadequate workplace facilities								
Yes	155 (68.6%)	71 (31.4%)	7.441	0.006*	164 (71.6%)	65(28.4%)	2.497	0.114
No	22 (95.7%)	1 (4.3%)			20(87.0%)	3(13.0%)		

χ^2 =Pearson Chi-Square Test; * p <0.05, ** p <0.001

Table 2: Predictors for Clinical Depression among Staff of Academic Institution

Predictors	Simple logistic regression				Multiple logistic regression				
	B	OR	P value	95%CI	Adj B	Adj OR	P value	95% CI	
Work facilities	2.310	10.007	0.025*	1.332 76.241	2.210	9.120	0.041*	1.099 75.668	
Job category	0.910	2.484	0.005*	1.321 4.672	1.367	3.924	0.001**	1.727 8.915	
Campus location	-1.189	0.320	0.000**	0.170 0.602	-1.889	0.151	0.000**	0.065 0.352	
Total household income	-0.631	0.532	0.027*	0.304 0.931	-.864	0.422	0.041*	0.184 0.965	
Workplace responsibility	1.176	3.242	0.006*	1.937 7.52	0.838	2.313	0.103	0.844 6.335	
Satisfaction with superior	0.773	2.165	0.010*	1.199 3.910	0.561	1.753	0.137	0.836 3.672	

Omnibus Test ($\chi^2=54.224$, $df=6$, $p=0.000$); Nagelkerke R Square=0.303; Cox & Snell R Square=0.212; Hosmer & Lemeshow=0.252; Specificity=89.6%; Sensitivity=52.3%; * p <0.05, ** p <0.001

Table 3 Predictors for Clinical Anxiety among Staff of Academic Institution

Predictors	Simple logistic regression					Multiple logistic regression			
	B	OR	P value	95%CI	Adj B	Adj OR	P value	95% CI	
Workplace responsibility	1.167	3.211	0.007*	1.386 7.444	1.096	2.993	0.017*	1.212 7.394	
Job category	0.693	1.999	0.027*	1.083 3.691	0.782	2.185	0.035*	1.057 4.517	
Family issues	0.844	2.326	0.024*	1.120 4.832	0.063	2.168	0.063	0.960 4.898	
Issue with client/students	0.795	2.215	0.012*	1.189 4.126	0.512	1.669	0.270	0.672 4.146	
Total household income	0.657	1.930	0.021*	1.102 3.378	0.327	1.387	0.359	0.690 2.790	
Satisfaction with superior	0.755	2.128	0.012*	1.178 3.843	0.165	1.179	0.712	0.492 2.826	

Omnibus Test ($\chi^2=22.071$, $df=6$, $p=0.001$); Nagelkerke R Square=0.122; Cox & Snell R Square=0.084; Hosmer & Lemeshow=0.671; Specificity=97.8%; Sensitivity=5.9%; * p <0.05, ** p <0.001

5.0 Discussion

In general population, most researchers suggested that background sociodemography such as age, gender, marital status, personal and family issues may precipitate depression (Grant et al., 2009; Lorant et al., 2003; Mead, 2002). However, in this paper, we highlight that the main predictors of depression and anxiety among staff in academic institutions are likely to be factors that relate to their work including workplace facilities, job category, work responsibility, total household income and the location of the campus.

High work demand has long been recognised by many researchers to precipitate stress leading to anxiety (Karasek Jr, 1979). Our study supported these findings and showed that staff who perceived having high workplace responsibility had a higher tendency for anxiety. In the era of a breakthrough in technology, in order to address the stress due to work demand, the academic institution should abreast and be equipped with up-to-date facilities to provide an efficient and smart work environment for the staff. Inadequate resources to facilitate the work process, as documented in this study played a significant role in the genesis of

depression among staff in the academic institution. Poorly maintained and inefficient facilities may increase the tendency for staff to develop job stress which in turn precipitates emotional disturbance such as depression. The attribution of low work resources (including inadequate work facilities) is substantial that it can independently contribute to depression among workers (Lunau, Wahrenndorf, Müller, Wright, & Dragano, 2018). The importance of the work environment in precipitating depression have also been supported by a 23-years prospective cohort study investigating factors for depression elsewhere (Heinz et al., 2018). In Malaysia, a local study by Yeoh, Tam, Wong, and Bonn (2017) who assessed predictors for depression showed a clear contribution of job environment and depressive symptoms. Hence, the authorities in academic institutions need to provide more supportive and conducive work environment with efficient facilities which function not only for promoting academic progress and enrich scholarly collaboration but also as spaces designed for timeout and quick escape during work time, which in turn can amplify productivity, hence ensures the physical and mental health of the workers (Heinz et al., 2018).

Our study showed that top-level management, professionals and managerial staff reported having less tendency for depression as well as anxiety compared to support staff and general workers. These job factors have also been documented as the crucial predictors for depression by other local researchers (Manaf et al., 2016; Yeoh et al., 2017), suggesting lack of power to make essential decisions is a source of depression and anxiety among lower rank staff in academic institutions. In a review of sixteen studies that involved 63 000 employees, experts documented that low decision latitude (apart from high work demand) was the strongest predictor for depression among workers (Bonde, 2008). Moreover, it is interesting to highlight that while decision making is one of the vital elements, we found no significant role of gender difference in depression among staff in the studied academic institution. This result is in contrary to the finding of another local study by Fasoro (2018) which found that male staff have a higher tendency for depression. Perhaps, in the academic institution we studied, an equal chance was given to both male and female staff to hold the top-level management and decision-making position. Addressing decision latitude is challenging because it relates to the work description of each staff. Hence, to manage depression among staff, instead of reevaluating work description, authority in the academic institution should use other strategies including positive reinforcement, reward strategies and increase support system for the academic staff (Letellier et al., 2018).

While social scientists are still in disagreement on the role of living environment on status of well-being (Berry & Okulicz-Kozaryn, 2009; Okulicz-Kozaryn & Mazelis, 2018), our study supported the traditional and widespread belief that financial security and living in a suburban area may protect one from psychological issues. Our finding is in keeping with the result of a recent systematic review that evaluated 21 studies on the impact of household financial strain on psychological well-being (French & Vigne, 2019). The study showed that having a financial issue may increase the tendency for one to have depression. Perhaps, mediating factors including personal factors such as difficulty to manage direct financial obligation (such as a mortgage, medical or educational expenses, and general consumer debt) and indirect financial requirement (such as family size, number of children and marital status) (Sinclair & Cheung, 2016) play significant contribution to depression. Moreover, our study agreed that

working in a suburban area is better, perhaps because of low population density, better social organization, healthier social integration as well as better social support in suburban area would prevent staff in academic institution from having psychological issues such as depression (Berry & Okulicz-Kozaryn, 2009; Okulicz-Kozaryn & Mazelis, 2018).

6.0 Implication and recommendation

The findings of this research are relevant to inform authorities of the need for academic authorities to address factors underpin depression and anxiety among the staff of the academic institution. The job-related factors, including high workplace responsibility, inadequate workplace facilities, low-tier job category or work position that allow control and decision making, low income and financial insecurity, as well as the unfavourable location of the institution which underpin depression and anxiety among staff in academic institutions, should be addressed comprehensively as early as possible to prevent complications. A concerted effort from the individual staff and higher authorities in the academic organisation are crucial to address these issues. In order to prevent anxiety and depression, the authorities should provide not only a conducive work environment but also facilities for stress management, including amenities for relaxation such as sensory garden, gymnasium and other leisure activities. Furthermore, work culture, which emphasizes the importance of work-life balance, empowers the staff to be assertive and provides a positive reward for productive work, are essential to boost their motivation. Enhancing knowledge of stress prevention and awareness on the manifestation of depression and anxiety among staff is crucial so that early detection and fast treatment and counselling can be offered to the needed staff. It is recommended that staff who have a mental illness such as depression and anxiety to be given a chance to get access for effective treatment and rehabilitation. Poor support, social isolation and marginalization of staff with mental illness would further lead to damaging effect to the academic institution.

7.0 Conclusion

This study provides insights to the predictors of depression and anxiety among staff in an academic institution; nevertheless, we would like to inform that the study was limited by its design and suggest a more robust prospective study, using diagnostic assessment and larger sample sizes to determine the causal factors for depression among the staff of an academic institutions. We are aware that many other personal, job and environmental factors that could influence depression among staff in academic institutions that have not been included in this study.

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References

- Ahsan, N., Abdullah, Z., Fie, D. Y. G. & Alam, S. S. (2009). A study of job stress on job satisfaction among university staff in Malaysia: Empirical study. *European journal of social sciences*, 8(1), 121-131.
- American Psychiatric Association (APA)(2019). The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) Retrieved from <https://www.psychiatry.org/psychiatrists/practice/dsm>
- Berry, B. J., & Okulicz-Kozaryn, A. (2009). Dissatisfaction with city life: A new look at some old questions. *Cities*, 26(3), 117-124.
- Bonde, J. P. E. (2008). Psychosocial factors at work and risk of depression: a systematic review of the epidemiological evidence. *Occupational and environmental medicine*, 65(7), 438-445.
- Fasoro, A. (2018). Prevalence and Associated Factors of Current Depressive Symptoms among Staff of a Public University in Malaysia. *Online Journal of Health and Allied Sciences*, 16(4).
- French, D., & Vigne, S. (2019). The causes and consequences of household financial strain: A systematic review. *International Review of Financial Analysis*, 62, 150-156.
- Grant, B. F., Goldstein, R. B., Chou, S. P., Huang, B., Stinson, F. S., Dawson, D. A., . . . Pickering, R. P. (2009). Sociodemographic and psychopathologic predictors of first incidence of DSM-IV substance use, mood and anxiety disorders: results from the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions. *Molecular psychiatry*, 14(11), 1051.
- Heinz, A. J., Meffert, B. N., Halvorson, M. A., Blonigen, D., Timko, C., & Cronkite, R. (2018). Employment characteristics, work environment, and the course of depression over 23 years: Does employment help foster resilience? *Depression and anxiety*, 35(9), 861-867.
- Ismail, A., Yao, A., & Yunus, N. K. Y. (2009). Relationship Between Occupational Stress and Job Satisfaction: An Empirical Study in Malaysia. *Romanian Economic Journal*, 12(34).
- January, J., Madhombiro, M., Chipamaunga, S., Ray, S., Chingono, A., & Abas, M. (2018). Prevalence of depression and anxiety among undergraduate university students in low-and middle-income countries: a systematic review protocol. *Systematic reviews*, 7(1), 57.
- Karasek Jr, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative science quarterly*, 285-308.
- Lammerts, L., Schaafsma, F. G., Eikelenboom, M., Vermeulen, S. J., van Mechelen, W., Anema, J. R., & Penninx, B. W. (2016). Longitudinal associations between biopsychosocial factors and sustainable return to work of sick-listed workers with a depressive or anxiety disorder. *Journal of occupational rehabilitation*, 26(1), 70-79.
- Lerner, D., & Henke, R. M. (2008). What does research tell us about depression, job performance, and work productivity? *Journal of Occupational and Environmental Medicine*, 50(4), 401-410.

- Letellier, M.-C., Duchaine, C., Aubé, K., Talbot, D., Mantha-Bélisle, M.-M., Sultan-Taieb, H., Brisson, C. (2018). Evaluation of the Quebec Healthy Enterprise Standard: effect on adverse psychosocial work factors and psychological distress. *International journal of environmental research and public health*, 15(3), 426.
- Lorant, V., Delière, D., Eaton, W., Robert, A., Philippot, P., & Ansseau, M. (2003). Socioeconomic inequalities in depression: a meta-analysis. *American journal of epidemiology*, 157(2), 98-112.
- Lunau, T., Wahrendorf, M., Müller, A., Wright, B., & Dragano, N. (2018). Do resources buffer the prospective association of psychosocial work stress with depression? Longitudinal evidence from ageing workers. *Scandinavian journal of work, environment & health*, 44(2), 183-191.
- Manaf, M. R. A., Qureshi, A. M., Lotfizadeh, M., Ganasegeran, K., Yadav, H., & Al-Dubai, S. (2016). Factors associated with anxiety and depression among outpatients in Malaysia: A cross-sectional study. *Malaysian Journal of Public Health Medicine*, 16(3), 181-187.
- Mead, D. E. (2002). Marital distress, co-occurring depression, and marital therapy: A review. *Journal of marital and family therapy*, 28(3), 299-314.
- Milner, A., Witt, K., LaMontagne, A. D., & Niedhammer, I. (2018). Psychosocial job stressors and suicidality: a meta-analysis and systematic review. *Occupational and environmental medicine*, 75(4), 245-253.
- Ministry of Health Malaysia. (2019). Management of Depressive Disorder (Second Edition). Retrieved 26 September 2019 from [http://www.moh.gov.my/moh/resources/Penerbitan/CPG/1_CPG_Management_Major_Depressive_Disorder_\(Second_Edition\).pdf](http://www.moh.gov.my/moh/resources/Penerbitan/CPG/1_CPG_Management_Major_Depressive_Disorder_(Second_Edition).pdf).
- Mukhtar, F., & Oei, T. P. (2011). A review of assessment and treatment for depression in Malaysia. *Depression research and treatment*, 2011.
- Musa, R., Fadzil, M. A., & Zain, Z. (2007). Translation, validation and psychometric properties of Bahasa Malaysia version of the Depression Anxiety and Stress Scales (DASS). *ASEAN Journal of Psychiatry*, 8(2), 82-89.
- Mustapha, N. (2013). The influence of financial reward on job satisfaction among academic staffs at public universities in Kelantan, Malaysia. *International Journal of Business and Social Science*, 4(3).
- Noor, A., & Ismail, N. H. (2016). Occupational stress and its associated factors among academicians in a research university, Malaysia. *Malaysian Journal of Public Health Medicine*, 16(1), 81-91.
- Noordin, F., & Jusoff, K. (2009). Levels of job satisfaction amongst Malaysian academic staff. *Asian social science*, 5(5), 122-128.
- Okulicz-Kozaryn, A., & Mazelis, J. M. (2018). Urbanism and happiness: A test of Wirth's theory of urban life. *Urban Studies*, 55(2), 349-364.
- Remes, O., Brayne, C., Van Der Linde, R., & Lafortune, L. (2016). A systematic review of reviews on the prevalence of anxiety disorders in adult populations. *Brain and behaviour*, 6(7), e00497.
- Sinclair, R. R., & Cheung, J. H. (2016). Money matters: Recommendations for financial stress research in occupational health psychology. *Stress and Health*, 32(3), 181-193.
- Van der Doef, M., & Maes, S. (1999). The job demand-control (-support) model and psychological well-being: a review of 20 years of empirical research. *Work & Stress*, 13(2), 87-114.

World Health Organization (WHO) (2019). Mental Health; Depression, Let's talk. Retrieved from https://www.who.int/mental_health/management/depression/en/

Yeoh, S. H., Tan, C. L., Wong, C. P., & Bonn, G. (2017). Examining depressive symptoms and their predictors in Malaysia: Stress, locus of control, and occupation. *Frontiers in psychology*, 8, 1411.