RELATIONSHIP BETWEEN SLEEP DEPRIVATION AND MENTAL HEALTH PROBLEMS AMONG MANAGEMENT UNIVERSITY STUDENTS

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Abstract

Depression, anxiety and stress are some of the common mental health problems faced by university students. Sleep is important to any individual and those with sleep deprivation are more vulnerable to mental health problems. This study aims to investigate the relationship between sleep deprivation and mental health problems (depression, anxiety, and stress) among Management (Technology) students in UTM as well as to identify the level of sleep deprivation, depression, anxiety and stress among the students. A total of 117 Management (Technology) students participated in this study using convenient sampling technique with the final sample size of 98 respondents. Sleep deprivation was assessed using the Pittsburgh Sleep Quality Index (PSQI) while mental health were assessed using the Depression Anxiety Stress Scale 21 (DASS-21). The findings indicate that majority students have a high level of sleep deprivation, mild level of depression, moderate level of anxiety, and normal level of stress. Moreover, there is a significant positive relationship between sleep deprivation and mental health dimensions (depression, anxiety and stress) among the students.

Keywords: *Sleep deprivation, Depression, Anxiety, Stress, University students*

Abstrak

Kemurungan, keresahan dan tekanan adalah antara masalah kesihatan mental yang biasa dihadapi oleh para pelajar universiti. Tidur penting bagi setiap individu dan mereka yang kurang tidur lebih terdedah kepada masalah kesihatan mental. Kajian ini dijalankan untuk mengkaji hubungan antara masalah kekurangan tidur dan masalah kesihatan mental (kemurungan, keresahan, dan tekanan) dalam kalangan pelajar Pengurusan (Teknologi) di UTM serta untuk mengenal pasti tahap masalah kekurangan tidur, kemurungan, keresahan dan tekanan dalam kalangan pelajar. Seramai 117 orang pelajar Pengurusan (Teknologi) mengambil bahagian dalam kajian ini dengan menggunakan teknik

persampelan mudah dengan bilanga sampel akhir seramai 98 responden. Masalah kekurangan tidur diukur menggunakan soal selidik *Pittsburgh Sleep Quality Index (PSQI)* manakala kesihatan mental diukur menggunakan soal selidik *Depression Anxiety Stress Scale 21 (DASS-21)*. Hasil kajian menunjukkan bahawa kebanyakan pelajar mempunyai masalah kekurangan tidur yang tinggi, tahap kemurungan ringan, tahap keresahan yang sederhana, dan tahap tekanan normal. Kajian ini juga mendapati terdapat hubungan positif yang signifikan antara masalah kekurangan tidur dan dimensi-dimensi kesihatan mental (kemurungan, keresahan dan tekanan) dalam kalangan pelajar.

Kata kunci: *Masalah kekurangan tidur, Kemurungan, Keresahan, Tekanan, Pelajar universiti*

■ **1.0 INTRODUCTION**

Depression, anxiety, and stress are the common mental health problems experienced by university students (Zochil & Thorsteinsson, 2018). Depression is a state of feeling not happy, displeased, and dreadful about life (Berk, 2010). It is reported that 53% young adults suffered with some level of depressive symptoms at the university (Furr, Westefeld, McConnell, & Jenkins, 2001). In addition, according to a study by Lemma, Gelaye, Berhane, Worku, and Williams (2012), the prevalence of university students who experienced depression is 50.8% which is high. Next, anxiety is a cognitive circumstances that have the ability to activate fight and flight in individuals when there is a hazard (Talbot, McGlinchey, Kaplan, Dahl, & Harvey, 2010). The prevalence of anxiety among university students is 58% (Lemma, Gelaye, Berhane, Worku, & Williams, 2012) which was considered as high. Stress refers to a tension or worry due to problems that occur in someone's life (Hornby, 2010). Lemma, Gelaye, Berhane, Worku, and Williams (2012) found that 34.1% university students suffered from stress. Surprisingly, a study conducted among undergraduate dental students shows 100% prevalence of stress in all years of study (Ahmad, Md Yusoff, & Abdul Razak, 2011). A study found that 60% of university students that were classified as having significantly high physical and mental health problems also reportedly suffered with sleep deprivation (Lund, Reider, Whiting, & Prichard, 2010).

Sleeping is a basic need for every living person. Getting a good night's sleep is important to ensure that our body functions most effectively when we wake up the next morning. There are many functions of sleep (Kalat, 2009) and the important functions are to regulate human's emotions (Anderson, 2010), rest body muscles, reduce metabolism, restore proteins in the brain (Kong et al., 2002), restructure synapses, and strengthen memories (Sejnowski & Destexhe, 2000). Sleep can be divided into two alternating psychological states which are rapid eye movement (REM) and non-rapid eye movement (NREM) (Dissanyaka, Cvetkovic, Abdullah, Ahmed, & Penzel, 2016). Both REM and NREM sleep are significance to human being but according to Vredenburgh (2017), people who experienced disturbance in REM sleep may face problems when they wake up.

Individuals who suffered from sleep deprivation have trouble focusing and become more vulnerable to disease (Kalat, 2009). Lund, Reider, Whiting, and Prichard (2010) also mentioned that sleep deprivation is considered as both a predictive sign and symptoms of many diseases. According to Sheehan, Frochen, Walsemann, and Ailshire (2019), the trend of short sleep has increased (<6 hours) beginning in 2013 and continued through 2017 based on the data from the National Health Interview Survey (NHIS) in the U.S. These recent data trend is kind of alarming as sleep deprivation may cause negative effects such as cognitive and physical impairments (Bootzin & Epstein, 2011), disturbances in

immune functions (Irwin, 2015), mood disorders (Baglioni, Spiegelhalder, Lombardo, & Riemann, 2010), and other related mental health problems if sustained for a long time.

It is apparent that sleep deprivation is related to mental health (Becker et al., 2018) and there is an increasing interest in university students well-being and their mental health. Notably, previous research reported that sleep loss both intensifies negativity and can diminishes positivity (Harvey, Mullin, & Hinshaw, 2006). In the United States, 71% university students suffered from at least one type of sleep deprivation (Hicks, Fernandez, & Pellegrini, 2001) and 25-33% of the university students experienced sleep deprivation across the Pittsburgh Sleep Quality Index (PSQI) components (Becker et al., 2018). In addition, the strongest effect of sleep deprivation is an increased negative mood (Vredenburgh, 2017) that may lead to mental health problems.

The prevalence of depression, anxiety, and/or stress were higher among students when linked with sleep deprivation (Taylor et al., 2011). In Australia, 84.6% students who experienced sleep deprivation suffered severe or extremely severe depression (18.0%), anxiety (20.5%), or stress (14.6%) (Zochil & Thorsteinsson, 2018). The prevalence are frightening and alarming as most university students are still young adults with average age of 18 - 26 years old (Selvi et al., 2012). A study also found that, 60% of undergraduate students were categorized as poor sleepers and were reportedly suffered with physical and mental health problems (Lund et al., 2010). There are many studies that explored the association between sleep deprivation and mental health problems namely depression, anxiety, and stress among university students across the globe such as Australia (Zochil & Thorsteinsson, 2018), United States (Taylor et al., 2011), Thailand (Pensuksan et al., 2016), Ethiopia (Lemma et al., 2012) and Estonia (Eller, Aluoja, Vasar, & Veldi, 2006). However, scarce studies were conducted in Malaysia. Studies in Malaysia related to sleep deprivation often being performed to pure science students (Ahmad et al., 2011; Kamarudin et al., 2009), and limited research performed to social science students related to this topic. Therefore, the researcher will focus on studying the relationship between sleep deprivation and mental health problems (depression, anxiety, and stress) among social science students at the Universiti Teknologi Malaysia (UTM) specifically Management (Technology) students.

Research Objectives

The research objectives are as follows:

i.   To identify the level of sleep deprivation of the Management (Technology) students at UTM.
ii. To identify the level of depression, anxiety, and stress of the Management (Technology) students at UTM.
iii. To investigate the relationship between sleep deprivation and mental health problems (depression, anxiety, and stress) among Management (Technology) students at UTM.

■ 2.0 LITERATURE REVIEW

Sleep Deprivation

Sleep is a condition in which the brain produces actively, characterized by an average decline in brain activity and decreased response to stimuli (Kalat, 2009). Although there is still no consensus on what activity that occurs in the brain during sleep, however, the activity that took place has a purpose (Sejnowski & Destexhe, 2000) as sleep is a significant physiological process for human beings (Lemma et al., 2012) and has important homeostatic functions (McEwen, 2006). According to McEwen (2006), brain and many other body systems has consequences to be affected by a stressor called sleep

deprivation. Sleep deprivation may cause additional effects such as sleepiness, increased exhaustion, negative mood or cognitive dysfunctions, that can contribute to a modulation of pain processing (Lautenbacher, Kundermann, & Krieg, 2006). In this research, sleep deprivation refers to a stressor that may cause cognitive dysfunctions along with depression, anxiety, and stress among Management (Technology) students.

Depression
Depression refers to the emotional expression of ego which can be divided into two states, which are ego-helplessness and ego-powerlessness in order to live up to a certain powerfully maintained narcissistic aspirations (Bibring, 1953). Depression can also be defined as a feeling of unhappiness, irritated, and hopeless about life, followed by losing pleasure in most activities and obstructions in sleep, appetite, focus, and energy (Berk, 2010). According to *DSM-V,* depression is the feeling of powerless every days for weeks at one period of time ("American Psychiatric Association," 2013). For this study, depression is a state of hopelessness, feeling sad, and irritated accompanied by loss of energy, concentration, and appetite among Management (Technology) students.

Anxiety
Anxiety is a cognitive-affective condition that assists people to plan for, and adapt to, the future (Barlow, 2004). Friedman and Schustack (2011) define anxiety as the anticipation of an endanger situation or challenge, either internal or external that may result in a condition of intense fear or uncertainty. Anxiety is also a cognitive state that encourage fight or flight in human when there is an appraised threat (Talbot et al., 2010). Anxiety cause a feeling characterized by an uncomfortable condition of inner turmoil that frequently occur with nervous action such as pacing back and forth, somatic disappointments, and rumination (Rosenhan & Seligman, 2000). In this research, anxiety refers to the emotional conditions that may results in extreme fear, feeling of pressure, nervous and anxious to the Management (Technology) students.

Stress
Stress refers to the negative feelings and beliefs that that appears when people are incapable to face pressure from their surroundings (Lazarus & Folkman, 1984). Moreover, stress is the not a detail reaction of the body to any stipulation but, it is more to the general reaction or response which triggered by psychological, physical, or chemical agents in which the reaction can be recognised (Taché, 1979). For this research, stress refers to the negative emotions and thought which may be developed among Management (Technology) students along with sleep deprivation.

Relationship between Sleep Deprivation and Depression, Anxiety, and Stress
A number of studies related to the relationship between sleep deprivation and depression, anxiety, and stress had been carried in the past decades. A study had been conducted by Zochil and Thorsteinsson (2018) to explore sleep deprivation and mental health problems in general universities in Australia. In this study, all of the variables of mental health problem (depression, anxiety and stress) have a significant relationship with the sleep deprivation with 18%, 20.5% and 14.6% students who suffered with sleep deprivation have depression, anxiety and stress respectively (Zochil & Thorsteinsson, 2018). Pensuksan et al. (2016) also conducted a study on the relationship between sleep deprivation and psychological problems among undergraduate students in Thailand. The findings from the research shows that all the psychological problems variables have a significant correlation

with sleep deprivation with prevalence of 17.8%, 27.9% and 16.5% sleep deprived students suffered with depression, anxiety and stress respectively (Pensuksan et al., 2016).

Another study has been conducted at two universities in Ethiopia to find out on sleep deprivation and its psychological correlates among undergraduate students (Lemma et al., 2012). The results from this study shows that there are strong correlations between sleep deprivation and mental health problems with prevalence of 50.8%, 58%, and 34.1% students who have sleep depression suffered with depression, anxiety and stress respectively (Lemma et al., 2012). Becker et al. (2018) investigated the sleep deprivation prevalence and mental health correlates among college students from six universities in United States and found significant correlations between sleep deprivation, depression and anxiety with a significant level of 0.22 (p<0.001) and 0.19 (p<0.001) respectively (Becker et al., 2018). Therefore, the researcher concludes that both depressive and anxiety symptoms was most steadily related with poorer sleep.

Furthermore, a study that involved undergraduate medical students was carried out at the University of Tartu by Eller, Aluoja, Vasar, and Veldi (2006) to assess the prevalence symptoms of anxiety and depression with sleep deprivation. The results shows that there is significant correlation between sleep deprivation and depressive symptoms with a prevalence of 30.6% students while 21.9% sleep deprived students suffered with anxiety (Eller et al., 2006). Next, a study at a Canadian university which involved full-time first year students were conducted by Galambos, Dalton, and Maggs (2009). The result reveals that there is a relation between sleep deprivation and stress with every time students have a good night sleep, there will be 6% reduction of stress for the next day (Galambos, Dalton, & Maggs, 2009). Galambos et al. (2009) also found that how well a student has slept have shown to affect their day in responses to stressors. Benham (2010) conducted a study at university of Texan-Pan American. The results indicates that there is a statistically significant correlation between sleep deprivation and stress with a significant level of 0.34 (p<0.01) (Benham, 2010).

Ahmad, Md Yusoff, and Abdul Razak (2011) conducted a study to dental students of University of Malaya in Malaysia. The results shows that there is a significant correlation between sleep deprivation and stress with a prevalence of 82.8% students mention that the consequences of stress is sleep deprivation (Ahmad et al., 2011). Another study conducted by Kamarudin et al. (2009) involved students from University of Technology MARA (UiTM) was divided into three part throughout the semester. The results shows that there is a high association between sleep deprivation and stress during the three part of study with 53.4%, 57.1% and 53.9% respectively (Kamarudin et al., 2009). Nyer et al. (2013) conduct a study to find out the relationship between sleep deprivation with depression, and anxiety, among undergraduate students in United States. They found no significant association between sleep deprivation and depression which in contrast with other studies above. Nyer et al. (2013) mentioned that the results may came out like that because they only focused on individuals with BDI ≥ 13. As for anxiety, the findings reveal that there is a significant relationship with a mean of 75.77.

■ 3.0 METHODOLOGY

Research Design

This study employs quantitative approach by using correlational research design. By utilising survey method, data were collected using self-report measures. For this study, cross-sectional method has been used to obtain the data from the respondents.

Population and Sampling

The population for this study is Management (Technology) students at UTM, and the sample was taken from that population. The sample included second to fourth year students from that course. The first year was excluded as they just entered the university for only a few months and may not experience sleep deprivation. The respondents were selected by using a non-probability sampling technique, specifically convenience sampling. A set of questionnaires was distributed to 117 Management (Technology) students by using convenient sampling. The researcher received 111 questionnaires back from the respondents. 13 questionnaires were excluded due to missing data and the final sample size was 98 respondents from the total population.

Measures

This study used the questionnaire as the instrument because the questionnaire is less expensive and it offers excellent anonymity (Kumar, 2014). The questionnaire is divided into three sections which includes Demographic Questions, Sleep Deprivation, and Depression, Anxiety, and Stress. For demographic questions, there are four questions which includes age, gender, ethnicity, and year of study. The questionnaire used to evaluate the sleep deprivation was the Pittsburgh Sleep Quality Index (PSQI) by Buysse, Reynolds, Monk, Berman, and Kupfer (1989). PSQI have an overall reliability coefficient of 0.83 which indicates that it has a high internal consistency (Buysse et al., 1989). PSQI is a beneficial self-rated instrument that can be used to measure both sleep quality and sleep patterns of adults. Section B consists of nine questions with 19 items which measure sleep deprivation with seven components. Each component weighted equally from 0 to 3.

For depression, anxiety and stress variables, the questionnaire was Depression Anxiety Stress Scale 21 (DASS-21) developed by Lovibond and Lovibond (1995). DASS-21 has an overall Cronbach's Alpha value of 0.91 for depression scale, 0.84 for anxiety scale and 0.90 for stress scale. This value indicates that it has a good reliability. Section C consists of 21 self-rated questions. Depression, Anxiety, and Stress scales were divided equally for this section.

Data Analysis

Descriptive statistics and Inferential statistics were utilised to achieve the study objectives. Descriptive statistics in this research includes data on demography, sleep deprivation, depression, anxiety and stress. The frequency and percentage will be calculated in this study to show the demographic data distribution which are age, gender, ethnicity and years of study. The mean and total scores were calculated to find out the level of sleep deprivation, depression, anxiety, and stress. For the first objective, the mean score was calculated to identify the level of sleep deprivation among the students. The total mean score that greater than 5 indicate a high level of sleep deprivation (Buysse et al., 1989). For the second objective, the mean of the total score was calculated using the formula from the original DASS-21 questionnaire where the level of depression, anxiety and stress were categorise into five levels; normal, mild, moderate, severe and extremely severe (Lovibond & Lovibond, 1995).

Inferential statistics was used to assess the relationship between sleep deprivation and depression, anxiety, and stress among Management (Technology) students. Pearson correlation (Pearson's r) coefficient was used to determine the magnitude and significance of the correlation. (Price, 2012). Pearson's *r* value ranges from -1.00 (Strongest possible negative relationship) to +1.00 (Strongest possible positive relationship). A value of 0 means that there is no relationship between the two variables.

■ 4.0 RESEARCH FINDINGS

Demographic Analysis

Table 1 shows that the majority of respondents were female (70.4%) while male students were 29.6%. Next, most of the respondents had an age range between 21 to 22 years old (62.2%). In terms of race distribution, the majority was the Malay respondents (63.3%). Finally, for years of study, most of the respondents were second year students (35.7%).

Table 1: Demographic Information (n=98 respondents)

Demographic Information		Frequency (f)	Percentage (%)
Gender	Male	29	29.6
	Female	69	70.4
Age	19 -20	18	18.4
	21 - 22	61	62.2
	23 - 34	17	17.3
	25 and above	2	2.0
Race	Malay	62	63.3
	Chinese	22	22.4
	Indian	8	8.2
	Others	6	6.1
Years of study	2	35	35.7
	3	30	30.6
	4	33	33.7

Level of Sleep Deprivation

Table 2 illustrates the overall mean score (M) and standard deviation (SD) of sleep deprivation (M=6.94 ±3.40) of Management (Technology) students at UTM by using the descriptive statistic method. The result indicates high level of sleep deprivation since the mean score is more than 5.

Table 2: Level of Sleep Deprivation

Dimension	M	SD	Level
Sleep Deprivation	6.94	3.40	High

*Note: M=Mean, SD =standard deviation, M>5=high

Level of Mental Health Problems

Table 3 displays the overall mean score and standard deviation of mental health problems among Management (Technology) students by using the descriptive statistic method. The mean score for depression symptom was found to be at a mild level (M=11.61), while anxiety symptoms was found to be at a moderate level (M=11.96). For stress symptoms, the mean score was found to be at normal level (M=12.69).

Table 3: Level of Mental Health Problems

Dimension	M	SD	Level
Depression	11.61	9.46	Mild

Anxiety	11.96	9.32	Moderate
Stress	12.69	9.19	Normal

*Note: M=Mean, SD =standard deviation

Relationship between Sleep Deprivation and Mental Health Problems

Table 3 to Table 5 present the correlation analyses between sleep deprivation and mental health problems of the respondents specifically depression, anxiety and stress. The variables were analysed by using the Pearson correlation coefficient (inferential statistic method). The findings from table 3 demonstrate that there is a significant weak positive relationship between sleep deprivation and depression among Management (Technology) students (r=0.406, p<0.05). The positive relationship indicates that low sleep deprivation contributed to low depression among the students.

Table 3: Correlations between Sleep deprivation and Depression

Dimension	Depression	
	r value	*p* value
Sleep Deprivation	0.406*	0.000

Correlation is significant at the .01 level

Next, the findings from table 4 also illustrate that there is a significant weak positive relationship between sleep deprivation and anxiety among Management (Technology) students (r=0.481, p<0.05). The positive relationship indicates that low sleep deprivation contributed to low anxiety among the students.

Table 4: Correlations between Sleep deprivation and Anxiety

Dimension	Anxiety	
	r value	*p* value
Sleep Deprivation	0.481*	0.000

Correlation is significant at the .01 level

The findings from table 5 demonstrate that there is a significant moderately strong positive relationship between sleep deprivation and stress among Management (Technology) students (r=0.523, p<0.05). The positive relationship indicates low sleep deprivation contribute to low stress among the students.

Table 5: Correlations between Sleep deprivation and Stress

Dimension	Stress	
	r value	*p* value
Sleep Deprivation	0.523*	0.000

Correlation is significant at the .01 level

■ 5.0 DISCUSSION, LIMITATIONS AND RECOMMENDATION

Discussion on Sleep Deprivation Level

The first objective was to determine the level of sleep deprivation of the Management (Technology) students in UTM. Based on the findings of this study, majority of Management (Technology) students

experienced high level of sleep deprivation. The findings is consistent with a past study that was conducted to the university students in Australia which reveals that most of the students experienced a high level of sleep deprivation (Zochil & Thorsteinsson, 2018). Moreover, Lemma, Gelaye, Berhane, Worku, and Williams (2012) found that a majority of university students in Ethiopia suffered with a high level of sleep deprivation. It is found that students who were trying to balance their challenging priorities which include demands in academic, social life, and work often suffered with sleep deprivation (Andrews & Chung, 2011; Brown, Soper, & Buboltz, 2002). It means that the reason on why the Management (Technology) students have high sleep deprivation may be because they were unable to balance their prime concern that encompasses of academic need (assignments), social life (friends), and work (part time job). High sleep deprivation also may decreased the positive affect and increased the negative affect and stress (Galambos, Dalton, & Maggs, 2009).

Discussion on Mental Health Problems Level

The second objective was to identify the level of depression, anxiety, and stress of the Management (Technology) students in UTM. For depression, the finding shows that majority of Management (Technology) students experienced a mild depression level. The findings is parallel to a past study conducted by Zochil and Thorsteinsson (2018) which found high number of university students in Australia were facing with a mild level of depression. According to Boehm, Lei, Lloyd, and Prichard (2016), students with depression was reported having a negative impact on their academic performance.

Based on the current study, majority of Management (Technology) students experienced moderate level of anxiety. The results is aligned to the previous research by Pensuksan et al. (2016) among university students in Thailand. The researcher found that a high number of students experienced a moderate level of anxiety (Pensuksan et al., 2016). Notably, one study reported that anxiety was the most prevalent mental health problem among university students (Peltz, Rogge, Pugach, & Strang, 2017) and Center for Collegiate Mental Health (2015) reported that more than half of students who went for counselling services, reported anxiety as a problem. Students with anxiety also was revealed to have a bad consequence on their academic performance (Boehm et al., 2016).

Finally, the finding of this study reveals that most of the Management (Technology) students have a normal level of stress. The result is parallel to the previous study by Zochil and Thorsteinsson (2018) which was conducted to university students in Australia. The result found that a majority of students have a normal stress level (Zochil & Thorsteinsson, 2018). Another study also found that a majority of university students in Ethiopia experienced a normal level of stress (Lemma et al., 2012). The normal level of stress may due to the students who is able to establish positive stress coping strategy that reduce the impact of stress on their behaviour (Ajmal, 2014).

Discussion on Relationship between Sleep Deprivation and Mental Health Problems among Management (Technology) students at Universiti Teknologi Malaysia

The last objective was to investigate the relationship between sleep deprivation and mental health problems (depression, anxiety, and stress) among Management (Technology) students in UTM. The current study found significant positive relationship between sleep deprivation with all three dimensions of mental health problems which are depression, anxiety, and stress. This signifies that higher sleep deprivation is associated with higher mental health problems (depression, anxiety, and stress). The findings were consistent to previous studies conducted by previous researchers (Becker et al., 2018; Lemma et al., 2012; Pensuksan et al., 2016; Zochil & Thorsteinsson, 2018) which explains that there is a significant positive relationship between the variables. According to Becker et al. (2018),

depression and anxiety have been found most frequently in relation to university student sleep although this current study found a weak positive correlation between both sleep deprivation and depression, and sleep deprivation and anxiety.

In contrast to other studies above, a study conducted by Nyer et al. (2013) among undergraduate students in United States has found no significant relationship between sleep deprivation with depression. That outcome may occurs as Nyer et al. (2013) used different instruments to measure the variables. Nyer et al. (2013) also stated that the findings were like that because they only focused on individuals with Beck Depression Inventory (BDI) ≥ 13.

Limitations and Recommendations

This study has several limitations. First limitation is the sample size and sampling method involved in this study was non-probability sampling and limited to the Management (Technology) undergraduate students in Universiti Teknologi Malaysia (UTM). In other word, only one course was involved from the social science stream. Therefore, the findings of the current study cannot be generalized to all undergraduate students in UTM or other universities. Next, other limitation includes using self-report instruments. Self-report instruments offer excellent anonymity however, some respondents might come up with invalid answers. When answering the questions, the respondents might not answer honestly, especially on sensitive items.

Based on the limitations that were mentioned above, recommendations are needed in order to improve future studies. First of all, the sampling method and sample size of the current study can be improvised. Therefore, it is suggested that the sampling strategy and sample size for the future studies to be broaden. Since only one course from social science stream was involved, it is recommended that all courses under social science stream take part in the future research. Furthermore, to improve the generalizability of the future studies, all students in UTM also should be randomly chosen by utilising probability sampling techniques. With that, the reliability and validity of the future studies can be enhanced. Moreover, the current study was utilised self-report instruments which was categorized as quantitative measure. Thus, it is suggested that for future research, a qualitative measure or a mix method of quantitative and qualitative measure can be used.

■ 6.0 CONCLUSION

Overall, the current study indicated that there is a high level of sleep deprivation, a mild level of depression, a moderate level of anxiety, and a normal level of stress among the Management (Technology) undergraduate students in Universiti Teknologi Malaysia (UTM). In addition, there is a significant positive relationship between sleep deprivation and mental health problems among the students.

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