ACADEMIC STRESS AND SLEEP QUALITY AS A PREDICTOR TOWARDS EATING BEHAVIOUR AMONG UNIVERSITY STUDENTS

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ABSTRACT

Introduction: Academic stress has been identified to be the main stressor, particularly among university students which cause negative effects on health as well as academic performance. University students also experience poor sleep quality. This study is conducted to identify the level of academic stress, sleep quality and eating behaviour, the relationship between academic stress, sleep quality and eating behaviour as well as to investigate the influence of academic stress and sleep quality towards eating behaviour among IIUM students. **Methods**: A cross – sectional study was conducted using convenience sampling, with a total sample of 410 students. Data were collected using the Educational Stress Scale for Adolescents (ESSA), Sleep Quality Scale (SQS) and Dutch Eating Behaviour Questionnaire (DEBQ). **Results**: The study reported that 46.3% of the students experienced low academic stress. Furthermore, there is a significant association between academic stress with restrained (r=0.245), emotional (r=0.224) and external eating behaviour (r=0.180). There were 75.6% of students reported having no sleep problem. There is a significant association between sleep quality with restrained (r= 0.162), emotional (r=0,260) and external eating behaviour (r=0.184). In addition, the result from regression analysis for academic stress and sleep quality towards restrained eating behaviour explained only 7.1% variance. Similarly the percentage of variance explained for emotional behaviour was 9.4% and external eating behaviour was just 5.3%. Thus, emotional eating behaviour is the most significant compared to other associations. **Conclusion:** This finding can be helpful in increasing the awareness of the students towards healthy lifestyle and provide a good intervention to manage academic stress as well sleep problem.

KEYWORDS: academic stress, sleep quality, eating behaviour, university students

INTRODUCTION

In several years, stress and its mental health allusion among university students has become a worldwide debate (Portoghese et al., 2019). Masih and Gulrez (2006) defined stress as a lifestyle crisis that impacts everyone, regardless of developmental level. This commonly happens among adolescents because this is a crucial time for social, biological, emotional, and psychological development (Ramadhani & Mahmudiono, 2021). Nonetheless, sleep problems among university students are frequently associated with mental health concerns as well (Schlarb, Anja & Classen, 2017). One of the crucial aspects under the area of nutritional habits is eating behaviour, defined as a series of behaviours creating humans' connection with food (Domínguez-Vásquez, 2008), which includes drinking habits, dietary preferences, culinary preparations, and quantity of food consumed.

However, when compared to other sources of stress, academic stress is the most significant. Kember and David (2004) identified several examples of academic-related pressures, such as insufficient instructional methods, limited teacher-student interactions, overwhelming academic workload, substandard physical classroom conditions, difficulty in managing school and leisure time, and disarray concerning academic assignments and schedules. Furthermore, sleep deprivation is becoming increasingly common among adolescents, especially university students. In fact, sleep deprivation among adolescents has been described as a quiet global epidemic. Quality of sleep time is critical for adults and children to maintain good health. According to Sivertsen et al. (2014), numerous research studies have been conducted to emphasize the detrimental physical, psychological, and social consequences of sleep loss on the health and well-being of teenagers.

In addition, sleep quality is likely to influence several elements of health. It is critical to investigate the elements that contribute to the onset of sleep problems. To support these statements, researchers have proposed numerous etiological and physio-pathological prototypes to comprehend

sleep difficulties. It is based on the 3P model which are predisposing, precipitating and perpetuating factors of sleep disorders including medical conditions (e.g., respiratory problem), psychiatric conditions (e.g., stress and anxiety), environmental conditions (e.g., sleep interruptions) and behavioural conditions that can affect sleep on these three different levels (Spielman et al., 1987). Hence, it is very important to conduct this study to measure the relationship of academic stress, sleep quality, and eating behavior among IIUM students.

METHODS

Subjects

Four hundred and ten students of IIUM from Gambang, Kuantan, Gombak, and Pagoh campuses from a variety of courses and level of studies were selected to be the participants of this research.

Study Design

This quantitative research was conducted using cross-sectional design involving all students of IIUM and a series of questionnaires was created by adopting and adapting previous studies with some modifications. Ethical approval was obtained from the Kulliyyah Postgraduate and Research Committee (KPGRC) and International Islamic University Malaysia Research Ethical Committee (IREC) before the study was conducted (KAHS 17/23). A set of questionnaires and informed consent were prepared and distributed to the selected respondents via Google Form.

Sampling Method

The sampling method that was used for this study is convenience sampling. The students that were included to be part of the sample should be those who are willing and interested and those who met the requirements of the inclusion and exclusion criteria that have been set to obtain reliable results from the reliable respondents in this research.

Instruments

A set of questionnaires comprised of four parts were distributed to the respondents through online. Firstly, sociodemographic factors such as gender, age, race, campuses, academic level, kulliyyah, year of study and current living. The second part was to assess the academic stress level using Educational Stress Scale for Adolescent (ESSA) consisting of 16 questions on a 5-point Likert scale with reliability index of 0.86 on Cronbach alpha. Scores of academic stress level were classified into high (score > 58), moderate (score 51-58), and low (score < 50). To identify the level of sleep quality, the Sleep Quality Scale (SQS) was used which consists of 28 items and 6 domains of sleep quality: daily symptoms, restorative after sleep, difficulties initiating and maintaining sleep, trouble waking, and sleep satisfaction. This self-reported questionnaire employs a 4-point Likert scale to reflect specific sleep habits (0 = "rarely," 1 = "sometimes," 2 = "often," and 3 = "almost always"). Total ratings range from 0 to 84, with higher values indicating more severe sleep issues. The reliability is 0.81 on Cronbach alpha. Lastly, the Dutch Eating Behaviour Questionnaire (DEBQ), which consists of 33 items were used to measure the eating behaviour among IIUM students. This assessment is used in students to evaluate three unique distinct eating behaviours in adults: emotional eating, external eating, and restrained eating. The DEBQ items used a 5-pointed Likert scale that scored from 1 (never) to 5 (very often), with higher scores indicating higher evidence of the eating behaviour. The reliability for DEBQ is 0.90 on Cronbach alpha.

Statistical Analysis

The data collected was analyzed by using SSPS version 29 software. The descriptive analysis was used to measure the percentage, mean and standard deviation (SD) of the socio- demographic data, meanwhile Pearson's correlation and multiple linear regression was used to analyze the relationship between academic stress, sleep quality and eating behaviour.

RESULTS

Socio-demographic factors

Descriptive analysis showed that 81% of the respondents were female. Most of the respondents were at the age of 20-21 years old (50.2%), followed by 22-23 years old (39.8%), 18-19 years old (6.3%), 24-25 years old (2.9%) and > 25 years old (0.8%). Malay was the dominating race among the respondents, shown by 100%. Most of the respondents (94.4%) were undergraduate students and 5.1% were foundation students while the remaining 0.5 % were postgraduate students that comprises 21.7% from year 1, 21.5% year 2, 40% year 3, 10.2% year 4 while the rest 1.5% were students of year 5 and above. In addition, students were from Kuantan (61%), Gombak (25.9%) and Pagoh (8%) while the least was from CFS Gambang (5.1%). There was also a huge difference between the living situation of the students in which many of them were already on-campus (97.6%, n = 4-00) while 1.7% (n = 7) and 0.7% (n= 3) were off - campus and stayed with family. Hence, the result of the respondents' socio-demographics factor was presented in Table 1.

Table 1: Sociodemographic factors of respondents

Sociodemographic Factors	Categories	Frequency (n)	Percentage (%)
Gender	Male	78	19
	Female	332	81
Age	18-19	26	6.3
	20-21	206	50.2
	22-23	163	39.8
	24-25	12	2.9
	25 and above	3	0.8
Race	Malay	410	100
Campus	CFS Gambang	21	5.1
	Kuantan	250	61
	Gombak	106	25.9
	Pagoh	33	8
Year of Study	CFS	21	5.1
	Year 1	89	21.7
	Year 2	88	21.5
	Year 3	164	40
	Year 4	42	10.2
	Year 5	6	1.5
Academic Level	Foundation	21	5.1

	Undergraduate	387	94.4
	Postgraduate	2	0.5
Living Campus	On Campus	400	97.6
	Off Campus	7	1.7
	Stay with Family	3	0.7
Kulliyyah	KAHS	195	47.6
	KAED	6	1.5
	KOD	4	1.0
	KENMS	18	4.4
	KOED	12	2.9
	KOE	8	2.0
	KICT	7	1.7
	KIRKHS	49	12.0
	KLM	19	4.5
	AIKOL	3	0.7
	KOM	13	3.2
	KON	18	4.4
	KOP	12	2.9
	KOS	46	11.2

Academic Stress Level

Descriptive analysis was done to identify the prevalence of academic stress among IIUM students. Based on the Table 2, it was reported that most of the students had low academic stress level with the prevalence of 46.3% followed by high 28.1% and moderate 25.6% of the students.

Table 2: Academic stress level

Stress level	**n**	%
High (>58)	115	28.1
Moderate (51-57)	105	25.6
Low (<50)	190	46.3

Sleep Quality Level

Descriptive analysis was done to identify the prevalence of sleep quality among IIUM students. Table 3 showed that most of respondents have no sleep problem with a prevalence of 75.6 % and 24.4% of the students have sleep problems.

Table 3: Sleep quality level

Stress level	**n**	%
Yes (more than 84)	100	24.4
No (less than 84)	310	75.6

Correlation between academic stress, sleep quality and eating behaviours.

Pearson correlation test was done to investigate the relationship between academic stress and sleep quality towards eating behaviour. Table 4 indicated the results of correlation analysis between

academic stress, sleep quality and three types of eating behaviour that consist of restrained, emotional, and external eating behaviour among IIUM students. The results for correlation analysis between academic stress and restrained eating behaviour is (r = 0.245, p < 0.01), academic stress and emotional eating behaviour (r = 0.224, p < 0.01), lastly is academic stress and external eating behaviour (r = 0.180, p < 0.01). Next, there are also the results of correlation analysis between sleep quality and three types of eating behaviour among IIUM students that demonstrated the correlation between sleep quality and restrained eating behaviour (r = 0.162, p < 0.01), sleep quality and emotional eating behaviour (r = 0.260, p < 0.01) as well as sleep quality and external eating behaviour (r = 0.184, p < 0.01). Overall, all variables have a significant relationship with each other since p < 0.01 for all variables and are explained in Table 4.

Table 4: Correlation analysis for academic stress, sleep quality and eating behaviours.

Variables	1	2	3	4
1. Academic stress	-			
2. Sleep quality	.253**	-		
3. Restrained eating behaviour	.245**	.162**	-	
4. Emotional eating behaviour	.224**	.260**	.201**	-
5. External eating behaviour	.180**	.184**	-.013	.391**

*Correlation is significant at the 0.01 level (2-tailed)
Correlation is significant at the 0.05 level (2-tailed)

Regression between academic stress, sleep quality and restrained eating behaviour

Table 5 illustrated the result of the regression analysis that conducted to identify the predictive factor of academic stress and sleep quality towards restrained eating behaviour among IIUM students. According to the table above, R value = 0.266 and R^2 value = 0.071 showed only 7.1% variance between three variables. F value showed that there is a significant relationship between the variables that prove that academic stress and sleep quality can lead to restrained eating behaviour among IIUM students F (2, 407) = 15.464, p < 0.0001.

Table 5: Summary for regression analysis between academic stress, sleep quality and restrained eating behaviour.

R	R^2	Adjusted R^2	Standard error of the estimate	F (df = 2, 407)	Sig.
0.266	0.071	0.066	8.634	15.464	0.000

Based on Table 4.6, it is found that academic stress (b = 0.167, p < 0.0001) and sleep quality (b = 0.109, p < 0.0001) are significantly predictive towards restrained eating behaviour among IIUM students. However, only 7.1% of variance explained which is very low for academic stress and sleep quality to be a predictor towards restrained eating behaviour.

Table 6: Coefficient regression analysis between academic stress, sleep quality and restrained eating behaviour.

Model	Unstandardized coefficients		Standardized coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	15.128	2.239		6.757	0.000
1. Academic stress	0.167	0.038	0.218	4.415	0.000
2. Sleep quality	0.109	0.050	0.106	2.154	0.032

Dependent variables: Restrained eating behaviour

Regression between academic stress, sleep quality and emotional eating behaviour

Table 7 illustrated the result of the regression that conducted to identify the relationship between academic stress and sleep quality towards emotional eating behaviour among IIUM students. According to the table above, R value = 0.307 and R^2 value = 0.094 that showed only 9.4% variance explained by the two variables. F value showed that there is a significant influence of academic stress and sleep quality towards emotional eating behaviour among IIUM students F (2, 407) = 21.206, p < 0.0001.

Table 7: Summary for regression analysis between academic stress, sleep quality and emotional eating behaviour.

R	R^2	Adjusted R^2	Standard error of the estimate	F (df = 2, 407)	Sig.
0.307	0.094	0.090	10.466	21.206	0.000

Based on Table 8, it is found that academic stress (b = 0.159, p < 0.0001) and sleep quality (b = 0.273, p < 0.0001) are significantly predictive towards emotional eating behaviour among IIUM students. However, the prevalence of academic stress and sleep quality to be a predictor towards emotional eating behaviour is 9.4% which the highest percentage among other types of eating behaviour.

Table 8: Coefficient regression analysis between academic stress, sleep quality and emotional eating behaviour.

Model	Unstandardized coefficients		Standardized coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	18.916	2.714		6.971	0.000
1. Academic stress	0.159	0.046	0.169	3.463	0.001
2. Sleep quality	0.273	0.061	0.217	4.459	0.000

Dependent variables: Emotional eating behaviour

Regression between academic stress, sleep quality and external eating behaviour

Table 9 illustrated the result of the regression analysis that conducted to identify the predictive factor of academic stress and sleep quality towards external eating behaviour among IIUM students. According to the table above, R value = 0.230 and R^2 value = 0.053 that showed only 5.3% variance explained by the predictor variables. F value showed that there is a significant relationship between the variables proving that academic stress and sleep quality can lead to external eating behaviour among IIUM students F (2, 407) =11.364, $p < 0.0001$.

Table 9: Summary for regression analysis between academic stress, sleep quality and external eating behaviour.

R	R^2	Adjusted R^2	Standard error of the estimate	F (df = 2, 407)	Sig.
0.230	0.053	0.048	5.347	11.364	0.000

Based on Table 10, it is found that academic stress (b = 0.067, $p < 0.0001$) and sleep quality (b = 0.093, $p < 0.0001$) are significantly predictive towards external eating behaviour among IIUM students. However, the prevalence of academic stress and sleep quality to be a predictor towards external eating behavior is 5.3% which the lowest percentage among other types of eating behaviour.

Table 4.10: Coefficient regression analysis between academic stress, sleep quality and external eating behaviour.

Model	Unstandardized coefficients		Standardized coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	21.474	1.387		15.487	0.000
1. Academic stress	0.067	0.023	0.142	2.854	0.005
2. Sleep quality	0.093	0.031	0.148	2.971	0.003

Dependent variables: External eating behaviour

DISCUSSIONS

Level of Academic Stress

The first objective of this study is to identify the academic stress level and sleep quality among IIUM students. According to the results, majority of IIUM students have been categorized as perceived low academic stress level. However, that was contradict with the previous study by Zamroni et al. (2018) that found out majority of the university students experienced with high level and moderate level of academic stress. Based on that study, 72 students enrolled in the Medicine and Pharmacy program at the Universitas Islam Negeri (UIN) Maulana Malik Ibrahim Malang, Indonesia were chosen to find out

how much academic stress they felt throughout their study journey. The degree of academic stress as perceived by the UIN students was later shown to be higher than the amount of academic stress as reported by the IIUM students. The difference in emphasis on the kinds of courses that the participants took may be the cause of the discrepancy between the current finding and the results of the prior study.

Another reason for the difference in prevalence between UIN students and IIUM students was that UIN study was conducted primarily among medical and pharmaceutical students, whereas the study that has been performed by IIUM students was in general for all courses. As a result, the prevalence of academic stress among the university students was varied in these two-research due to the diverse participant background study and criteria. As a result, it can be inferred that since participants in this study came from a variety of academic backgrounds rather than just students with the same background.

Level of Sleep Quality

When comparing the findings of earlier local studies conducted during COVID-19 pandemic, which varied from 45.2% to 57.3% that showed a reduced prevalence of poor sleep quality was discovered (Md Zuki et al., 2021). The fact that this survey was undertaken after Malaysia had been in lockdown for one and half years, starting in March 2020, may be a plausible explanation for the lower prevalence revealed in the current study. With increasing confinement or lockdown time, it is thought that the quality of sleep dropped. In conclusion, compared to the other two learning centres, the community health facility had the largest percentage of students who slept poorly (Ngu et al., 2017). This finding was supported by the previous study by Corrêa et al. (2017) that reported majority students from health sciences program had highest score that indicates having sleep problems.

However, the results from the current study were contradictory since IIUM students showed that the prevalence of sleep quality among them is good while they do not have any sleep problems. The inconsistency of the current finding with the previous study may be due to the different focus on the types of the courses taken by the participants since this study is looking into general courses whereas the previous study is performed specifically among community health centres and programs of health sciences.

The relationship between academic stress, sleep quality and eating behaviour among IIUM students.

Academic Stress and Eating Behaviour (Emotional, Restrained and External)

This study aims to investigate the relationship between academic stress and three types of eating behaviour among IIUM students. This research validated earlier findings about this link since eating behaviour is thought to be a coping mechanism to deal with stressful situations. In addition, the range of student responses on the scale for emotional eating was towards the middle and students tend to eat more when they are feeling sad. This is consistent with Caso et al. (2020) showing a higher food consumption was related with sadness, anger, and anxiety. Based on the result for this study, academic stress expectations were positively associated with sweet food consumption and snacking which can be categorized under restrained eating behaviour. Additionally, the association found between snacking and academic stress, it is possible that students who are under stress are consuming most of their unhealthy food through between-meal snacks.

The last association for academic stress is about the association between academic stress and external eating behaviour. According to Deborah et al. (2022), stress was observed to affect snack intake

in those with either a moderate or high level of external eating behaviours, which was found to be significantly associated with stress-eating patterns. In addition, the previous analysis also found inconsistent results regarding the moderating effect of external eating behaviour on both stress and food intake, with some studies suggesting higher external eating is linked to more daily snacks consumed when experiencing stress (O'Connor et al., 2008). It should be made clear that there is not enough evidence on the association between academic stress and external eating behaviour. As a result, it lacks a solid assertion to support this association.

Sleep Quality and Eating Behaviour (Restrained, Emotional, External)

According to Saleh-Ghadimi et al. (2019), the result from his study showed that there is a significant difference in emotional eating behaviour between the two groups of sleep problems and non-sleep problems among students. The observed result was supported by a substantial correlation between insufficient sleep and emotional eating. The association is confirmed by looking at the scoring which if the score is increasing, hence the score for emotional eating also will increase. This finding is consistent with a study by Dweck et al. (2014) that discovered a relationship between emotional and external eating and poor sleep quality. Therefore, a lack of sleep may make it difficult to control the regulation of emotions, which may make people want to eat more.

Based on the current research, there is a significant association between sleep quality with restrained eating behaviour among IIUM students. However, Blumfield et al. (2017) found no association between poor sleep quality and restrained eating behaviour, refuting the notion that those with sleep disorders or insufficient sleep are more likely to overeat. To support this matter, a lack of sleep has been shown to cause elevated ghrelin levels and lower leptin levels, which result in hunger and appetite (Filiatrault et al., 2014). Hence, this increases the likelihood of overeating, especially when being awake longer results in more opportunities to eat and weight gain. Therefore, it should be made apparent that there is lack of sufficient evidence and research to prove this association.

The influence of academic stress and sleep quality towards eating behaviour among IIUM students.

Another aims for this study also include the influence of academic stress and sleep quality towards eating behaviour among IIUM students. According to Chamberlin et al. (2018), there is significant association between academic stress and emotional eating behaviour. This is due to those who are got higher grade point average (GPA) may experience higher levels of stress about studies, which would increase the possibility that they would turn to emotional eating as a coping mechanism. Even restrained eating habits is not common among university students, but it still gives an impact to them. Restrained eating behaviour basically involves in restricting food intake goes against physiological controls like hunger and satiety with the purpose of controlling body weight (Polivy et al., 2020). On the other hand, it also has been found to be negatively related with the eating of low energy high nutrition foods (i.e., healthy foods), notably fruit and vegetables, with intake of these foods decreasing as stress levels rise.

Furthermore, sleep quality also can influence restrained eating behaviour. This can be proof by Filiatrault et al. (2014) study that showed relationship between restrained eating behaviour with sleep quality and duration seem to influence this relationship. However, this study demonstrated that characteristics of restrained eating behaviour are also associated with the success of weight loss. Susceptibility to hunger and its related subcores all diminished as a treatment effect. These adjustments help people lose weight since increased hunger susceptibility levels make it difficult to avoid consuming too much energy in the future and are positively correlated with obesity levels (Elfhag, 2005). To support this matter, lack of sleep has been demonstrated to result in increased ghrelin levels

and decreased leptin levels, which result in hunger and appetite (Paturel, 2022). As a result, there is a higher chance of overeating because staying awake longer gives one more opportunity to eat and puts on weight. Therefore, even though poor sleep quality and controlled eating habits are associated, this relationship cannot be proven because there is insufficient data for this study.

CONCLUSION

In summary, students also can be affected by the stress perceived. The biggest source of stress for this age group would consequently be academic-related issues as they spend most of their time at school or university. Even though the majority of IIUM students reported experiencing low of academic stress, the prevalence of students reporting moderate to high levels of academic stress was alarming because this situation can be worsened in the future if no intervention taken. Sleep quality also can affect eating behaviour among students especially those who are having sleep problems because it will link to unhealthy eating habits, thus can affect students' health condition.

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