

Research Article

Relationship of Stress on the Eating Behaviors of Science Undergraduates in Kuala Lumpur

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Abstract: This study aimed to determine the effect of stress on eating behaviors of the university undergraduates from Kuala Lumpur. One hundred fourteen students completed the Depression, Anxiety and Stress Scale (DASS) questionnaire and the Three-Factor Eating Questionnaire-R18 (TFEQ-R18). Data analysis done using SPSS 20.0 included descriptive statistics, parametric statistics, non-parametric statistics, Spearman rho's correlation and stepwise multiple regression. Majority of the students had medium cognitive restraint (56.1%) and uncontrolled eating scores (69.3%), but low emotional eating score (43.9%). Most students had normal depression level (57.9%) and normal to moderate anxiety (86.9%) and stress level (81.6%). Male (12.92±8.83) and Malay (9.64±6.40) undergraduates had higher depression score ($p < 0.05$). Male (18.17±2.62) and underweight (18.93±2.29) subjects obtained higher cognitive restraint score ($p < 0.05$). There was a significant negative correlation between depression and uncontrolled eating ($r_s = -0.324$, $p < 0.001$, $R^2 = 0.103$, adjusted $R^2 = 0.095$, $F(1, 112) = 12.80$) and stress and emotional eating ($r_s = -0.301$, $p = 0.001$). In conclusion depression and stress does affect the uncontrolled eating and emotional eating.

Keywords: Anxiety, depression, stress, Three-Factor Eating Questionnaire-R18 (TFEQ-R18), undergraduates

INTRODUCTION

Since 1980s many studies highlighted the relationship between stress and eating behaviors. Stress is identified to have been caused by excessive pressure on an individual which is beyond the individual's ability to adapt (Cohen *et al.*, 2007). Stress can be generally classified into two, acute and chronic. Chronic stress is stress that has occurred over a prolonged period while acute stress is characterized by an event of a single episode (Torpy and Lynn, 2007).

According to the American Medical Association, study-related events or issues are known causes of stress. It was proven true that university or college life can be stressful (Gower *et al.*, 2008). College and university students perceived increased levels of stress due to a range of causes including having to adapt to new environments, the broadening sense of independence and self-reliance, coping with studies, increased social demands besides personal and family concerns (Nelson *et al.*, 2008; Khor *et al.*, 2002).

In a study by Grossniklaus *et al.* (2010), it was been stated that they were unable to specifically identify the source of stress, whether it was stress-related or caused by other stressors. This leads to the

idea that it is very important to specifically define the type of stressor being studied one of which in this case, is study-related stress in a university setting. Cohen *et al.* (1995) revealed in their study that demographics and environment may have been the source to psychological stress. Another study by Saat *et al.* (2011) indicated that merit score was associated with stress among university student in Kuala Lumpur. Often, stressful university life may be shadowed by greater psychological problems such as depression and anxiety.

Depression is described as having a low positive affect and inability to experience pleasure from activities around oneself while anxiety is classified as having excessive physiological excitement (Nieuwenhuijsen *et al.*, 2003). On the other hand, general distress is indicated by tension, irritability and overreactions (Antony *et al.*, 1998). It is known that these three conditions overlap with one another in terms of their characteristics but can be distinguished by certain distinct features.

The Depression Anxiety Stress Scales (DASS) which consist of the form of 42-items or 21-items questionnaire is capable of distinguishing between

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depression, anxiety and general distress (Antony *et al.*, 1998). The items in a DASS questionnaire are categorised into three scales, depression, anxiety and stress (Lovibond and Lovibond, 1995). Psychometric analyses done on the DASS with both clinical and non-clinical samples showed consistency as well as highlighted the similar and distinct features between the three scales (Lovibond and Lovibond, 1995; Brown *et al.*, 1997). In a local study done by a fellow postgraduate student in International Islamic University Malaysia, the DASS has been noted as a valid and reliable tool for the assessment of depression, anxiety and stress in the Malaysian population (Syed, 2007).

There are many factors influencing food intake in an individual. Stress has been associated with poorer diets, inactivity and various adverse health behaviors among college and university students (Nelson *et al.*, 2008). Many studies concluded that stress appears to lead in decreased or increased food intake (Turner *et al.*, 2010; Macht, 2008; Torres and Nowson, 2007; Snoek *et al.*, 2007) and if the energy intake is excessive, that is, exceeding the energy expenditure over a long period, it may cause weight gain and later obesity (Torres and Nowson, 2007).

Previous studies have shown that stress may lead to the change of dietary habits and preference of certain foods, particularly energy-dense, high in both fat and carbohydrate foods (Grossniklaus *et al.*, 2010; Torres and Nowson, 2007; Ng and Jeffery, 2003; Epel *et al.*, 2001; Hellerstedt and Jeffery, 1997). Snoek *et al.* (2007) and Torres and Nowson (2007) stated that negative emotional arousal and stress are believed to affect eating pattern by suppression of appetite. In another study by Macht (2008), intake of sweet and high-fat food were increased in emotional eaters and heightened by the negative emotions.

A study among Malaysian pre-clinical medical undergraduates in 2012 by Ganasegeran *et al.* (2012) revealed that the eating habits among these students were implicated by psychological factors despite the fact that most of the subjects were regularly having good eating habits. This study helps to put things into perspective that Malaysian university students are often subjected to study-related stress which somehow affects their eating habits. However, specific studies to this level (in a localized setting) are rare. Hence, this opens up the opportunity for such a study to be done to further justify the theory that stress and eating habits are related to one another.

Many studies have been done regarding human eating behavior and resulted in the development of several eating theories. One of it was the concept of dietary restraint. Restraint theory was discussed in the study by Karlsson *et al.* (2000). The authors defined that the development of obesity and eating disorders are due to the episodic overeating when an individual attempt to regulate body weight by controlling food intake. Hence, most studies used cognitive restraint to measure dietary restraint as control over food intake to

influence body weight and shape (Karlsson *et al.*, 2000). Alternatively, emotional eating refers to using food as a mood regulation tool and snacking such as eating cookies (Turner *et al.*, 2010), resulting in overeating during dysphoric mood states. On the other hand, uncontrolled eating refers to actual effects of self-regulatory processes. It is the tendency to eat more than usual because of a loss of control over intake (Karlsson *et al.*, 2000).

The Three-Factor Eating Questionnaire (TFEQ) has been employed in many studies related to eating behavior. A shortened 18-item version (TFEQ-R18) was developed utilizing data from severely obese participants in Sweden (Karlsson *et al.*, 2000) and has been tested with student samples and the general population in France (de Lauzon *et al.* 2004). The shortened version is more appropriate for epidemiological studies or clinical trials in which the study participants may need to complete several questionnaires (Cappelleri *et al.*, 2009).

The objective of this study is to determine the effect of stress on eating behaviors of the Science undergraduates from the students in Kuala Lumpur. The objective of the study was to determine the stress level and eating behavior among Science undergraduates of different races, gender, year of study and BMI level. This study also wants determine the relationship between stress level and eating behavior among Science undergraduates.

Various studies have stated the importance of eating habits as a determinant of health status among university students (Ganasegeran *et al.*, 2012; Nelson *et al.*, 2008). This transition period into adulthood during the university years is important for establishing long-term health behavior patterns, yet is often being overlooked. The university years are usually often the first time these students live away from home for the first time. Undergraduates may adopt new health behavior patterns during these years. Thus, university life set the stage for establishing important behavioral patterns that will impact chronic disease risk (Nelson *et al.*, 2008). The years students spent in universities can also be well-suited settings to implement diet and lifestyle behavior-related interventions as enrolled students may largely share residential factors (living together in hostel), have limited access to off-campus areas and are tied to a common environment and health-care system (Nelson *et al.*, 2008).

This study is highly essential due to its potential health implications. For instance, highly stressed individuals with poor eating habits are at a higher risk of chronic diseases such as cardiovascular diseases (Torpy and Lynn, 2007). Poor eating habits have also been associated with obesity (Barrington *et al.*, 2012) and issues with gastric motility (Huerta-Franco *et al.*, 2012). These health issues ought to be identified and tackled at its early stages to ensure the health of the population, particularly among university students in order to increase the quality of life of university students.

Table 1: Classification of score for each scale

	Cognitive restraint	Uncontrolled eating	Emotional eating
Low	12-16	24-32	6-8
Moderate	9-11	17-23	5
High	4-8	8-16	2-4

METHODOLOGY

In this cross-sectional study, data from 114 Science undergraduates from university in Kuala Lumpur, Malaysia. Subjects were recruited through convenience sampling. All subjects completed a questionnaire given to them on demographics that includes family history of depression and the administration of medicine for depression, 21 items Depression, Anxiety and Stress Score (DASS) which is used to measure the stress level among subjects and 18 items Three-Factor Eating Questionnaire (TEFQ-R 18) which is designed to assess subject's eating behavior.

Three-Factor Eating Questionnaire (TFEQ-R18):

The TEFQ is a self-administered questionnaire that measures cognitive and behavioral components of eating (Karlsson *et al.*, 2000). This questionnaire contains 18 items on a 1-4 likert scale. The seriousness of eating habits increased with the decrease in score; score 1 poses higher seriousness of eating habit than score 4. The questionnaire comprises of three scales, Cognitive Restraint (CR-6 items), Uncontrolled Eating (UE-9 items) and Emotional Eating (EE-3 questions) (Karlsson *et al.*, 2000). Cognitive Restraint assesses dietary restraint, indicating control over food intake to influence body weight and image. Uncontrolled Eating measures failure to control eating, while the extent of food used as a mood regulator is measured by Emotional Eating (Karlsson *et al.*, 2000). Below is the classification of score for each scale according to the seriousness of eating behavior (Table 1).

Depression Anxiety Stress Scales-21 (DASS-21):

The General Psychological Distress (GPD), stress, anxiety and depression levels of these undergraduates were measured by the DASS-21. DASS is a self-reporting instrument and available in two versions: 42 items (DASS-42, complete version) and 21 items (DASS-21, short form version). DASS-21 is a self report questionnaire designed to assess the severity of a range of symptoms common to depression, anxiety and stress. DASS-21 consists of three main scales which are Depression (D), Anxiety (A) and Stress (S). Each scale has 7 items. Each item uses 4-point Likert-scale between 0 (Did not apply to me at all) and 3 (Applied to me very much, or most of the time). After the questionnaire is complete, the scores of each scale (D, A and S) is sum and then multiplied by two (2) before

Table 2: DAS scores and eating behavior scores of science undergraduates (n = 114)

Variables	Number of undergraduates (n)	(%)
Cognitive restraint		
High	6	5.30
Medium	64	56.1
Low	44	38.6
Uncontrolled eating		
High	8	7.0
Medium	79	69.3
Low	27	23.7
Emotional eating		
High	36	31.6
Medium	28	24.6
Low	50	43.9
Depression level		
Normal	66	57.9
Mild	22	19.3
Moderate	19	16.7
Severe	5	4.4
Extremely severe	2	1.9
Anxiety level		
Normal	31	27.2
Mild	31	27.2
Moderate	37	32.5
Severe	6	5.3
Extremely severe	9	7.9
Stress level		
Normal	32	28.1
Mild	25	21.9
Moderate	36	31.6
Severe	12	10.5
Extremely severe	9	7.9

comparing with the DASS severity ratings. The DASS-21 was used in this study due to it requires less time to administer, a well validated and reliable instrument in overseas but not in Malaysian population yet (Yusoff *et al.* 2012). As the DASS-21 is a short form version of the DASS (42-items), the final score of each item groups (D, A and S) needs to be multiplied by two (x2) to simulate the full-scale version scores. Once multiplied by 2, each score can now be used to compare between the three scales and with severity labels. Below is the severity rating for DASS (Table 2).

RESULTS

A total of 114 undergraduates participated in this study. The demographic profile of the undergraduates who participated in the study is presented in Table 3. Majority of the subjects were female (78.9%) and Malay (68.4%). Most (63.2%) were within the normal BMI range (18.5-24.9 kg/m²). Approximately 72% of the subjects' resided in-campus and 78% of the undergraduates stayed with their course mates. Only seven subjects (6.1%) had family history of depression.

Table 2 indicated that the DASS scores and eating behavior scores of science undergraduates. It was observed that a majority of these undergraduates have medium cognitive restraint and uncontrolled eating scores, with 56.1 and 69.3% students having medium scores. However, the subjects had a higher tendency to

Table 3: Demographic profile of undergraduates (n = 114)

Variables	Number of undergraduates (n)	(%)
Gender		
Male	24	21.1
Female	90	78.9
Race		
Malay	78	68.4
Non-malay	36	31.6
BMI		
Underweight	29	25.4
Normal	72	63.2
Overweight and obese	13	11.4
Year of study		
Year 1	21	18.4
Year 2	22	19.3
Year 3	33	28.9
Year 4	38	33.3
Residential		
In-campus	72	63.2
Out-campus	42	36.8
Staying with		
Course mate	78	68.4
Peer	27	23.7
Family member	9	7.9
Family history of depression		
Yes	7	6.1
No	107	93.9

develop emotional eating, as implied by a higher percentage of undergraduates obtaining low emotional eating score (43.9%). As for DASS scores, most science undergraduates have normal depression scores (57.9%), while the anxiety and stress scores ranged from normal to moderate for most subjects (a total of 86.9% for anxiety scores and 81.6% for stress scores).

Results in Table 4 showed the depression score, anxiety score and stress score among science undergraduates of different gender, race, year of study and BMI level. For gender, depression score was significant between male and female ($p < 0.05$) whereby, the depression scores of the male undergraduates were significantly higher than those of the female undergraduates. However, there was no significant differences among gender for anxiety scores and stress scores ($p > 0.05$). Besides that, for the Depression Score's effect can be described as "medium" ($r = -0.236$) and small effect size for both anxiety score ($r = -0.093$) and stress scores ($r = -0.077$).

For race, there was a significant difference in races for depression and anxiety score whereby the depression scores of Malay undergraduates were significantly higher than those of the non-Malay undergraduates ($p < 0.05$). For stress score, there was no significant difference among Malays and non-Malays significant ($p > 0.05$). Besides that, for the effect size for depression score, anxiety score and stress score can be described as between "small and medium" which are ($r = -0.200$), ($r = -0.185$) and ($r = -0.181$) subsequently.

However, there was no statistical differences were found in the depression, anxiety and stress scores among students with different BMI levels ($p > 0.05$). It was also found that the p-value for depression, anxiety and stress scores for comparison between years of study all exceeded 0.05 and therefore rendering them statistically insignificant. There is no significant difference between the mean ranks of all DASS scores among undergraduates in different year of study.

Table 4: DASS scores among science undergraduates of different gender, race, year of study and BMI level

Variable	N	Depression score		Anxiety score		Stress score	
		Mean±S.D. (median)	p	Mean±S.D. (median)	p	Mean±S.D. (median)	p
Gender			0.010*		0.320		0.410
Male	24	12.92±8.83 (12.00)		15.17±8.77 (15.00)		15.33±9.90 (14.00)	
Female	90	7.84±5.69 (6.00)		12.98±7.03 (12.00)		13.31±7.10 (12.00)	
Races			0.030*		0.048		0.054
Malay	78	9.64±6.40 (8.00)		14.46±7.65 (12.00)		14.69±7.56 (14.00)	
Non-malay	35	7.33±7.33 (6.00)		11.22±6.53 (10.00)		11.67±7.92 (11.00)	
Year of study			0.867		0.841		0.146
Year 1	21	9.43±7.35 (8.00)		14.48±7.13 (12.00)		15.81±8.48 (14.00)	
Year 2	22	8.36±7.63 (6.00)		12.55±7.54 (12.00)		10.55±6.65 (10.00)	
Year 3	33	9.64±6.97 (8.00)		13.64±8.24 (12.00)		14.12±8.11 (12.00)	
Year 4	38	8.22±5.88 (8.00)		13.08±7.08 (12.00)		14.00±7.47 (14.00)	
BMI level			0.329		0.117		0.149
Underweight	28	9.21±8.51 (8.00)		13.93±7.21 (14.00)		12.43±7.67 (12.00)	
Normal	72	8.14±5.45 (6.00)		12.58±7.64 (12.00)		13.50±7.62 (12.00)	
Overweight and obese	13	12.31±8.64 (10.00)		16.77±7.46 (14.00)		17.54±8.41 (16.00)	

*: $p < 0.05$

Table 5: Cognitive restraint score, uncontrolled eating score and emotional eating score among undergraduates of different gender, race, year of study and BMI level

Variable	N	Cognitive restraint score		Uncontrolled eating score		Emotional eating score	
		Mean±S.D.	p	Mean±S.D.	p	Mean±S.D.	p
Gender			0.010*		0.140		0.560
Male	24	18.17±2.62 ^a		20.21±3.79		5.08±1.32	
Female	90	16.46±2.95 ^b		21.48±3.73		5.27±1.39	
Races			0.170		0.820		0.690
Malay	78	16.40±2.76		20.81±3.75		5.06±1.47	
Non-malay	35	17.83±3.17		22.14±3.74		5.57±1.22	
Year of study			0.089		0.813		0.588
Year 1	21	15.95±2.50		20.86±3.89		5.00±1.64	
Year 2	22	17.23±2.83		21.41±3.85		5.05±1.65	
Year 3	33	16.18±2.33		20.85±3.34		5.24±1.12	
Year 4	38	17.61±3.54		21.61±4.08		5.45±1.25	
BMI level			<0.001*		0.960		0.217
Underweight	28	18.93±2.29 ^a		21.04±3.92		5.61±1.20	
Normal	72	16.39±2.95 ^b		21.28±3.81		5.14±1.41	
Overweight and obese	13	14.62±1.39 ^b		21.23±3.56		4.92±1.50	

*: p<0.05; ^{a-b}: Mean values within the same row bearing different superscripts differ significantly (p<0.05)

Table 5 showed the cognitive restraint score, uncontrolled eating score and emotional eating score among undergraduates of different gender, races, year of study and BMI. The results of cognitive restraint score was significant (p<0.01) between male and female but not significant for uncontrolled eating score (p>0.05) and emotional eating score (p>0.05). There was no significant difference in races and year of study (p>0.05) for cognitive restraint score, uncontrolled eating score and emotional eating score. For BMI level, cognitive restraint was the only eating behavior that was significantly affected by BMI (p<0.001).

Spearman's correlation indicated a negative correlation between depression and uncontrolled eating ($r_s = -0.324$, $p < 0.001$) as well as emotional eating ($r_s = -0.296$, $p = 0.001$). Only the depression score was significant and it accounted for a significant 10.3% of the variability of uncontrolled eating ($R^2 = 0.103$, adjusted $R^2 = 0.095$, $F(1, 112) = 12.80$, $p = 0.001$). A negative correlation was also found between stress and uncontrolled eating ($r_s = -0.284$, $p = 0.002$) as well as emotional eating ($r_s = -0.301$, $p = 0.001$). The stress score was significant and it accounted for a significant 9.5% of the variability of emotional eating ($R^2 = 0.095$, adjusted $R^2 = 0.087$, $F(1, 112) = 11.79$, $p = 0.001$). For eating behavior scores, the higher the scores, the less severe the eating behavior, whereas for DASS scores, higher scores indicated higher stress experienced by an individual. Therefore, for the regression of a negative relationship between the stress level score and eating behavior score is expected. The regression equation obtained from this study was:

- Uncontrolled eating = 22.799-0.178 (depression)
- Emotional eating = 5.976-0.054 (stress)

For uncontrolled eating as the depression score increased by 1 unit the uncontrolled eating scoreless 0.178. Meanwhile for emotional eating as the stress

score increase by 1 unit the emotional eating score decrease 0.054. This indicated that the stress and depression does influence the uncontrolled eating and emotional eating indirectly among undergraduate students.

DISCUSSION

Generally, depression is the most prevalent psychiatric condition which affects the women twice as compare to the men (Iowa, 2007). However, in this study it showed the significant difference of the score between male and female in depression score (p<0.05). Male has higher depression score (75.48) as compared to female (53.51). Among students, depression is probably caused by stress during and over examinations and relationship problems with partners, parents, siblings, lecturers, course mates and loved ones (Zaid *et al.*, 2007; Sherine *et al.*, 2003). International studies also associate the prevalence of depressive disorders among students mainly with a stressful educational environment (Peterlini *et al.*, 2002) such as failure in achievement and education related problems like examinations and projects are major causes of depression.

In this study Malays had higher mean score of depression and anxiety compared to non Malays. However, for the stress scores there was no significant differences among Malays and non Malays maybe due to reasons as mentioned before where by the students were in the same educational environment.

In this study population, the weight of the student (measured in terms of BMI) was not associated with psychological disorders (depression and anxiety) and stress. Some studies have shown that, body weights (particularly underweight and overweight) were associated with higher depressive tendency (Hou *et al.*, 2013; Linde *et al.*, 2004). However, other study studies showing no particular association between BMI and

depression (Hach *et al.*, 2006) as well as anxiety (Rivenes *et al.*, 2009). Another study by Saat *et al.* (2010) indicated that there was no relationship between stress score and BMI. In this case, it can be derived that the students were generally not depressed nor anxious regardless of their body weight. However, as majority of the students have normal body weight category, the findings were therefore not justified.

Previous studies done in the United States of America (Ross *et al.*, 1999), Hong Kong (Wong *et al.*, 2006) and Turkey (Bayram and Bilgel, 2008) to investigate the relationship between stress and the year of study have all yielded similar results, with higher DASS scores among first year students or freshmen. This was due to cope with psychologically and socially due to transitional adjustments. However, in this study on the undergraduates, there was no such observation in the population of undergraduates surveyed. This could be explained that the students here coped better with the stressors that may cause depression, anxiety and general distress as the ability to cope with external stressors will directly affect one psychologically (Shah *et al.*, 2009). Besides, this study also revealed that the final year dissertation (project) does not significantly cause psychological distress (depression, anxiety and stress) among the students.

As for eating behaviour, in this study, male undergraduates had significantly higher restraint score (18.17 ± 2.62) compared to female undergraduates (16.46 ± 2.95), indicating that male students are less prone to restraint eating. This finding is consistent with the research done by De Lauzon-Guillan *et al.* (2004, 2009), where females were reported to have higher degree of restraint eating, which might be related to a greater propensity for dieting.

Cognitive restraint, uncontrolled eating and emotional eating behaviours did not differ among races. Atlas *et al.* (2002) reported that differences in race among Caucasian and African American undergraduates did not account for differences in these eating behaviours. Similar findings were also demonstrated by Rutledge and Linden (1998) among Caucasian and Asian undergraduates, thus implying that difference in race is not a factor influencing eating behaviours.

Various studies with TFEQ-R18 conducted on undergraduates had not compared the effect of different year of study on the eating behaviours (Bond *et al.*, 2001; Lowe *et al.*, 2006). However, eating habits had not shown to differ among Malay undergraduates of health sciences of different year of study in University Sains Malaysia (Lua *et al.*, 2012). Thus, it can be concluded that year of study of undergraduates is not indicative of any differences in cognitive restraint, uncontrolled eating and emotional eating.

Underweight undergraduates showed the highest cognitive restraint score (18.93 ± 2.29), followed by those who have normal BMI (16.39 ± 2.95), while

overweight and obese undergraduates demonstrated the lowest cognitive restraint score (14.62 ± 1.39). This implies that subjects who have higher BMI in this study tend to restrain their diet to a higher degree. Similar findings have also been reported by Cappelleri *et al.* (2009) and Tholin *et al.* (2005) where positive correlations have been found between BMI level and degree of cognitive restraint eating behaviour. This may reflect a weight control strategy adopted in overweight and obese people, who are often motivated to lose weight (Kontinen, 2012).

Based on the results of the correlation and regression, it is clearly shown that depression is very closely related with uncontrolled eating behavior. Stress had been shown to be non-significantly associated with uncontrolled eating. On the other hand, emotional eating had been closely related with the subjects' stress level. Emotional eating is not associated with depression. Our study involved 114 students from the Sciences programme from the first till the final year. Based on the analysis above, we can be able to predict the eating pattern of the Science undergraduates when they are depressed or under severe stress.

Chronic stress is believed to affect eating pattern by increasing appetite. In our study, it is clearly shown that, as the depression score increases, the score for the uncontrolled eating behavior decreases. This means that, as the students are more depressed, they tend to engage in uncontrolled eating behavior. This is also similar with the findings using stress score as the independent variable. As the stress score increases among the Science undergraduates, emotional eating score shows a significant reduction. This indicates that; as the severity of stress increases among Science undergraduates, this will be an enhancing factor for emotional eating.

Depression and stress among university students is usually due to overload of assignments, improper time management, family problems and misunderstandings among friends and classmates. Generally, people tend to consume large quantity of food especially junk food in response to depression. This is in accordance with the findings from Kausar (2010). The study done by Brown *et al.* (1997) showed that depression is one of the most important factors which triggers binge or uncontrolled eating. Food is often regarded as being able to bring comfort, at least in short term. As a result, those who are depressed might turn to food to heal their problems.

Science undergraduate often consume uncontrolled amount of food when they are depressed. This is particularly obvious during the examination week. Students tend to consume more food during this period. Depression is regarded as appetite enhancer. This is similar with the findings by Epel *et al.* (2001), which stated that depression is very closely related with uncontrolled eating behavior. Depressed students who are often engaged in uncontrolled eating behavior are at

a highest risk of developing eating disorder such as bulimia nervosa. This is especially common among female where after a period of uncontrolled eating, they tend to feel guilty for consuming large quantities of food. This will in turn lead them to involve in purging. Purging is possible by forceful vomiting, usage of laxatives or enemas. Severely depressed students are more likely to develop unfavorable behaviors such as exercising for a long duration of time till the body is over-exhausted or starvation for many days.

However, when the students fail to a proper solution to manage their depression, they will tend to engage in uncontrolled eating behavior. Thus, this forms a cycle which includes depression, uncontrolled eating and eating disorder. When depression is failed to be resolved for a long duration of time, the student are most likely at a higher risk of developing eating disorder. A study done by Weltzin *et al.* (2005), shown that female are more vulnerable to uncontrolled eating. Female were more likely to experience a 'loss of control' during uncontrolled eating. The study also indicated that uncontrolled eating is not very common among male.

Furthermore, chronic stress is an appetite enhancer. Stress among the Science students is the causative agent to the development of disordered eating pattern. Stress among university students is most commonly triggered by examinations or assignments. This may usually lasts for a short time, where, once stressors had been eliminated, the students tend to resume their normal eating behavior. However, students who are affected by severe stress are more likely to engage in emotional eating often even though the sources of stress had been eliminated.

Students who are under stress have a lower self-esteem and thus they are highly vulnerable to developing unhealthy eating pattern. The results of our study showed that stress enhance emotional eating. Emotional eating is triggered by cortisol. Cortisol is the hormone that is released during stress and it is commonly known as the 'stress hormone'. Increased level of cortisol may lead to cravings of foods laden with carbohydrate and fat. Thus, physiological mechanism in human body is also a leading factor to emotional eating during stress. The students might not feel hungry during stress, but they tend to find pleasure from eating. Besides that, students who are stress are generally 'orally fidgety'. Nail biting and teeth grinding are very common behaviors in stressed individuals. Usually, they will have a feeling to munch on food especially junk foods such as potato chips or sweet crackers.

On the other hand, emotional eating during stress is also a possible way to deal with frustration, anger, anxiety or fear. Food can be able to divert their mind from the problems. A study done by Hudd *et al.* (2000) using university students as subjects showed that, students who are highly stressed tend to consume

unhealthy food compared to the group experiencing lower stress level.

One of the main problems among students who are depressed is that they have no shoulder to rely on. They tend to isolate themselves and create an own world around them. This is considered to be very dangerous because severe depression or stress can lead to psychological illnesses in the near future.

Some of the disadvantage of heightened uncontrolled eating and emotional eating are weight gain and getting physically sick due to excessive eating. A better way to overcome those cravings during unhappy moments is to carry out activities that tend to relax and stabilize the students' mood. This is possible by going for a walk, jogging, listening to music, watching favorite movies or reading interesting novels. Students should be able to manage their mood accordingly. They should not reward themselves with food when they are unhappy. Hunger cues that are not genuine (triggered by emotions) should be distracted by some other beneficial activities. During stressful or depressed moments, students should eat what the body wants and just enough to feel satisfied. Eating more than normal can be dangerous to health over-time. On the other hand, uncontrolled eating or emotional eating due to stress or depression may lead to the development of eating disorders such as bulimia nervosa.

Thus, the best way students can manage their problems is by attending on-campus counseling sessions. These counseling sessions can be able to guide students to find solutions to their problems and thus reduce the severity of depression and stress. Students under severe depression and stress should try to examine their thoughts and actions. Instead of eating, they could talk to friends and family about their problems or consult a psychologist.

CONCLUSION

In conclusion, the present study determined the effects of stress on the eating behaviours among science undergraduates in Kuala Lumpur. In this particular study, it is found that male are more depressed and have lower tendency of cognitive restrain in eating behavior compare to female. Malays are more depressed and anxiety compared to non-Malays whereas there was no difference in eating behavior among Malays and non-Malays. Both stress level and eating behavior were not influenced by different BMI level and year of study. There was a positive relationship between uncontrolled eating with stress and depression as well as emotional eating with stress and depression. As the level of depression and anxiety increase, the tendency for uncontrolled eating and emotional eating also increase. Therefore, stress induced eating should be considered in order to determine the type of meal (high dense calorie food) that may relate with the development of obesity.

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