ORIGINAL ARTICLE

Relationship Between Nutrition Literacy and Stress Towards Eating Behaviour Among IIUM Students

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ABSTRACT

Background: The rising prevalence of stress and its influence on eating behaviours among university students is becoming a significant concern, especially in regard to nutrition literacy. This study examined the relationship between nutrition literacy, stress, and eating behaviour among students enrolled at the International Islamic University Malaysia (IIUM). **Methods:** This study used a cross sectional design and a convenience random sampling, to obtain a total sample of 384 students. A combination of questionnaires including socio-demographic questions, the Short Nutrition Literacy (S-NutLit), the Perceived Stress Scale (PSS), and the Dutch Eating Behavior Questionnaire (DEBQ), was given to respondents. **Results:** The study revealed a majority of students scoring a high nutrition literacy level for functional and critical, 86.7% and 79.4% respectively. There was a significant association between critical nutrition literacy and restrained eating behaviour ($r=0.123$, $p<0.01$). The stress level reported also was in moderate level which was only 70.6%. In addition, there was a significant association between stress and emotional eating behavior ($r=0.142$, $p<0.01$). The result from regression analysis showed that stress and critical nutrition literacy were significant predictors of restrained and emotional eating behaviour. **Conclusion:** Hence, these findings highlight the potential for enhancing students' awareness of a healthy lifestyle by addressing the relationship between nutrition literacy and stress. Thus, it can serve as a guide to provide a good intervention in managing stress and increasing nutrition literacy level among university students.

INTRODUCTION

A healthy diet is essential for optimal body function, providing necessary nutrients and energy. The World Health Organization (2020), emphasizes key aspects of a healthy diet, including balanced energy intake, reduced saturated and trans fats, increased fruit and vegetable consumption, and limited sugar and salt. Nutrition and academic demands can lead to poor food choices, such as a higher intake of snacks and fast food (Barrington et al., 2014).

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literacy, knowledge and skills related to healthy eating helps individuals make informed dietary choices, which is crucial for university students as it affects their physical and mental health and overall academic performance.

However, university students often struggle to maintain healthy eating habits due to academic and social pressures. Increased stress levels from independent living

Eating behaviours are influenced by environmental, social, and biological factors, including personal preferences and nutrition knowledge (Kabir et al., 2018).

Given the health risks associated with poor eating behaviour, like obesity and non-communicable diseases,

this study investigates the relationship between nutrition literacy, stress, and eating behaviors among university students (Davison et al., 2019). According to the National Health Morbidity Survey (2023), the prevalence of overweight or obesity was 54.4% in Malaysia, which kept increasing from 2011 to 2023 by approximately 10%. The epidemic of obesity in Malaysia is an issue of significant concern due to its possible implications for other metabolic syndromes, such as hypertension, dyslipidemia, and impaired glucose or insulin metabolism, which contribute to a significant amount of the worldwide disease burden (Alberti et al., 2005). One of the main factors contributing to the growth of those metabolic syndromes is poor eating behaviour, which is characterized by unhealthy dietary choices and lifestyle behaviours (Peters et al., 2020). Additionally, insufficient understanding of nutrition (Zeng et al., 2022) and psychological factors (Hill et al., 2022) such as perceived stress, depression, boredom, and anxiety, have been linked to poor eating behaviour.

The relationship between nutrition literacy and stress is complex. While nutrition literacy aids in making healthier choices, stress can disrupt decision-making, hindering individuals' ability to choose healthy options (Moehlecke et al., 2020). Stress is linked to various eating behaviours, including emotional eating, which often results in the consumption of high-calorie foods during stressful times (Černelič-Bizjak & Guiné, 2022). Stress can also lead to restrained eating, where individuals try to control their intake but may end up binge eating when restrictions are unsustainable (Poínhos et al., 2015).

Stress heightens sensitivity to external food cues, such as impulsive eating due to food appearances even when not hungry (Oliver et al., 2000). Therefore, the interaction between stress and nutrition literacy on eating behaviours requires further exploration. In addition, the research on eating behaviour often overlooks university students in comparison to children and adults (Nuur Fazliza Wan Zakaria et al., 2021). Young adults are the most vulnerable group to engaging in unhealthy eating behaviour due to the combination of rapid changes in physical growth and psychosocial development they encounter (Ganasegeran et al., 2012). Nevertheless, there exists a lack of empirical research investigating the correlation between nutrition literacy, stress, and eating behavior, particularly within the context of university students. Understanding how stress influences dietary choices among those with high nutrition literacy is crucial for creating targeted interventions to promote healthier eating in university students.

This study specifically examines how stress affects emotional, restrained, and external eating behaviours among IIUM students. Insights gained from this research can inform future health promotion strategies focused on stress management and improving nutrition literacy to encourage healthier eating habits.

MATERIALS AND METHODS

Subjects

All IIUM students aged 18 years old and above were recruited to participate. Ethical approval was sought from the Kulliyyah Postgraduate and Research Committee (KPGRC) and International Islamic University Malaysia Research Ethical Committee (IREC) under the identification number IREC 2024-(KAHS/NS9) before conducting data collection.

Socio-Demographic Factors

This part consisted of the questionnaire on the participants' socio-demographic factors such as gender, age, race, campus, academic level, kulliyyah, year of study, current living (on campus, off campus, living with family), and self-reported anthropometry measurements.

Short Nutrition Literacy Scale (S-NutLit)

This section consisted of 11 questions. The first five questions focused on functional nutrition literacy, while the remaining six address critical nutrition literacy both used a 5-point Likert scale.

Perceived Stress Scale (PSS)

This part of the questionnaire consisted of 10 questions to measure the level of stress among IIUM students. The score was calculated by reversing responses to the four positively stated items (items 4, 5, 7, and 8) and then totaling across all scale items (e.g., 0 = 4, 1 = 3, 2 = 2, 3 =1 & 4 = 0). Meanwhile, questions 2, 4, 5, and 10 were combined to form a short 4-item scale. It showed that a high level of stress of the participants obtained a maximum 27 score which is more than 27, 14-26 was considered a moderate level of stress while the minimum score is less than 13.

Dutch Eating Behavior Questionnaire (DEBQ)

The part of the questionnaire contained 33 questions that assessed three dimensions of eating behaviour: restrained, emotional, and external eating. Responses

were measured on a 5-point Likert scale from 1 (never) to 5 (very often). The first 10 questions focused on restrained eating, questions 11 to 23 addressed emotional eating, and questions 24 to 33 covered external eating.

Statistical Analysis

The data was analysed with the Statistical Package for the Social Sciences Version 29 (SPSS version 29.0). Descriptive analysis was performed to calculate the percentage, of socio-demographic data, nutrition literacy level, stress scale and eating behaviour score. Pearson Product-Moment Correlation and multiple regression were utilised to investigate the connection between nutrition literacy, stress and eating behaviour.

RESULTS

Socio-Demographic Factors

A total of 384 students were recruited, including 77.9% (n =299) female and 22.1% (n=85) male. Most of the respondents were at the age of 22-23 years old (40.6%, n =156), followed by 20-21 years old (31.8%, n = 122), 18-19 years old (24.7%, n = 95), 24 and above (2.9%, n = 11). All respondents were Malay race. Undergraduate students 69.0% (n=265) were the majority while there were 19.2% (n=74) foundation students, and the remaining 11.7% (n=45) were postgraduate students. The majority of the respondents were from IIUM Kuantan campus respondents (52.6%, n=202), while the least number of respondents were from Pagoh campus at (11.2%, n=43). Only one respondent reported living of campus with their family.

Table 1: Sociodemographic results

Variables	Categories	*n*	*%*
Gender	Male	85	22.1
	Female	299	77.9
Age	18-19	95	24.7
	20-21	122	31.8
	22-23	156	40.6
	24 & above	11	2.9
Race	Malay	384	100
Campus	CFS Gambang	74	19.2
	Kuantan	202	52.6
	Gombak	65	16.9
	Pagoh	43	11.2
	Year 1	95	24.7
	Year 2	67	17.5
	Year 3	90	23.4
	Year 4	58	15.1
Academic level	Foundation	74	19.2
	Undergraduate	265	69.0
	Postgraduate	45	11.7
Living Campus	On Campus	383	99.7
	Stay with Family	1	0.3
Kulliyyah	AIKOL	12	3.1
	KAED	12	3.1
	KAHS	144	37.5
	KENMS	17	4.4
	KICT	8	2.1
	KIRKHS	44	11.5
	KLM	46	12.0
	KOD	2	0.5
	KOE	20	5.2
	KOED	7	1.8
	KOM	8	2.1
	KON	18	4.7
	KOP	11	2.9
	KOS	35	9.1

Nutrition Literacy Level

Functional Nutrition Literacy

It was reported that most of the students were on the high functional nutrition literacy level, shown by 333 students with a prevalence of 86.7%. As for the low functional nutrition literacy categories, there was a slight prevalence difference, showing that 13.3% of the students with 51 respondents were in the low functional nutrition literacy category.

Critical Nutrition Literacy

The analysis showed that most of the students showed a high critical nutrition literacy level, with a prevalence of 79.4 % among 305 students. 20.6% (n=79) revealed low levels of critical nutrition literacy.

Stress Level

A total of 56 students with a prevalence of 14.6% have a high stress level. Most of the respondents have a moderate stress level which was 70.6%, as shown by 271 respondents. 14.8% of the students, or 57 respondents, were found to have low-stress levels.

Eating Behaviour Level

A descriptive analysis reported that most of the students were on a highly restrained eating behaviour level, a high emotional eating level, and a high external eating level.

Table 2: Level of Nutrition Literacy, Stress & Eating Behaviour

Variables	Level	n	%
Functional nutrition literacy	High	333	86.7
	Low	51	13.3
Critical nutrition literacy	High	305	79.4
	Low	79	20.6
Stress	High	56	14.6
	Moderate	271	70.6
	Low	57	14.8
Restrained eating	High	247	64.3
	Low	137	35.7
Emotional eating	High	249	64.8
	Low	135	35.2
External eating	High	377	98.2
	Low	7	1.8

Correlation Between Nutrition Literacy, Stress, and Eating Behaviours

Pearson correlation test was done to investigate the relationship between nutrition literacy and stress towards eating behaviour. Table 3 indicates the results of the correlation analysis between functional nutrition literacy, critical nutrition literacy, stress, and three dimensions of eating behaviour that consist of restrained, emotional, and external eating behaviour among IIUM students.

The results of correlation analysis revealed a significant relationships between stress and emotional eating (r=.142, p<0.05), critical nutrition literacy and restrained eating (r=.123, p<0.05). Finally, there was a positive relationship between functional nutrition literacy and critical nutrition literacy (r=.670, p<0.05). Based on correlation analysis all sub dimension that measure eating behaviour showed significant relationship to each onther.

Table 3: Correlation Test for Nutrition Literacy, Stress and Eating Behaviour

	Variables	1	2	3	4	5
1	Stress	1				
2	Functional nutrition literacy	-.64	1			
3	Critical nutrition literacy	-.50	.670**	1		
4	Restrained eating	.086	.093	.123*	1	
5	Emotional eating	.142**	-.052	-0.48	.191**	1
6	External eating	0.42	-.099	-.081	-.111*	.353**

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

** Correlation is significant at the 0.001 level (2-tailed)

Regression Between Critical Nutrition Literacy, Stress, and Restrained Eating Behaviour

Regression analysis was conducted to analyse the significance of the predictor which is critical nutrition literacy and stress toward restrained eating behaviour. According to Table 4 above, R^2 value = 0.024 showed only a 2.4 % variance between the variables. *F* value showed that there is a significant relationship between the variables that prove that critical nutrition literacy can lead to restrained eating behaviour among IIUM students F (2, 381) = 4.615, p < 0.001.

It is found that critical nutrition literacy (b = 0.09, p < 0.001) is significantly predictive of restrained eating behaviour among IIUM students. The result showed that the restrained eating behaviour increased by 0.283 for every one-unit increase in critical nutrition literacy. However, it is only 2.4%, which is very low for critical nutrition literacy to be a predictor of restrained eating behaviour.

Table 4: Predictors to Restrained Eating Behaviour

Predictor	*B*	*SE*	*Beta*	*t*	*Sig.*
(Constant)	20.89	2.51			
Stress	0.137	0.075	0.092	1.82	0.070
Critical nutrition literacy	0.283	0.112	0.128	2.52	0.012
Model summary	R = .154 R^2 = .024 *Adj.* R^2 = .019 *SE* = 9.070 $F(2, 381) = 4.615$, $p < .001$				

Regression Between Critical Nutrition Literacy, Stress, and Emotional Eating Behaviour

Regression analysis was conducted to identify the significance of the predictor which is critical nutrition literacy and stress towards emotional eating behavior among IIUM students. According to Table 5, R^2 value = 0.022 showed only a 2.2% variance between the three variables. F value demonstrated a significant relationship that proved critical nutrition literacy, and stress can lead to emotional eating behaviour among IIUM students F (2, 381) = 4.28, p < 0.001. It is found that stress (b = 0.269, p < 0.001) is significantly predictive of emotional eating behaviour among IIUM students.

Table 5: Predictors to Emotional Eating Behaviour

Predictor	***B***	***SE***	***Std B***	***t***	***Sig.***
(Constant)	34.850	3.254			
Stress	0.269	0.097	0.140	2.766	0.000
Critical nutrition literacy	-0.118	0.145	-0.041	-0.816	0.415
Model summary	R = .148				
	R^2 = .022				
	Adj. R^2 = .017				
	SE = 11.741				
	$F(2, 381) = 4.280$, $p < .001$				

DISCUSSION

Nutrition Literacy Level

The primary objective of this study was to assess the nutrition literacy level among IIUM students. Findings show that the majority of IIUM students have a high level of nutrition literacy, contrasting with a study by Liao et al., (2019) which reported that college students in Taiwan had suboptimal nutrition literacy. According to Liao et al. (2019), Taiwanese college students were confident in obtaining information due to their Internet skills but struggled to assess the credibility of online health resources. The difference in findings may be due to the educational background of the IIUM respondents, many of whom are in healthcare-related programs with greater exposure to nutrition information.

Additionally, this study found that students' functional nutrition literacy scores were slightly higher than their critical nutrition literacy. Functional nutrition literacy involves basic skills in understanding nutritional information, while critical nutrition literacy requires advanced skills to evaluate, identify misinformation, and reflect on nutrition based on personal needs. Zhang et al. (2022), suggest that individuals with strong functional nutrition knowledge may retain it even without critically engaging with it. Silva (2023) emphasizes the importance of practical skills for applying nutritional information to achieve a balanced diet. These results suggest that although IIUM students can meet their immediate dietary needs, there is potential for improvement in their capacity to critically evaluate more intricate nutrition issues.

Stress Level

This study revealed that most IIUM students have a moderate stress level, which is consistent with the findings from Wong et al. (2023). In a study by Wong et al. (2023), several characteristics were identified as contributors to stress in university students, including sleeping patterns, gender, socioeconomic status, and ethnicity. Research indicates that college students exhibit a greater susceptibility to mental health conditions, such as stress, anxiety, and depression, as compared to the general population.

Nutrition Literacy and Eating Behaviour

This study examines the relationship between two dimensions of nutrition literacy which are critical and functional, and three types of eating behaviours (restrained, emotional, and external) among IIUM students. The findings revealed a significant association between critical nutrition literacy and restrained eating behaviour. Students with higher critical nutrition literacy are more conscious of their dietary intake and more likely to control food consumption to achieve or maintain their desired weight or health status. This controlled eating behaviour reflects a form of dietary restraint, where individuals intentionally limit food intake to manage body weight. Consistent with Poínhos et al. (2015), who found Portuguese nutrition students with higher critical literacy, especially females, were more inclined toward restrained eating, these behaviours can be beneficial if students practice flexible restraint by balancing their diet without strict limitations (Nagrath et al., n.d.).

In contrast, no significant association was found between functional nutrition literacy and any of the three eating behaviours. Functional nutrition literacy involves basic skills like reading food labels and understanding dietary information, which is important for informed eating choices but may not directly impact restrained, emotional, or external eating behaviours. The ability to

acquire and comprehend nutrition information alone does not necessarily impact how students manage their eating habits, especially in response to emotions or external cues. As Alzaben et al. (2021) noted, while nutrition education increases knowledge, it doesn't always lead to behaviour changes, pointing to a gap between knowledge and its practical application. Additionally, functional literacy alone may not sufficiently predict eating behaviours, as factors such as stress and emotions often play a more significant role, especially in emotional eating (Macht, 2008). Higher-level literacy skills, combined with a supportive environment, may, therefore, be necessary to impact eating behaviours effectively (Gibbs & Chapman-Novakofski, 2012).

Stress and Eating Behaviour

This study revealed a significant association between stress and emotional eating, indicating that students under high stress are more likely to eat in response to sadness, frustration, or anxiety rather than hunger. Shah et al. (2023) found a positive correlation between perceived stress and emotional overeating among Malaysian adolescents, suggesting that students turn to palatable foods for immediate comfort. However, this behaviour often fails to improve mood in the long term and may lead to consuming nutrient-poor foods, potentially resulting in feelings of shame (Carpio-Arias et al., 2022). Additionally, no significant association was found between stress and restrained eating, suggesting that stress does not necessarily drive students to limit their food intake, as restrained eating tends to relate more to cognitive control and dietary goals than emotional states. However, Herhaus & Petrowski (2021) reported conflicting results, finding that stress could lead to restrained eating, potentially causing overeating once the restraint phase ends.

CONCLUSION

In conclusion, the study found a significant link between stress and emotional eating behaviour, indicating that higher stress levels lead students to use food as a coping mechanism, which can result in unhealthy eating habits. Additionally, there was a strong correlation between critical nutrition knowledge and controlled eating behaviour; students with higher critical nutrition literacy tended to practice more restrained eating, suggesting a more mindful approach to their food choices.

Future research should investigate additional factors that influence eating behaviour among students, such as physical activity, sleep patterns, mental health, and socioeconomic status. These factors may play significant roles in shaping eating habits, as nutrition literacy and stress are just a small part of the picture. Exploring these factors with stress and nutrition literacy could offer a more holistic well being, deeper understanding of the determinants of eating behaviour in the student population.

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