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Research Article
Mindful Eating Practice Predicts Lower Body Mass Index Among University Students

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Abstract

Background and Objective: The hectic life of university students may contribute to mindless eating and eventually may lead to obesity. Previous studies suggested that adopting mindful eating practice has a positive influence on eating habit modification and obesity rate reduction. Hence, this study aimed to assess the role of mindful eating practice and health attitudes in predicting the body mass index (BMI) of university students. **Materials and Methods:** A cross-sectional study was conducted among 300 university students at the International Islamic University Malaysia (IIUM). Participants' weight and height were measured and they were required to complete the Mindful Eating Questionnaire (MEQ) and Health Attitude Scale (HAS). **Results:** The mean body mass index (BMI) of participants was 22.53±4.00 kg m^{-2}. The highest mean reported for the mindful eating practice subscale is the awareness subscale (mean = 2.7852±0.475). The results showed that a higher MEQ score predicted a lower BMI ($p<0.05$) and this explained 2% of the variance in BMI. However, BMI was not predicted by health attitudes. **Conclusion:** The results suggested that the concept of mindfulness has a positive impact on body weight, which could be incorporated into weight loss and weight maintenance intervention programmes.

Key words: Body mass index, health attitude, mindful eating, obesity, university students

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Over the past four decades, a marked increase has been observed in the number of overweight and obese adults aged 18 years and older, as reported by the Global Health Observatory data. Approximately 2 billion adults worldwide were reported to be overweight and more than half of them were obese[1]. In relation to these data, an alarming result shows that 22% of university students from 22 countries are overweight[2]. The current trend of fast food consumption that has rapidly spread among university students and their eating behaviour is associated with a potential risk for developing obesity later in life, as the time at university is critical for developing long-term eating habits[3,4]. Crombie *et al.*[5] also indicated that health behaviours that develop during the university years may remain throughout adulthood. Consequently, prevention programmes discouraging unhealthy eating habits among university students are needed in order to prevent an increasing prevalence of overweight and obesity later in life.

Young adults who have experienced a shift from school to university life often have poor dietary intake, which causes substantial public health concerns[6]. For example, university students tend to adopt more mindless eating behaviour due to stress[7]. In addition, although university students are expected to obtain adequate knowledge regarding healthy eating equivalent to their education level, given their access to educational resources, stress and lack of time act as barriers for students to practice healthy eating habits[8]. In addition, stress due to financial constraints and academic factors often leads to poor emotional health in college students[9]. Moreover, the hectic life of students may prompt them to indulge in unhealthy eating habits, such as habits of eating quickly and eating while doing work or watching movies. These habits can be referred to as mindless or unconscious eating and are strongly associated with unintentional overeating[10]. Such eating habits can lead to weight gain and eventually obesity.

Mindfulness can be interpreted differently depending on who is studying it and how it is applied. Mindful eating as defined by Framson *et al.*[11,] is a "nonjudgmental awareness of physical (hunger and satiety cues) and emotional (for example: stress, boredom) feelings when eating or in situations that have environmental eating triggers". In other words, mindful eating involves the act of eating slowly; not doing anything else while eating, such as watching television or doing an assignment; eating only when hungry and stopping when one is full; responding nonjudgmentally to food; choosing food that is nourishing and enjoyable by activating all the senses while enjoying the meal; being aware of the act of unmindful eating (e.g., eating out of boredom); and practising meditation[12]. A study by Moor *et al.*[13] proposed that increasing individuals' mindful eating skills can positively affect their BMI status, as participants who have higher scores for mindful eating have lower BMI than those with lower scores. Although, these findings suggest a potential influence of mindful eating to reduce weight, only a limited number of studies have assessed this psychological concept of eating behaviour, particularly among university students.

University students also have moderate attitudes towards health. Studies on knowledge, attitudes and practices among university students have been conducted in several countries, including Malaysia, Iran and Lebanon, where the results show that they were not adopting sound healthy eating habits[8]. Furthermore, a study conducted by Steptoe *et al.*[14] among university students from thirteen European countries found that college students consistently did not engage in healthier lifestyle practices. Involvement in risky health behaviours that may have long-term effects on health, such as alcohol and tobacco use, physical inactivity and unhealthy dietary habits, is also evident[15]. Due to stress factors, university students might neglect their health, which explains their moderate health attitudes[15]. Furthermore, they might not consider the long-term effect of their current eating habits and might assume that it is normal to have such eating habits during the college years[16]. Previous studies demonstrated that mindfulness lead to healthy eating practice[17,18] but none have revealed the mindful eating as predictor of BMI. Consequently, this study indicated a need for researchers to incorporate the mindfulness concept into weight loss and weight maintenance interventions to prevent further increases in the global obesity rate. Therefore, the present study aimed to investigate the influence of mindful eating habits and health attitudes as potential variables in predicting BMI among university students.

MATERIALS AND METHODS

Participants: This cross-sectional study was conducted at the IIUM Kuantan campus. The participants were 300 health science students (200 female and 100 male) selected by convenience sampling. The inclusion criteria for this study are as follows: (1) Students at the IIUM Kuantan campus and (2) Age between 20 and 25 years. Postgraduate students and students who were involved in any diet regime during the time when this study was conducted were excluded from the study.

Measures

- **Anthropometric data:** The SECA Portable Stadiometer and SECA Clara Bathroom Scale were used to measure height and weight, respectively. Body mass index (BMI) was calculated using the following formula: weight in kilograms divided by the square of height in metres (kg m^{-2}). BMI status was classified using the WHO[19] standard: BMI <18.5 (underweight), BMI >25 (overweight) and BMI ≥30 (obese)
- **Demographic data:** This section includes questions on demographic data, such as the age and gender of the participants
- **Mindful eating:** The Mindful Eating Questionnaire (MEQ) was used to assess the practice of mindful eating among students. The MEQ is a validated questionnaire developed by Framson *et al.*[11]. It contains 28 items that use a 4-point Likert-type scale. The scale contains five subscales: disinhibition, consciousness, external factors, emotional response and distraction. Disinhibition measures the ability to stop eating when full. Awareness is noticing the effects of food on the senses and how food affects internal states. External cues measure eating in response to environmental triggers. Emotional response is defined as eating in response to negative emotions. Distraction is focusing on other activities while eating. MEQ has good construct validity and acceptable reliability for the summary score (Cronbach's $\alpha = 0.64$). In the present study, the summary score was used to assess participants' overall mindful eating practices and it was obtained as the average from the mean of the five subscales
- **Health attitude:** The Health and Taste Attitude Scale (HTAS) was developed by Roininen *et al.*[20]. It is a 38-item validated questionnaire that measures attitudes about health, taste and sensory analysis in the food selection process. The HTAS used a 7-point Likert scale where "1" means strongly disagree and "7" indicates strongly agree. For the purpose of this study, eight questions from the HTAS that were related to health attitudes were adopted and the present study named it the Health Attitude Scale (HAS). The internal consistency of the eight items used in this study was 0.78

Procedure: Approval for this study was granted from the IIUM Research Ethics Committee (IREC 2018-126). During data collection, participants were approached and a set of questionnaires was given to those who voluntarily agreed to participate provided that they fulfilled the inclusion criteria for this study. Before completing the questionnaire, the participants were given an information sheet regarding the study and a consent form.

Data analysis: The collected data were analysed statistically by using SPSS software version 22.0. All scores were presented by descriptive statistics. Multiple linear regression was performed to identify the predictors of BMI. The p-value was set at $p<0.05$ as the level of statistical significance.

RESULTS

Table 1 shows that one-third of the participants were male (33.3%) and the remaining two-thirds were female (66.7%). The age of the participants ranged from 18-25 years, with a mean of 21.94±1.53 years. In addition, the mean BMI was 22.35±4.00 kg m^{-2}.

Mindful eating practice and health attitudes of participants: The mean and standard deviation of the MEQ and HAQ scores of the participants are presented in Table 2. The majority of the respondents were in the category of eating with awareness (mean = 2.79±0.48). The disinhibition subscale had the lowest mean (2.49±0.55). The low mean in this subscale indicates that participants had difficulty identifying satiety and hunger cues. For health attitudes, the total mean score was 4.21±0.05.

Predictive analysis: Multiple regression was performed with BMI as the predictor variable. Mindful eating and health attitudes were entered as independent variables. The results of the regression indicated that mindful eating and

Table 1: Demographic characteristics of the participants (n =300)

Characteristics	No.	Percentage	Mean (SD)
Gender			
Male	100	33.3	
Female	200	66.7	
Age (year)			21.94 (±1.53)
Body weight (kg)			56.84 (±12.80)
Height (m)			1.59 (±0.09)
BMI (kg m^{-2})			22.35 (±4.00)

Table 2: Mean and standard deviation of MEQ and HAQ scores

Variables	Mean±standard deviation
MEQ total score	2.68±0.24
MEQ subscales	
Awareness	2.79±0.48
Distraction	2.77±0.55
Disinhibition	2.49±0.55
Emotional	2.65±0.62
External	2.68±0.46
Health attitude	4.21±0.93

Table 3: Standardized regression coefficients in predicting BMI

	B	SE	B
BMI	27.67	2.55	
Mindful eating	-2.52	1.03	-0.15*
Health attitude	0.04	0.03	0.08

*p<0.05, R^2 = 0.02

health attitude accounted for 2% of the variance in BMI [F (2, 297) = 3.07, p<0.05]. Table 3 demonstrates that mindful eating significantly predicted the BMI of university students (β = -0.15, p<0.05). Health attitude, however, had no influence on BMI (β = 0.08, p>0.05).

DISCUSSION

The present study aimed to examine the contribution of mindful eating and health attitudes in predicting BMI among university students. Generally, the results showed that university students were more likely to eat mindfully as it was frequently being practised but not all the time. In addition, they were more likely to be aware of what they were eating. The term "awareness" used here was described as "noticing the effects of food on the senses and how food affects internal states"[13]. The current eating trends of young people could be one of the possible contributors to increased awareness during eating among university students. Currently, food culture trends among the youth where food is considered entertainment and self-expression are giving rise to a food photography phenomenon where no meal goes undocumented[21]. Taking pictures of meals before eating involves visual and sensory cues. Increasing visual prompts lead individuals to become more aware of their total food consumption[21]; thus, the advent of foodstagrams or food photography may increase one's awareness during eating.

As hypothesized, it was found that mindful eating predicted BMI. This finding is consistent with findings from numerous studies that have also investigated mindful eating among college students[13,22]. Theoretically, mindful eating may promote healthy eating habits by increasing consciousness and responses to internal and physical cues rather than environmental or emotional trigger. It has also been suggested that the ability to recognize and respond to normal satiety cues can be improved by promoting awareness of emotional states and physiological signals[7]. Previous studies have suggested that mindful eating could be helpful in weight regulation and is highly associated with better eating behaviour. For example, mindful eating practice has been identified to positively affect dietary intake[23] and may influence individuals to make better decisions in terms of portion size and food choices[24].

Unlike a typical diet that emphasizes cutting calories, mindfulness helps people to reduce weight and improve health by restoring their ability to detect and respond to natural cues of hunger and satiety[25]. In addition, engaging in mindful eating can also increase awareness of automatic eating behaviours and reduce the tendency to overeat[3,26]. Mindful eaters have also been reported to engage in less emotional and stressful eating, as mindful eating enhances a person's feeling of control[24]. This is also supported by another study that found that increased mindfulness was positively associated with self-regulation and negatively associated with external and emotional eating[27]. These well-documented benefits of mindfulness could be a significant concept in changing an individual's conditioned pattern of eating that has developed over the years.

On the other hand, health attitude was not a predictor of BMI, in contrast to the hypothesis in the present study. Other studies that examined health attitudes in college students suggested that a high level of health attitudes may be associated with lower BMI of participants[28]. Health attitudes may not be able to predict BMI among university student populations compared to working adults because these attitudes may be due to other contributing factors, such as time constraints[29] related to eating a balanced diet and financial limitations in buying nutritious food. In addition, attitudes and actual behaviours are not always perfectly aligned. The finding of a study among university students with an adequate level of knowledge and a good attitude towards healthy eating shows that they do not tend to engage in healthy eating[8]. Hence, even though an individual possesses a good health attitude, it may not necessarily translate into mindful eating in practice.

While the standard approach to predict body weight involves conducting dietary assessments, the present study alternatively examined the psychological aspects of eating habits. The current findings, although in need of replication, could be of value to prevent and reduce the prevalence of youth obesity. A better understanding of the concept of mindfulness in eating habits may produce more effective intervention strategies for combating the risk of overweight and obesity in young adult populations, especially among university students. Our finding that mindful eating habits predicted to lower BMI suggests that the mindfulness concept could be incorporated into weight maintenance and weight reduction intervention programs because it is likely to cultivate awareness and attention in eating. Mindful awareness of eating habits[30] may help people control their appetite and thus control food intake. Framson *et al.*[11]

suggested that mindful eating is a skill that can be learned. Hence, healthcare professionals such as dietitians or nutritionists could educate not only university students but also the general population regarding mindful eating habits through exhibitions, talks or even demonstrations. When people are empowered with the skill of mindful eating, dieting-related eating disorder symptomatology could be prevented and a healthy diet behaviour may be promoted.

However, the present study had two limitations that could be addressed in future studies. First, the study involved health science students as the participants. Health science students are believed to have background knowledge related to healthy eating. As a result, they may tend to answer what they perceive to be the correct answers in the self-report questionnaire rather than their actual eating habits. Therefore, future studies could include more young adults from the general population to mitigate this limitation. Another limitation is the lack of measure to strengthen the findings regarding mindful eating. The findings of mindful eating practice through MEQ could be more meaningful if the actual dietary intake is also recorded by participants. This is to ensure that the mindful eating habit is associated with healthier dietary intake, such as having reduced calorie consumption, preferring healthier snacks and selecting food with desirable health benefits.

CONCLUSION

In conclusion, mindful eating practice is found to be one of the factors predicting BMI and mindfulness could be a valuable psychological variable to be further explored, particularly in the field of nutrition and dietetics. Healthcare professionals, especially dietitians and nutritionists, can incorporate and emphasize the mindfulness concept by offering guidance in mindful eating techniques in consultations. Integrating mindful eating practice with a weight loss programme may produce promising results not only in curbing youth obesity but also in helping with weight maintenance across the population.

SIGNIFICANCE STATEMENT

This study revealed that mindful eating practice predicted lower BMI among university students. This study will help researchers to incorporate the mindfulness concept into weight loss and weight maintenance interventions to prevent further increases in the obesity rate.

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REFERENCES

1. WHO., 2016. Global Health Observatory (GHO) data. World Health Organization, Geneva, Switzerland. http://www.who.int/gho/ncd/risk_factors/overweight_text/en/.
2. Peltzer, K., S. Pengpid, T. Samuels, N. Özcan and C. Mantilla *et al*., 2014. prevalence of overweight/obesity and its associated factors among university students from 22 countries. Int. J. Environ. Res. Public Health, 11: 7425-7441.
3. Maillet, M.A., 2014. The effectiveness of mindful eating in a student population. West Undergraduate Psychol. J., Vol. 2, No. 1.
4. Alfawaz, H.A., 2012. The relationship between fast food consumption and BMI among university female students. Pak. J. Nutr., 11: 406-410.
5. Crombie, A.P., J.Z. Ilich, G.R. Dutton, L.B. Panton and D.A. Abood, 2009. The freshman weight gain phenomenon revisited. Nutr. Rev., 67: 83-94.
6. Gan, W.Y., M.T.M. Nasir, M.S. Zalilah and A.S. Hazizi, 2011. Differences in eating behaviours, dietary intake and body weight status between male and female Malaysian university students. Malaysian J. Nutr., 17: 213-228.
7. Kristeller, J.L. and C.B. Hallett, 1999. An exploratory study of a meditation-based intervention for binge eating disorder. J. Health Psychol., 4: 357-363.
8. Hassan, M.R., H.F. Ghazi, N.S. Umar, N. Masri, S.M. Jamil, Z.M. Isa and N. Safian, 2015. Knowledge, attitude and practice of healthy eating and associated factors among university students in Selangor, Malaysia. Pak. J. Nutr., 14: 892-897.
9. Pryor, J.H., S. Hurtado, L. DeAngelo, L.P. Blake and S. Tran, 2010. The American Freshman: National Norms Fall 2010. Expanded Edn., Higher Education Research Institute, Los Angeles, ISBN: 978-1-878477-50-7, Pages: 165.
10. Wansink, B., D.R. Just and C.R. Payne, 2009. Mindless eating and healthy heuristics for the irrational. Am. Econ. Rev., 99: 165-169.
11. Framson, C., A.R. Kristal, J.M. Schenk, A.J. Littman, S. Zeliadt and D. Benitez, 2009. Development and validation of the mindful eating questionnaire. J. Am. Diet. Assoc., 109: 1439-1444.
12. Mathieu, J., 2009. What should you know about mindful and intuitive eating? J. Am. Diet. Assoc., 109: 1982-1987.

13. Moor, K.R., A.J. Scott and W.D. McIntosh, 2013. Mindful eating and its relationship to body mass index and physical activity among university students. Mindfulness, 4: 269-274.
14. Steptoe, A., J. Wardle, W. Cui, F. Bellisle, A.M. Zotti, R. Baranyai and R. Sanderman, 2002. Trends in smoking, diet, physical exercise and attitudes toward health in European university students from 13 countries, 1990-2000. Preventive Med., 35: 97-104.
15. Von Ah, D., S. Ebert, A. Ngamvitroj, N. Park and D.H. Kang, 2004. Predictors of health behaviours in college students. J. Adv. Nurs., 48: 463-474.
16. Kutty, N.A.M., T.Y. Ru, V.H.Q. Chiang and W.Y. Zhi, 2015. Association of dietary habits and body mass index among university students in Malaysia: A cross-sectional study. IOSR J. Nurs. Health Sci., 4: 78-85.
17. Jordan, C.H., W. Wang, L.R. Donatoni and B.P. Meier, 2014. Mindful eating: Trait and state mindfulness predict healthier eating behavior. Personality Individual Differences, 68: 107-111.
18. Arch, J.J., K.W. Brown, R.J. Goodman, M.D.D. Porta, L.G. Kiken and S. Tillman, 2016. Enjoying food without caloric cost: The impact of brief mindfulness on laboratory eating outcomes. Behav. Res. Ther., 79: 23-34.
19. WHO., 2005. Body mass index-BMI. World Health Organization, Geneva, Switzerland. http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi.
20. Roininen, K., L. Lahteenmaki and H. Tuorila, 1999. Quantification of consumer attitudes to health and hedonic characteristics of foods. Appetite, 33: 71-88.
21. Kennedy-Hagan, K., J.E. Painter, C. Honselman, A. Halvorson, K. Rhodes and K. Swir, 2011. The effect of pistachio shells as a visual cue in reducing caloric consumption. Appetite, 57: 418-420.
22. Bahl, S., G.R. Milne, S.M. Ross and K. Chan, 2012. Mindfulness: A long-term solution for mindless eating by college students. J. Public Policy Market., 32: 173-184.
23. Jacobs, J., L. Cardaciotto, J. Block-Lerner and C. McMahon, 2013. A pilot study of a single-session training to promote mindful eating. Adv. Mind Body Med., 27: 18-23.
24. Beshara, M., A.D. Hutchinson and C. Wilson, 2013. Does mindfulness matter? Everyday mindfulness, mindful eating and self-reported serving size of energy dense foods among a sample of South Australian adults. Appetite, 67: 25-29.
25. Dalen, J., B.W. Smith, B.M. Shelley, A.L. Sloan, L. Leahigh and D. Begay, 2010. Pilot study: Mindful eating and living (MEAL): weight, eating behavior and psychological outcomes associated with a mindfulness-based intervention for people with obesity. Complement. Ther. Med., 18: 260-264.
26. Robinson, E., S. Higgs, A.J. Daley, K. Jolly, D. Lycett, A. Lewis and P. Aveyard, 2013. Development and feasibility testing of a smart phone based attentive eating intervention. BMC Public Health, 10.1186/1471-2458-13-639
27. Grinnell, S., G. Greene, K. Melanson, B. Blissmer and I.E. Lofgren, 2011. Anthropometric and behavioral measures related to mindfulness in college students. J. Am. Coll. Health, 59: 539-545.
28. Monica, P., S. Barbara, I. Aviad and G. Karen, 2017. College students' health attitudes, perceptions of restaurant menu items and purchase intentions. J. Food Serv. Bus. Res., 20: 464-488.
29. Kwok, S.T., S. Capra and M. Leveritt, 2016. Factors influencing changes in eating patterns among Hong Kong young adults transitioning to tertiary education. Asia Pac. J. Public Health, 28: 347-355.
30. Brewer, J.A., A. Ruf, A.L. Beccia, G.I. Essien, L.M. Finn, R. van Lutterveld and L.E. Mason, 2018. Can mindfulness address maladaptive eating behaviors? Why traditional diet plans fail and how new mechanistic insights may lead to novel interventions. Front. Psychol., 10.3389/fpsyg.2018.01418