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Research Article
Breakfast Intake Habits Among Universiti Brunei Darussalam Students

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Abstract
Background and Objective: Breakfast is one of the most important meals of the day because the consumption of regular breakfast provides many health benefits. University students commonly skip breakfast. This study assesses the breakfast habits of university students to determine correlations between breakfast intake habits and body mass index. **Materials and Methods:** A descriptive cross-sectional study was conducted among students of Universiti Brunei Darussalam. Three hundred forty-one students completed questionnaires and physical measurements (weight and self-reported height). **Results:** Among the respondents, only 74% had consumed breakfast on the day they were queried. 28% of the respondents consume breakfast regularly (daily). 90% of the respondents skipped breakfast of whom 50% had no time to eat or prepare breakfast. There was no significant correlation between breakfast intake habit and body mass index. Nonetheless, undergraduate students and those aged 19-21 years were significantly more likely to skip breakfast than graduate students and other age groups. **Conclusion:** The study identified no correlation between breakfast eating habits and body mass index. The most common factor for skipping breakfast was insufficient time to eat or prepare breakfast. Furthermore, health awareness campaigns and structured academic curriculum are recommended to promote good breakfast habits.

Key words: Awareness, body mass index, breakfast skipping, breakfast, dietary habits, eating habit, university students

INTRODUCTION

Breakfast is one of the most important meals of the day. It is defined as the first meal of the day eaten in the morning, within two hours of waking[1]. However, it is often missed and underestimated[2]. Consuming breakfast regularly provides health benefits which include better nutritional status, reduced body mass index, better cognitive functions, reduced incidence of degenerating diseases including type 2 diabetes and cardiovascular disease, a healthier lifestyle, healthier food choices and regular eating and exercise patterns[2].

Numerous studies have shown that most nutrients are provided by breakfast, which is not compensated by other meals[3]. Healthy food choices consumed at breakfast provide a better intake of essential nutrients, thus providing health benefits to the body[4,5]. It is recommended to eat nutritious meals for breakfast. Incorporating protein-rich food sources such as eggs, cheese and yoghurt in breakfast will decrease appetites and increase satiety throughout the day[6,7]. A fibre-rich breakfast meal such as wholemeal bread and oats have greater effects on satiety compared to other meals such as lunch and dinner. Therefore, it is more desirable to increase dietary protein and fibre consumption at breakfast rather than other mealtimes[7].

Consuming a high intake of good nutrient-dense foods contributes to a number of positive outcomes which includes favourable health benefits and good cognition[4,8]. A favourable health outcome in adults includes a decreased prevalence of obesity[8]. Breakfast also helps to regulate energy intake during the rest of the day. Some studies have shown that people who consume breakfast regularly tend to have a normal body mass index (BMI) and are less likely to be overweight than those who do not consume breakfast regularly[9,10]. According to a study conducted in the United Kingdom, breakfast protects against overweight and obesity[9]. In 2014, according to the World Health Organisation (WHO), obesity is a leading non-communicable disease and major risk factor for death in Brunei[11].

Eating breakfast is essential to achieve and maintain healthy body weight[12]. University is said to be a critical period for potential weight gain[13]. Students enrolled in university need to adapt the new environmental changes. When they fail to adapt adequately, this could lead to negative consequences for their health and weight. During these years of transition to young adulthood, it is important to establish healthy lifestyle behaviours for a long-lasting impact on their health. It is crucial to educate these young adults on the importance of healthy eating habits so that these healthy eating behaviours could be implemented and maintained. This intervention acts as a preventive measure to prevent or delay diseases, specifically emerging non-communicable diseases such as cardiovascular diseases, chronic respiratory diseases and diabetes. Eating habits play an important role in controlling these non-communicable diseases.

Young adults commonly skip breakfast. According to a study about skipping breakfast in Europe, young adults tend to skip breakfast more than older generations[14]. Young adults aged 18-25 years often neglect health education compared to children and adults[1]. This is due to the adjustment to being independent when they leave home. They tend to omit good dietary habits adopted from home and appear to be at higher risk of adverse health outcomes through unhealthy eating habits.

The lack of discipline and time, self-control, social support, product prices (costs) and limited budgets and the availability of and access to (healthy) food options were reported as being critical influencing factors of university students' eating behaviours[13]. These students believed that they are constantly challenged by competing demands, including academic responsibilities and involvement in community activities and tend to skip breakfast. A similar study found that smoking, a sedentary lifestyle, a low level of education and high BMI were linked with breakfast skipping in adults[14].

There is an increasing prevalence of obesity in Brunei, especially among adults. Detection and prevention are crucial in fighting non-communicable diseases, including obesity. In a step towards addressing this issue, this study assessed the breakfast eating habits of UBD students and investigated the prevalence and association between BMI and breakfast intake habits.

MATERIALS AND METHODS

Design: This is a descriptive cross-sectional study in which a questionnaire was given to students in UBD currently studying in the Academy of Brunei Studies, Centre of Lifelong Learning, Faculty of Integrated Technology, Faculty of Arts and Social Sciences, Faculty of Science, Institute of Policy Studies, Language Centre, Sultan Hassanal Bolkiah Institute of Education, Pengiran Anak Puteri Rashidah Sa'adatul Bolkiah Institute of Health Sciences (PAPRSB IHS) and UBD School of Business and Economics. Both local and international students regardless of education level were included. The questionnaire was completed by the students. A total of 341 volunteered responses were collected.

Data collection: Data were collected from September 2017 to March 2018 from various faculties. The participants were

approached by the research team and were briefed about the study. Moreover, an information sheet comprising further details of the study was given. Informed consent was obtained from all participants. Prior to that, a pilot study involving 5-10 students was performed to assess the self-designed questionnaire. A pre-tested and self-administered questionnaire was given and completed by the participants. It was prepared in English and Malay for ease of reading. The questionnaire consisted of two sections. One section consisted of questions regarding sociodemographic, background and breakfast habits. The other section was physical measurements recorded by the research team and include height and weight. Height was self-reported whereas weight was weighed using electronic weighing balance and measurements were recorded to the nearest 0.1 cm and 0.1 kg.

Ethical consideration: The study was approved by the Institutional ethics review board of UBD on 29th November 2017 (Reference: UBD/IHS/B3/8).

Data analysis: The data were analysed using IBM|SPSS version 21. Descriptive statistics were calculated for the characteristics of participants and breakfast eating habits. The prevalence of skipping breakfast and having breakfast every day was estimated with 95% confidence interval (CI) using the normal approximation method. The proportion of breakfast eating habits and abnormal BMI (underweight, overweight and obese) were compared using the Chi-square test for independence. A p-value of less than 0.05 was considered significant (two-tailed). BMI classification was based on the World Health Organisation[15]. BMI was calculated using the Eq.:

$$BMI = \frac{Weight\ (kg)}{Height\ (m) \times Height\ (m)}$$

RESULTS

The sociodemographic characteristics of the participants are listed in Table 1. A total of 341 university students participated in this study (83.4% response rate), of which 143 (41.9%) were male and 198 (58.1%) were female. The majority of the participants were undergraduate students (93.3%) aged between 19-21 years (50.7%) and enrolled in the Faculty of Arts and Social Sciences (35.8%). Half of them (50%) have normal weight. The prevalence of underweight, overweight and obesity among the participants was 13% (95% CI: 9%, 16%), 24% (95% CI: 16%, 25%) and 13% (95% CI: 9%, 17%) respectively.

Table 1: Sociodemographic information of participants (N = 341)

	N	Percentage	Skipped breakfast*
Age (years)			0.048
<18	20	5.9	
19-21	173	50.7	
22-24	110	32.3	
>25	38	11.1	
Gender			0.100
Male	143	41.9	
Female	198	58.1	
Faculty/institute			0.409
Faculty of arts and social sciences	122	35.8	
Faculty of Science	74	21.7	
School of business and economics	62	18.2	
Academy of brunei studies	31	9.1	
PAPRSB institute of health sciences	25	7.3	
Faculty of integrated technology	14	4.1	
Center of lifelong learning	8	2.3	
Sultan hassanal bolkiah institute of education	5	1.5	
Highest education level			0.010
Undergraduate	318	93.3	
Graduate	16	4.7	
PhD	6	1.8	
Body mass index			0.664
Underweight	43	12.6	
Normal weight	170	49.9	
Overweight	83	24.3	
Obese class I	23	6.7	
Obese class II	18	5.3	
Obese class III	4	1.2	

n: Frequency, *Chi-square test for independence (p<0.05 is significant, two tailed)

Table 2: Relationship between breakfast habit among university students and body mass index (N = 341)

	N	Percentage	Under-weight*	Over-weight*	Obese*
Did you eat breakfast today?			0.455	0.441	0.140
Yes	253	74.2			
No	88	25.8			
Where did you eat your breakfast?			0.541	0.687	0.733
At home	172	50.4			
At University	44	12.9			
Canteen or restaurant	22	6.5			
Others [†]	13	3.8			
What did you eat for breakfast today? (Multiple response, N = 253)					
Rice-based food	66	26.1	0.860	0.061	0.914
Noodles-based food	45	17.8	0.445	0.540	0.822
Cereal	52	20.5	0.347	0.844	0.518
Fruits or vegetables	19	7.5	0.709	0.381	0.177
Bread	97	38.3	0.108	0.534	0.859
Others [‡]	35	13.8	0.273	0.106	0.620
How often do you eat breakfast in a week?			0.664	0.902	0.525
Everyday	94	27.6			
Very often (5-6 days)	71	20.8			
Occasionally (3-4 days)	110	32.3			
Rarely (1-2 days)	63	18.5			
Never	3	0.9			
What do you usually eat for breakfast? (Multiple response, N = 341)					
Rice-based food	130	38.1	0.827	0.676	0.924
Noodles-based food	119	34.9	0.731	0.780	0.502
Cereal	125	36.7	0.614	0.676	0.319
Fruits or vegetables	48	14.1	0.599	0.438	0.818
Bread	225	66.0	0.350	0.757	0.715
Others [§]	40	11.7	0.609	0.580	0.803
Have you ever skipped breakfast?			0.596	0.557	0.790
Yes	306	89.7	No	35	10.300
Main reason for skipping breakfast?			0.491	0.619	0.898
Do not have time to eat or prepare food	172	50.4			
Lazy to prepare food	62	18.2			
No appetite	58	17.0			
Not enough money to buy food	7	2.1			
Others [¶]	42	12.3			

n: Frequency, [†] others include 1,2,3,4, [‡] Others include assorted cakes and biscuits, [§] Others include, fried food, biscuits, eggs, fritters, [¶] Others include stomach ache, diet, habit, *Chi-square test for independence (p<0.05 is significant, two-tailed)

Skipping breakfast was significantly associated with age group and education level. Students aged 19-21 years skipped breakfast significantly more than those less than 18 and more than 22 years. Undergraduate students skipped breakfast significantly more than graduate students. No significant association was detected between skipping breakfast and gender, faculty/institute and BMI. There was also no significant association detected between BMI and sociodemographic factor.

The prevalence of taking breakfast among university students on the same day was 74% and half of them (50%) had breakfast at home. Less than half of the university students (28%) consumed breakfast regularly (daily), while the rest (72%) had irregular breakfast intake. About 66% of the participants had bread regularly. The consumption of fruits or vegetables was relatively uncommon as the prevalence was only 14%. The details of the breakfast habit are presented in Table 2. Breakfast eating habits were not significantly associated with body mass index and sociodemographic factors among university students.

The prevalence of skipping breakfast among university students was 90% (95% CI: 87%, 93%). The prevalence of eating breakfast every day among university students was 28% (95% CI: 23%, 32%). The reasons for skipping breakfast were no time to eat (50%), lazy to prepare food (18%), no appetite (17%), not enough money to buy food (2%) and others (12%), which include stomach ache, diet and habit.

DISCUSSION

This study sought to determine if there is an association between breakfast intake habits and BMI among university students. The analysis showed, the majority of students took breakfast on the same day and half of them were most likely to eat breakfast at home (home-cooked meals). A study has shown that eating home-cooked meals frequently are beneficial to health, particularly cardio health[15]. Another study reported that university students were more likely to skip breakfast if their mothers did not supply their meals[16].

Less than half of the respondents consumed breakfast regularly. This finding was similar to a previous study that found no significant association between breakfast eating frequency and BMI[17]. Academic performance can be affected if the nutritional needs of a student are not met. A previous study showed that intelligence quotient (IQ) was higher among regular breakfast consumers compared to infrequent breakfast consumers[18]. Moreover, it has been proven that regular breakfast consumption provides many health benefits such as better cognitive functions[2,18].

This research found that bread was the most common regular breakfast food option. Previous studies have reported that incorporating whole-grain products into diets is linked with reduced risk of non-communicable diseases[19]. Our study showed that consumption of fruits or vegetables was unsatisfactory among university students. Similar findings have been reported among undergraduates in a public university in Kuala Lumpur[1]. The reasons for poor consumption of fruits and vegetables include students tending to neglect the importance of incorporating fruits and vegetables into the diet or being unable to access or afford fruits and vegetables[1].

Skipping breakfast was common among the respondents. The study found that students aged between 19-21 year were more likely to skip breakfast than any other age group. Apart from that, undergraduate students were more likely to skip breakfast than graduate students. According to Brunei Darussalam Education Statistics, in 2016 the average age to start pre-university in Brunei was 17 years[20]. Hence, enrolment to university is most likely at the age of 18 years. It could be suggested that these students are adapting to new changes to the environment and as such are not keen to prepare breakfast causing them to skip it[13]. This is consistent with the study as the majority of the students did not have time to eat or prepare food for breakfast. A previous study among Belgium University students reported that preparing a meal is significant and university students often dedicated their time to personal priorities instead and ignored the importance of breakfast[13].

Our study showed no association between BMI and breakfast intake habit. Several studies also failed to establish a correlation between body mass index and breakfast eating habits[1,17]. A study among undergraduate students in a public university in Kuala Lumpur has shown no correlation[1]. However, in contrast, previous reports have proven that good breakfast habits are associated with healthy weight using baseline BMI[9,10]. As mentioned before, a healthy breakfast can increase satiety. This will avoid overeating and help maintain proportionate weight.

As observed above, some of the reasons for skipping breakfast were more related to information and knowledge available to university students. Health education is a major aspect of health promotion and awareness. As a medium, health educators can promote health awareness. This will lead to changes in behaviours. Health educators believe that a large number of students in the universities and colleges has great opportunity for nutritional education[21]. Therefore, health education and reinforcement of healthy eating habits are crucial among young adults, specifically university students. This could be achieved through awareness campaigns related to the importance of consuming breakfast. Brunei has also implemented its dietary guidelines which should be introduced to the students so they can opt for better food choices.

The prevalence of regular breakfast intake increases with better perceptions of sleep quality[22]. Poor quality sleep could result in difficulty in waking up in the morning leaving less time to eat breakfast. A study suggested that lack of sleep is associated with decreased appetite[22]. Our study showed that the majority of the students who skipped breakfast did not have time to eat breakfast[23]. One possible reason might be that their class is packed and starts in the early morning, so they have less time to eat breakfast. The academic curriculum could be assessed so that they have short breaks in between classes for the consumption of breakfast.

This study has its limitations. Firstly, there was a lack of diversity in the demographic factors. Future studies could reduce this limitation by focusing on diverse demographic groups such as race and academic background (science or non-science). Despite these limitations, the study also has its strength. The large sample size narrows the margin of error and increases the generalisability of findings to the population of university students. In addition, the pre-tested and self-designed questionnaire could be used by other researchers in a similar field of study.

CONCLUSION

The outcome of the study demonstrated that there was no association between breakfast intake habit and BMI. The majority of the participants skipped breakfast. The most likely factor for skipping breakfast was insufficient time to eat or prepare breakfast. It is crucial to raise awareness among university students regarding the importance of breakfast. This study could be used to manage and reduce the prevalence of skipping breakfast.

ACKNOWLEDGMENT

SIGNIFICANCE STATEMENT

This study explored breakfast eating habits among university students in Brunei that can be beneficial for health awareness programs and interventions in higher education settings. It will help researchers to uncover possible factors related to rising physical and mental health issues among university students. Accordingly, a more integrated and effective intervention could be formulated to promote students' academic performance and health outcomes.

REFERENCES

1. Moy, F.M., S. Johari, Y. Ismail, R. Mahad, F.H. Tie and W.M.A. Wan Ismail, 2009. Breakfast skipping and its associated factors among undergraduates in a public university in Kuala Lumpur. Malays. J. Nutr., 15: 165-174.

2. Kamada, I., L. Truman, J. Bold and D. Mortimore, 2011. The impact of breakfast in metabolic and digestive health. Gastroenterol. Hepatol. Bed Bench, 4: 76-85.

3. Affinita, A., L. Catalani, G. Cecchetto, G. de Lorenzo and D. Dilillo *et al.*, 2013. Breakfast: A multidisciplinary approach. Ital. J. Pediatr., Vol. 39. 10.1186/1824-7288-39-44

4. Koo, H.C., S.N. Abdul Jalil and R.A. Talib, 2015. Breakfast eating pattern and ready-to-eat cereals consumption among schoolchildren in Kuala Lumpur. Malays. J. Med. Sci., 22: 32-39.

5. Wahl, D.R., K. Villinger, L.M. Konig, K. Ziesemer, H.T. Schupp and B. Renner, 2017. Healthy food choices are happy food choices: Evidence from a real life sample using smartphone based assessments. Scient. Rep., Vol. 7. 10.1038/s41598-017-17262-9

6. Leidy, H.J., L.C. Ortinau, S.M. Douglas and H.A. Hoertel, 2013. Beneficial effects of a higher-protein breakfast on the appetitive, hormonal and neural signals controlling energy intake regulation in overweight/obese, "breakfast-skipping," late-adolescent girls. Am. J. Clin. Nutr., 97: 677-688.

7. Sayer, R., A. Amankwaah, G. Tamer, N. Chen and A. Wright *et al.*, 2016. Effects of dietary protein and fiber at breakfast on appetite, *ad libitum* energy intake at lunch and neural responses to visual food stimuli in overweight adults. Nutrients, Vol. 8. 10.3390/nu8010021

8. Hausman, D.B., M.A. Johnson, A. Davey and L.W. Poon, 2011. Body mass index is associated with dietary patterns and health conditions in Georgia centenarians. J. Ag. Res., Vol. 2011. 10.4061/2011/138015

9. Ashwell, M. and A. de la Hunty, 2012. How does breakfast help manage bodyweight? Nutr. Bull., 37: 395-397.

10. Song, W.O., O.K. Chun, S. Obayashi, S. Cho and C.E. Chung, 2005. Is consumption of breakfast associated with body mass index in US adults?. J. Am. Dietetic Assoc., 105: 1373-1382.

11. WHO., 2014. Non communicable disease (NCD) country profiles: Brunei Darussalam. World Health Organization, Geneva, Switzerland. http://www.who.int/nmh/countries/brn_en.pdf

12. Dhurandhar, E.J., J. Dawson, A. Alcorn, L.H. Larsen and E.A. Thomas *et al.*, 2014. The effectiveness of breakfast recommendations on weight loss: A randomized controlled trial. Am. J. Clin. Nutr., 100: 507-513.

13. Deliens, T., P. Clarys, I. de Bourdeaudhuij and B. Deforche, 2014. Determinants of eating behaviour in university students: A qualitative study using focus group discussions. BMC Public Health, Vol. 14. 10.1186/1471-2458-14-53

14. Keski-Rahkonen, A., J. Kaprio, A. Rissanen, M. Virkkunen and R.J. Rose, 2003. Breakfast skipping and health-compromising behaviors in adolescents and adults. Eur. J. Clin. Nutr., 57: 842-853.

15. WHO., 2019. 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

16. Mills, S., H. Brown, W. Wrieden, M. White and J. Adams, 2017. Frequency of eating home cooked meals and potential benefits for diet and health: Cross-sectional analysis of a population-based cohort study. Int. J. Behav. Nutr. Phys. Activity, Vol. 14. 10.1186/s12966-017-0567-y

17. Yokoyama, H., M. Miyazaki, Y. Mizuta, H. Matsuki and I. Okazaki, 2002. [Analysis of factors affecting breakfast skipping by male students undergoing hard training for sports]. Jpn. J. Public Health, 49: 902-910, (In Japanese).

18. Megson, M., 2016. Effects of breakfast eating and eating frequency on body mass index and weight loss outcomes in adults enrolled in a web-based obesity treatment program. Honors Scholar Thesis, University of Connecticut, Storrs, CT., USA.

19. Hisam, A., M.U. Rahman, S.F. Mashhadi, A. Bilal and T. Anam, 2015. Regular breakfast consumption associated with high intelligence quotient: Myth or reality? Pak. J. Med. Sci., 31: 1084-1088.

20. Barr, S.I., L. DiFrancesco and V.L. Fulgoni, 2015. Association of breakfast consumption with body mass index and prevalence of overweight/obesity in a nationally-representative survey of Canadian adults. Nutr. J., Vol. 15. 10.1186/s12937-016-0151-3

21. Ministry of Education Brunei Darussalam, 2016. Brunei Darussalam education statistics 2016. Education Statistic Section, Department of Planning, Research and Development, Ministry of Education, Brunei Darussalam, August 2017.

22. Sakamaki, R., K. Toyama, R. Amamoto, C.J. Liu and N. Shinfuku, 2005. Nutritional knowledge, food habits and health attitude of Chinese university students: A cross sectional study. Nutr. J., Vol. 4. 10.1186/1475-2891-4-4

23. Sun, J., H. Yi, Z. Liu, Y. Wu and J. Bian *et al.*, 2013. Factors associated with skipping breakfast among Inner Mongolia Medical students in China. BMC Public Health, Vol. 13. 10.1186/1471-2458-13-42.