

RESEARCH ARTICLE

The relationship between breakfast habits, physical activity status and academic achievement among undergraduates in UiTM Puncak Alam Campus.

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Abstract:

A regular breakfast consumption and physical activity were among the important health practices in order to live a healthy life. However, breakfast is the most common skipped meal and physical activity has been neglected by many university students. Therefore, the present study aimed to examine the relationship between breakfast habits, physical activity and academic achievement among university students. The main objective of this study is to assess students' breakfast habit, physical activity status and their level of academic achievement. This is a cross-sectional study involving a total of 376 undergraduate students randomly selected from eight faculties in UiTM Puncak Alam Campus. A self-administered questionnaire on breakfast habits, physical activity and academic achievement was given. There were 49.5% of the respondents classified as breakfast eaters while the other 50.5% of them were breakfast skippers. Majority of the respondents claimed to be engaged in vigorous and moderate physical activity within 1-2 days/week and they only spent 1-2 hours/day in minimal activity. Most of the respondents have moderate CGPA which ranged from 3.00-3.49. The associations of breakfast habit, physical activity and CGPA was determined by using Pearson's Chi-square test and the results obtained showed that there are no significant associations among those variables. In conclusion, the study did not find any relationship between breakfast habits, physical activity status and academic achievement.

Keywords: Academic achievement, Breakfast habit, Physical activity, Undergraduate

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1. INTRODUCTION

The significance of breakfast consumption among adults cannot be overstated, as it plays a pivotal role in promoting physical health and enhancing mental well-being (Pengpid & Peltzer, 2020). A growing body of empirical evidence underscores the profoundly constructive impact of breakfast consumption on various aspects of adult life. Indeed, breakfast consumption has been scientifically demonstrated to exert a positive influence on key parameters such as body mass index (BMI), daily caloric intake, and the adoption of a healthy dietary regimen (Kavi & Walvekar, 2022). Moreover, it has been associated with the cultivation of favorable sleep patterns and the cultivation of robust mental well-being (Nusrat Aziz, 2020).

The merits of breakfast extend beyond the realms of physical health and psychological well-being, as breakfast consumption has been unequivocally linked to heightened physical activity levels throughout the day in adults (Masoomi et al., 2020). This enhanced physical activity, in turn, underscores a salient correlation with cognitive function and academic achievement (Masoomi et al., 2020). Consequently,

it is evident that breakfast consumption engenders a multitude of advantageous outcomes for adults.

Regrettably, the consumption of breakfast has been steadily declining among adults over the past decade (Lazzeri et al., 2016; O'Donovan et al., 2020; Terry et al., 2020) attributed in part to the effects of urbanization and modernization, which have led to increasingly sedentary lifestyles (Park & Ko, 2022; Sincovich et al., 2022).

While the deleterious consequences of breakfast skipping may be subject to debate, a substantial body of research has unequivocally demonstrated its adverse repercussions among adults. These repercussions encompass being underweight (Fagnant et al., 2022), anemia (Anandaraj et al., 2019), dysmenorrhea (Fujiwara et al., 2020), diminished cognitive functions (Dutta & Nayak, 2022), heightened risk of type 2 diabetes mellitus due to postprandial hyperglycemia (Mirghani, 2021), and elevated BMI (Longo-Silva et al., 2022). Notably, these deleterious effects have been observed in studies focusing on adult populations, thereby emphasizing the gravity of this issue among those who constitute the backbone of a nation's workforce.

Considering that the future of any nation is inherently intertwined with the health and well-being of its adult population, the persistence or exacerbation of the trend of breakfast skipping poses a grave concern for the prospects of future generations. Consequently, the primary objective of this study is to elucidate the intricate relationship between breakfast consumption, physical activity, and academic achievement within the context of adolescents at UiTM Puncak Alam Campus, as they represent the future torchbearers of Malaysia and warrant careful consideration in safeguarding the nation's welfare and prosperity.

2. MATERIALS AND METHODS

2.1. Research ethics approval

This research has been reviewed and approved by the Faculty of Health Sciences Research Ethics Committee.

2.2. Study Design

This study used a cross-sectional study design to identify the relationship of breakfast habit, physical activity and academic achievement among undergraduates.

2.3. Study Location

The present study was conducted in UiTM Puncak Alam Campus.

2.4. Participants

The study population were 376 full-time undergraduate students of UiTM Puncak Alam Campus, recruited by random sampling method.

2.5. Inclusion and exclusion criteria

Participants involved in the study must be between 18-30 years old and being full-time undergraduate students from any faculties in UiTM Puncak Alam Campus. Participants must demonstrate a willingness to voluntarily participate in the study and provide informed consent. Participants must have the cognitive and linguistic capacity to understand and communicate effectively in the language in which the study is conducted. Individuals below 18 years old or above 30 years old are excluded from participating. Individuals who are a part time students or undergoing post graduate program are also excluded. Individuals who express unwillingness or inability to comply with the study procedures, including follow-up visits and data collection, will be excluded. Individuals who do not have sufficient proficiency in the language of the study to provide informed consent and participate effectively will be excluded.

2.6. Study Variables

Breakfast habit

Breakfast habits of the respondents were assessed by using questionnaire (O'Neil et al., 2014a) where they were asked on how frequent they consume breakfast in a week. The frequency of breakfast consumption in a week was used to determine whether the respondent is a breakfast eater or breakfast skipper. Respondent will be classified into breakfast eaters if they consume breakfast five times or more in a week and if consume less than five times a week, they will be classified as breakfast skippers (O'Neil et al., 2014b).

Physical activity

Physical activity was assessed by using the International Physical Activity Questionnaire Short Form (IPAQSF) that consisted of 9 items questionnaires which recorded physical activity into four intensity levels: 1) vigorous-intensity activity such as aerobics, 2) moderate-intensity activity such as leisure cycling, 3) walking, and 4) sitting, within last 7 day recall (Meh et al., 2021). Respondents filled all the questionnaire items in English by themselves unassisted.

Academic achievement

Academic achievement of the respondents was assessed by using Cumulative Grade Point Average (CGPA). It is also a multiple-choice question where the CGPA is ranged and divided into four categories: 1) first class with CGPA 3.50-4.00, 2) high with CGPA 3.00-3.49, 3) low with CGPA 2.00-2.99 and 4) third class with CGPA 1.99 and below, in accordance to UiTM guidelines on exam grades (Pejabat Timbalan Naib Canselor Akademik dan Antarabangsa, 2021).

Other variables

Other variables are the demographic data of the respondents which include age, gender, weight, height and faculty. The BMI of the respondents were calculated and categorized into: 1) obesity with BMI ≥ 30 kg/m², 2) pre-obesity with BMI 25-29.9 kg/m², 3) normal weight with BMI 18.5-24.9 kg/m² and 4) underweight with BMI < 18.5 kg/m² (World Health Organization, 2010).

2.7. Statistical analysis

The data collected were exported to IBM Statistical Package for Social Sciences (SPSS) Statistics version 22.0 to be analysed. A descriptive analysis was used to measure the frequencies and percentages of respondents' socio-demographic data, breakfast habit, physical activity level and level of academic achievement. Pearson's Chi-square test was then used to identify the relationships of breakfast habit, physical activity and CGPA of the respondents. The *p*-value of more than 0.05 ($p > 0.05$) indicates the relationship of those variables is not statistically significant. On the other hand, *p*-value of less than 0.05 ($p < 0.05$) shows that there is a significant association between the variables.

3. RESULTS

3.1. Socio-demographic data

A total of 376 undergraduate students, ages ranges from 18 to 26 years old participated in this study (Table 1). The majority of respondents were female (84.8%) while 15.2% of them were male. The measurement of body mass index (BMI) showed that the majority of them were normal weight (47.6%) followed by obese (26.1%), underweight (14.4%) and overweight (12.0%). Half of the respondents were health sciences students (50.0%) and others were students of business management (22.9%), pharmacy (5.9%), accountancy (5.6%), education (5.6%), hotel and tourism management (5.6%), art and design (2.9%) and architecture, planning and surveying (1.6%) (Table 1).

Table 1. Socio-demographic data of the respondents (n=376)

Variable	n	(%)
Age groups		
18-20 years old	111	29.5
21-23 years old	170	45.2
24-26 years old	95	25.3
Gender		
Male	57	15.2
Female	319	84.8
BMI		
Underweight	54	14.4
Normal weight	179	47.6
Overweight	45	12.0
Obese	98	26.1
Faculty		
Health sciences	188	50.0
Pharmacy	22	5.9
Business and Management	86	22.9
Accountancy	21	5.6
Education	21	5.6
Art and design	11	2.9
Architecture	6	1.6
Hotel and tourism management	21	5.6

3.2. Breakfast habit

Table 2 shows the distribution of breakfast habits among respondents. The number of respondents who had breakfast regularly and who skipped breakfast was almost equal, where 49.5% of them were breakfast eaters and another 50.5%.

Table 2. Distribution of breakfast habits of respondents (n=376)

Variable	n	(%)
Do you take breakfast every day?		
Yes	186	49.5
No	190	50.5

3.3. Physical activity

Table 3 shows the distribution of physical activity of the respondents. Based on the table above, most of them reported to be engaged in vigorous (54.3%, n=204) and moderate (51.3%, n=193) activities within 1-2 days/week. The least number of respondents were those who regularly engage in vigorous activity (6.4%, n=24) and there were only 5.6% (n=21) of them who engaged in moderate activity for 5-6 days/week. On the other hand, respondents who engaged in minimal activity within 1-2 hours/day (32.7%, n=123) were the highest and the least were those who answered more than 6 hours in a day.

Table 3. Distribution of physical activity of respondents (n=376)

Variable	n	%
Vigorous activity		
Never	58	15.4
1-2 days/week	204	54.3
3-4 days/week	65	17.3
5-6 days/week	25	6.6
Everyday	24	6.4
Moderate activity		
Never	52	13.8
1-2 days/week	193	51.3
3-4 days/week	87	23.1
5-6 days/week	21	5.6
Everyday	23	6.1
Minimal activity		
1-2 hours/day	123	32.7
3-4 hours/day	99	26.3
5-6 hours/day	87	23.1
More than 6 hours	67	17.8

3.4. Academic achievement

Majority of the respondents (62.5%) have high CGPA which ranged from 3.00-3.49 and only 16.2% obtained first class CGPA ranged from 3.50-4.00. The rest of them have low CGPA which ranged from 2.00-2.99 (Table 4).

Table 4. Distribution of CGPA of respondents (n=376)

CGPA	n	%
First class	61	16.2
High	235	62.5
Low	80	21.3

3.5. Results of Pearson's Chi-square test

Table 5 shows the association between breakfast habit and physical activity. Based on Pearson's chi-square test, physical activities which include vigorous (p=0.457), moderate (p=0.687) and minimal activity (p=0.071) are not associated

with breakfast habits. When asked on how often they engage in vigorous activity, more than half of breakfast eaters answered 1-2 days/week (51.1%) and the same goes with breakfast skippers where half of them responded 1-2 days/week (57.4%).

Table 5. Relationship between breakfast habit and physical activity (n=376)

Variable	Breakfast habit		X ²	P value
	Breakfast eater n=186	Breakfast skipper n=190		
How often do you engage in				
Vigorous activity			3.64	0.457
Never	29(15.6%)	29(15.3%)		
1-2 days/week	95(51.1%)	109(57.4%)		
3-4 days/week	33(17.7%)	32(16.8%)		
5-6 days/week	13(7.0%)	12(6.3%)		
Everyday	16(8.6%)	8(4.2%)		
Moderate activity			2.26	0.687
Never	21(11.3%)	31(16.3%)		
1-2 days/week	97(52.2%)	96(50.5%)		
3-4 days/week	46(24.7%)	41(21.6%)		
5-6 days/week	11(5.9%)	10(5.3%)		
Everyday	11(5.9%)	12(6.3%)		
Minimal activity			7.03	0.071
1-2 hours/day	50(26.9%)	73(38.4%)		
3-4 hours/day	56(30.1%)	43(22.6%)		
5-6 hours/day	48(25.8%)	39(20.5%)		
More than 6 hours	32(17.2%)	35(18.4%)		

Regarding moderate activity, the result shows that half of both breakfast eaters (52.2%, n=97) and breakfast skippers (50.5%, n=96) claimed that they engage in moderate activity within 1-2 days/week. In minimal activity section, majority of breakfast eaters, 30.1% (n=56) claimed that they engage in minimal activity for 3-4 hours/day. On the other hand, the highest response from breakfast skippers falls on 1-2 hours/day (38.4%, n=73) and only 18.4% (n=35) of them engage in minimal activity for more than 6 hours/day.

Table 6 shows the association between physical activity and academic achievement. Based on Pearson Chi-square test, it showed that physical activity was not statistically associated with academic achievement.

Table 6. Relationship between physical activity and CGPA

Variable	CGPA			X ²	P value
	Low n=80	Moderate n=235	High n=61		
Vigorous activity					
Never	16(27.6%)	33(56.9%)	9(15.5%)	4.115	0.847
1-2 days/week	39(19.1%)	134(66%)	31(15.2%)		
3-4 days/week	15(23.1%)	40(61.5%)	10(15.4%)		
5-6 days/week	5(20.0%)	15(60.0%)	5(20.0%)		
Everyday	5(20.8%)	13(54.2%)	6(25.0%)		
Moderate activity					
Never	11(21.2%)	31(59.6%)	10(19.2%)	0.001	0.981
1-2 days/week	49(25.4%)	120(62%)	24(12.4%)		
3-4 days/week	14(16.1%)	59(67.8%)	14(16.1%)		
5-6 days/week	4(19.0%)	11(52.4%)	6(28.6%)		
Everyday	2(8.7%)	14(60.9%)	7(30.4%)		
Minimal activity					
1-2 hours/day	26(21.1%)	76(61.8%)	21(17.1%)	9.138	0.166
3-4 hours/day	25(25.3%)	62(62.6%)	12(12.1%)		
5-6 hours/day	11(12.6%)	56(64.4%)	20(23.0%)		
More than 6 hours	18(26.9%)	41(61.2%)	8(11.9%)		

4. DISCUSSION

4.1 Breakfast habit

A total of 49.5% of the respondents were breakfast eaters while the remaining 50.5% were breakfast skippers. Majority of the respondents claimed breakfast as an important meal, however, many of them were still skipping their breakfast. The prevalence of skipping breakfast is usually higher than skipping lunch and dinner among university students, with female students overwhelmingly surpass the male students (Abro et al., 2021). Overslept and shortage of time to take breakfast were among the most reported reasons for skipping breakfast (Abro et al., 2021). There were also some personal preferences such as does not like to eat early and no appetite (Nakade et al., 2017). Slow adaptation to campus life may also be the reason why they missed breakfast especially among younger students who live in the campus (Suhett et al., 2022). This is because some of them were used to live with parents before entering university where everything is prepared including breakfast (Higashi et al., 2022). Thus, students with poor time management were more likely to miss breakfast especially when they have lectures early in the morning (Khurshid et al., 2018).

4.2 Physical activity

Regarding physical activity, the present study has found that more than half of the respondents were engaged in

vigorous and moderate activities within 1-2 days/week. This finding reflects that most of the respondents did not meet the recommendations for moderate physical of at least 150 minutes/week (Tafireyi & Grace, 2022). The result is supported by Kljajević et al. (2022) who noticed a profound decline in university students' motivation and act to physical activity for weekly moderate and vigorous physical activity. Nevertheless, we do not have any data to ensure if the current findings on the physical activity status of the respondents correspond to their physical activity status prior to university enrolment. This study also could not claim that the student's engagement in vigorous physical activity as the amount of time spent on vigorous physical activity was not assessed. Previous study, however, has notable claims on how lifestyle seems to change significantly upon entering university and being inactive is one of the obvious changes that has been noticed (Fagaras et al., 2015). Physical activity declines dramatically during the transition of young adults to early adulthood especially when entering university (Silva et al., 2022). The significant change in physical activity among university students was mainly because of a lack of time and their tight schedule (Pan et al., 2022). In addition, students with low motivation and high perceived barriers were also more likely to adopt a sedentary lifestyle (Sáez et al., 2021). Lack of interest, time, phone addiction, poor dietary intake, and low social and self-esteem were among the perceived barriers that have been identified in students (Al Salim, 2023; Lin et al., 2022; Saffari et al., 2022). In a previous study focused on physical activity among university students in Malaysia, it was suggested that a majority of students demonstrated an inclination towards physical activity and were aware of its positive impacts on health (Stephen et al., 2021). Similarly, two other extensive studies conducted in Malaysia among adults aged 18 and above found that a substantial proportion engaged in physical activities within their domestic environments, driven by various motivating factors (Alias et al., 2022; Nik-Nasir et al., 2022). The facilities and environmental offerings at UiTM Puncak Alam Campus appear to be reasonably conducive to promoting physical activity among its students. However, it is important to note that the present study lacked comprehensive data to thoroughly analyse the potential influence of these amenities on the respondents' levels of physical activity. Further investigation is warranted to delve deeper into this intriguing relationship.

4.3 Level of academic achievement

This study found an average academic achievement of the respondents at high CGPA which ranged from 3.00-3.49.

4.4 Relationship between breakfast and physical activity

This study found no relation between breakfast and physical activity among respondents in the study. We could

not find the answer to this result, since we did not do any further evaluation on the matter. However, past studies demonstrated the lack of relationship between breakfast and physical activity may be due to the energy gained from having breakfast is only significant in the morning but not for the whole day. The energy obtained from breakfast may decline after a few hours (Sasabe et al., 2021; Zakrzewski-Fruer et al., 2021). This could be the reason why respondents reported their physical activity and breakfast habits being in no relation. Other non-dietary factors might also influence respondents on overall daily physical activity, for instance, morning snacks or early lunch (Roshanmehr et al., 2022). Contrary to the findings of this study, some studies do find a positive relation between breakfast intake and physical activity. However, these positive relations were seen to be outdone by other factors including the food selection in accordance with subjects' physical activity (Carrillo-López et al., 2021), the nutrient content in the food (Kinoshita et al., 2022), level of knowledge on healthy eating (Pop et al., 2021), the subjects' concern on body image (Gifari et al., 2022), food selection or preference (Leech et al., 2021) and self-motivation on healthy lifestyle (Kuipers et al., 2021). As of current, the relationship between the two domains is still debatable as studies came with undecisive patterns. Thus, it is believed that there could be no direct relationship between the two, but there might be other mediators between the two which has not been understood yet.

4.5 Relationship between physical activity and academic achievement

The result of the current study has found no relationship between physical activity and academic achievement among the respondents. Breakfast intake has been studied to improve mood, concentration and motivation and act as pathway to better academic achievement (Javaid, 2020). Though there were studies that demonstrated a positive relationship between physical activity and academic achievement, their findings were dependent on several determinants including the types of nutrients in the breakfast meal (Liu et al., 2019), regularity of intake and the manner of assessments of the undergraduate programs itself (T. L. Burrows et al., 2017; Liu et al., 2021). This finding inevitably mirrored the university lifestyle devoted the majority of the hours a day to studying rather than physical activity and breakfast intake. It is a common culture to see that academic motivation exceeds the healthy needs that are acquired by our body. Therefore, the passed grades are probably attributed to other factors that are mainly seen as mental well-being rather than physical activity or breakfast intake. This has well been established by many previous studies on the positive outcome of good mental well-being to academic achievement (Abdullah et al., 2022; T. Burrows et al., 2017; Manippa et al., 2021). But again, mental well-being does not have a sole contributor. Spiritual (Salehan

et al., 2022) and socioeconomic status (Mann et al., 2022) are among vital synchronous contributors.

5. CONCLUSION

In conclusion, half of the respondents were breakfast skippers. This study did not find any relationship between breakfast intake, physical activity and academic achievement. The findings in this study are arguable since it applied self-administered questionnaires in which subjects may under or over appraised themselves. However, this study has opened more opportunities for research in the future to find the long-term effect of breakfast intake and breakfast skipping on physical activity and academic achievement among university students up to their adulthood. The future study may also investigate other possible pathways on how breakfast quantity and quality may affect morning or daylike physical activity and how it correlates with the activity and function of cognitive function and mental health.

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