Available online: https://journal.ipb.ac.id/index.php/jgizipangan
ISSN 1978-1059 EISSN 2407-0920
J. Gizi Pangan, November 2025, 20(3):167-174
DOI: https://doi.org/10.25182/jgp.2025.20.3.167-174

Research Article

Exploring the Relationships between Eating Behaviours, Body Mass Index, Perceived Stress, and Dysmenorrhea among University Students in Malaysia

Anisha Alia Shaiful Bahrin[1], Norliyana Aris[1,2*]
[1]Nutrition Programme, Faculty of Food Science and Nutrition, Universiti Malaysia Sabah, 88400 Sabah, Malaysia
[2]Nutrition in Community Engagement Living Lab, Faculty of Food Science and Nutrition, Universiti Malaysia Sabah, 88400 Sabah, Malaysia

ABSTRACT

This study employed a cross-sectional design to investigate the interrelationships among eating behaviours (emotional, restrained, and external), Body Mass Index (BMI), perceived stress, and dysmenorrhea among university students. A total of 190 students from three higher education institutions in Kota Kinabalu were recruited via convenience sampling. Data collection was conducted using a self-administered questionnaire comprising sections on sociodemographic background, eating behaviours (DEBQ questionnaire), stress levels (PSS-10 instrument), dysmenorrhoea (WaLIDD score), and anthropometric measurements. Relationships among the variables were analysed using Pearson's correlation test. The findings showed that most students exhibited external eating behaviours (55.3%), followed by restrained eating (32.1%) and emotional eating (12.6%), with mean±SD scores of 3.16±0.57, 2.84±0.83, and 2.63±0.73, respectively. Most students had a normal weight (60.5%), reported medium stress (80.5%), and experienced moderate dysmenorrhea (51.1%), with corresponding means of 22.31±4.40 kg/m² for BMI, 20.89±4.96 for perceived stress, and 5.93±2.59 for dysmenorrhea severity. The restrained eating was significantly correlated with BMI ($r=0.320$, $p<0.001$). No significant correlations were observed between BMI and emotional or external eating ($p>0.05$). Emotional and external eating behaviours were significantly correlated with perceived stress ($r=0.227$; $r=0.183$) and dysmenorrhoea severity ($r=0.223$; $r=0.288$), with all associations significant at $p<0.05$. In conclusion, the exploratory findings highlight interrelated associations among eating behaviours, BMI, perceived stress, and dysmenorrhea. The results suggest potential interactions between eating patterns and body composition, with menstrual discomfort and psychological stress possibly influencing eating behaviours. These findings underscore the need for integrated university-based programmes that promote mindful eating, stress management, and menstrual health to enhance students' well-being and academic performance.

Article History:
Received *05-06-2025*
Revised *07-08-2025*
Accepted *17-10-2025*
Published *30-11-2025*

Keywords:
body mass index, eating behaviour, dysmenorrhea, perceived stress, university students

***Corresponding Author:**
tel: +60123272204
email: liyana@ums.edu.my

INTRODUCTION

The global prevalence of overweight among university students is estimated to range between 20% and 40%, highlighting a major public health concern the university years (Štefan *et al.* 2017). University is a time of change for young adults, bringing new experiences, challenges, and lifestyle adjustments. During this period, students not only develop essential skills like problem-solving and time management but also face changes in their social life (Stoliker & Lafreniere 2015). These changes can impact students' eating habits, which are influenced by a combination of physical, mental, social, and genetic factors that affect meal timing, food choices, and portion sizes (Gill 2014). Many university students consume unhealthy foods,

such as sweets, processed meats, and trans fats, in amounts exceeding the recommended daily intake (Blondin *et al.* 2015). In addition to poor eating habits, this phase also brings new weight-related behaviours, such as excessive alcohol consumption and physical inactivity (Sogari *et al.* 2018). Unhealthy eating during late adolescence may persist into adulthood, contributing to poor nutrition and increased risk of chronic diseases (Ragavi & Muthu 2024).

Alongside these dietary concerns, university life is often linked to significant stress caused by academic pressures, social challenges, and the transition to independent living (Stoliker & Lafreniere 2015). Perceived stress, defined as an individual's subjective appraisal of life stressors, has been associated with poor dietary choices, including emotional eating and reduced intake of fruits and vegetables (Aslan *et al.* 2020; Ling & Zahry 2021). The move from high school to university can be challenging, resulting in unhealthy eating patterns such as overeating or undereating in response to stress (Choi 2020).

In addition, dysmenorrhea, or menstrual pain, is prevalent among university students. Malaysian studies report that 60% to 78% of female students experience dysmenorrhea (Jaiprakash *et al.* 2016; Bakro Mohamad *et al.* 2023; Azli *et al.* 2021; Abubakar *et al.* 2020) which causes lower abdominal or pelvic pain during menstruation and may disrupt daily activities (Abreu-Sánchez *et al.* 2020). Dysmenorrhea may also influence dietary behaviour, particularly through cravings for chocolate, sweets, and salty foods due to potential serotonin-related relief (Gorczyca *et al.* 2016; Souza *et al.* 2018).

This study is underpinned by the theoretical concept that perceived stress, and dysmenorrhea may influence eating behaviours, which in turn may affect Body Mass Index (BMI). These variables are explored as interrelated factors, reflecting the complex nature of students' health behaviours. Considering these points, the aim of this study is to explore the interrelationships between eating behaviours, body mass index, perceived stress, and dysmenorrhea among university students in Kota Kinabalu, Sabah.

METHODS

Design, location, and time

The research employed a cross-sectional design and was implemented in three tertiary institutions located in Kota Kinabalu, Sabah: Universiti Malaysia Sabah (UMS), Tunku Abdul Rahman University of Management and Technology (TARUMT), and Politeknik Kota Kinabalu. The data collection period spanned from March 2024 to January 2025. Ethical clearance was obtained from the UMS Medical Research Ethics Committee (JKEtika 3/24 (22)). All participants provided informed consent before participating in the study.

Sampling

The calculation of the sample size followed Daniel's (1999) formula, utilising an estimated prevalence rate of 87.3%, which was based on previous findings regarding dysmenorrhea prevalence among young adults in Malaysia (Ning *et al.* 2020). This estimation resulted in a minimum required sample of 170 university students. In total, 190 female participants were successfully recruited for the present study. Inclusion criteria required participants to have regular menstrual cycles with consistent cycle intervals, no history of amenorrhea. Students were excluded if they had irregular menstrual cycles or were diagnosed with gynaecological diseases or secondary dysmenorrhea, including endometriosis, pelvic inflammatory disease, leiomyomas, and interstitial cystitis, to reduce potential confounding factors that could influence menstrual pain. Additionally, participants who were following a strict medical or therapeutic diet, as well as those with a diagnosed eating disorder, were excluded based on self-reported information prior to questionnaire distribution, to avoid bias in the assessment of eating behaviours. Participants were selected through non-probability convenience sampling, where students were recruited based on ease of access and availability during the data collection period at each university.

Data collection

Prior to participation, informed consent was obtained from all participants. Data were collected using a structured self-administered questionnaire, which was prepared in both Malay and English (bilingual) to accommodate participants' language preferences. All instruments used in the questionnaire were adopted from previously validated tools. The self-administered format provided more privacy and comfort, encouraging honest responses, particularly

given the sensitive nature of topics like eating behaviours and dysmenorrhea. Participants received a brief explanation of the questionnaire beforehand to ensure clarity. Communication between the researcher, and participants was primarily in English, with Bahasa Malaysia used when necessary. To enhance data quality and ensure consistent understanding of the study, the researcher was present while participants completed the questionnaire to provide a brief explanation, verify eligibility, and assist with any queries.

The questionnaire consisted of five sections. Sociodemographic information, including age, ethnicity, educational level, and university, was collected in the first section. Participants' height and weight were measured with a stadiometer (SECA 213) and a body composition analyser (OMRON/HBF-375), respectively. The Body Mass Index (BMI) was computed by dividing weight in kilograms by height in metres squared (kg/m²). Based on the WHO (2010) classification, individuals were categorised as underweight (<18.5 kg/m²), normal (18.5–24.9 kg/m²), overweight (25.0–29.9 kg/m²), or obese (≥30.0 kg/m²).

The Dutch Eating Behaviour Questionnaire (DEBQ) was used to evaluate psychological eating patterns. It comprises 33 statements rated on a five-point Likert scale and includes three main domains: emotional eating (responses triggered by emotions), external eating (eating driven by external food cues), and restrained eating (efforts to control intake for weight regulation). Subscale scores were obtained by averaging the total item scores. The highest scoring subscale indicated the participant's dominant eating behaviour tendency (Subramaniam *et al.* 2017; Wong & Aris 2024).

Stress perception was evaluated through the 10-item Perceived Stress Scale (PSS-10) instrument, which includes 10 items rated using a 4-point scale. The total scores were interpreted and grouped into three categories: low (0–13), moderate (14–26), and high (27–40), as outlined by Al-Dubai (2015).

Data on menstrual and dysmenorrhea experiences were gathered, emphasising how dysmenorrhea previously affected participants in terms of their ability to work, pain site, pain strength, and pain duration. The Working ability, Location, Intensity, Days of pain, Dysmenorrhea (WaLIDD) scoring system was utilised to evaluate dysmenorrhea severity, classifying the overall scores into the following categories: no dysmenorrhea (score=0), mild (1–4), moderate (5–7), and severe (8–12) (Teherán *et al.* 2018).

Data analysis

The statistical procedures were carried out using IBM SPSS Statistics version 29. Descriptive statistics summarised the dataset's main characteristics. Frequencies and percentages described categorical variables, whereas continuous variables were expressed as means with standard deviations for normally distributed data or as medians with interquartile ranges (Q1, Q3) if the distribution was skewed. Data normality was tested using the Kolmogorov–Smirnov test, where p-values above 0.05 signified a normal distribution. Pearson's correlation analysis was then applied to explore associations among eating behaviours, BMI, perceived stress, and dysmenorrhea in the sampled students.

RESULTS AND DISCUSSION

In total, 190 university students were included in this study, comprising 127 from Universiti Malaysia Sabah (UMS), 47 from Tunku Abdul Rahman University of Management and Technology (TARUMT), and 18 from Politeknik Kota Kinabalu. Participants had an average age of 20.93 years. Most of them were Chinese (28.9%), studying at UMS (65.8%), and pursuing undergraduate programmes (65.3%) (Table 1).

Table 2 presents the characteristics of eating behaviours, anthropometry, perceived stress, and dysmenorrhea. The findings showed that the majority of students exhibited external eating behaviours (55.3%), followed by restrained eating (32.1%) and emotional eating (12.6%). Most students had a normal BMI (60.5%), reported medium stress (80.5%), and experienced moderate dysmenorrhea (51.1%).

Table 3 shows the results of the relationship between eating behaviour, BMI, perceived stress, and dysmenorrhea. The correlation analysis indicated that only restrained eating showed a significant positive relationship with BMI ($r=0.320$, $p<0.001$). This result supports prior evidence indicating that those with elevated BMI are more inclined to engage in restrained eating as a method of weight management. Kowalkowska *et al.* (2024), for instance, observed that individuals who engage in restrained eating are almost twice as likely to be overweight and face

Table 1. Sociodemographic background of study participants

Characteristics	n=190
Age (mean±SD)	20.93±1.84
Ethnic (n (%))	
Chinese	55 (28.9)
Malay	41 (21.6)
Dusun	27 (14.2)
Bajau	13 (6.8)
Kadazan	10 (5.3)
Others[a]	44 (23.2)
Education level (n (%))	
Undergraduate	124 (65.3)
Diploma	65 (34.2)
Foundation	1 (0.5)
University (n (%))	
UMS	125 (65.8)
TARUMT	47 (24.7)
Politeknik KK	18 (9.5)

UMS: Universiti Malaysia Sabah; TARUMT: Tunku Abdul Rahman University of Management and Technology; Politeknik KK: Politeknik Kota Kinabalu; Data were presented as frequency (percentages); [a]:indicates the inclusion of Indian, Bumiputera Sarawak, Siam, Brunei, Bisaya, Sino, Suluk, Cocos, Iban, Rungus, Banjar, Sungai, Bugis and Idahan

a 1.8-fold increased risk of abdominal obesity. Likewise, research in China noted that university students with higher BMI tended to demonstrate severe patterns of restrained eating (Yong *et al.* 2021). This association may be due to individuals with higher body weight engaging in dieting behaviours in an attempt to manage their weight, which explains the positive correlation. However, restrained eating does not always lead to successful weight loss, as individuals may not adhere to their restrictions consistently or may overcompensate later (Yong *et al.* 2021). Higher BMI has also been linked to negative perceptions of body image and feelings of shame, particularly in women, which could lead to restrictive eating behaviours as a form of emotional coping (Brechan & Kvalem 2015). In contrast, Azli *et al.* (2024) reported no meaningful relationship between restrained eating and BMI. Such differences in findings might stem from variability in study samples, methodology, or participant characteristics, which could include variations in cultural, behavioural, or psychological profiles that influence eating behaviours differently. Despite the contrast, our findings support existing literature indicating that restrained eating can be linked to a range of health and psychological risks, particularly among those with higher BMI (Laessle & Hilbert 2019; Elran-Barak *et al.* 2015).

In terms of the correlation between eating behaviours and perceived stress, both emotional (r=0.227, p=0.002) and external eating (r=0.183, p=0.012) showed significant positive correlations. This aligns with a study by Ling & Zahry (2021), which also demonstrated a positive correlation between perceived stress and emotional eating among undergraduate students in the United States. Likewise, a study conducted at IPB University in Indonesia among undergraduate students reported a notable rise in eating frequency during stress episodes (Ulhaq *et al.* 2023). Stressed individuals often struggle to control their food intake, resulting in emotional and external eating. Stress alters appetite regulation by decreasing hormones that suppress hunger, such as leptin and insulin, while increasing ghrelin, a hormone that stimulates appetite (Chao *et al.* 2017). Ghrelin contributes to stress-related overeating, particularly of comfort foods high in sugar and fat, as a way to fulfil physiological needs (Sinha *et al.* 2019). Additionally, people experiencing stress often respond to external triggers like the visual appeal or aroma of enticing foods, leading to increased food intake (Graves *et al.* 2021; Mohammad Radzi *et al.* 2022).

The current study identified significant associations between dysmenorrhea severity and both emotional eating (r=0.223, p=0.002) and external eating (r=0.288, p<0.001). During episodes of dysmenorrhea, students were more likely to experience cravings for sweet foods such as chocolate. These cravings may arise instinctively as a way to alleviate symptoms, as consuming sweet foods is linked to increased serotonin synthesis. Higher serotonin levels help restore balance and provide relief from pain (Souza *et al.* 2018). Additionally, high-fat and sugary foods can trigger hyperphagia, leading to an excessively heightened sense of hunger (Sen *et al.* 2024). This finding is consistent with the study by Gorczyca *et al.* (2016), which demonstrated that during menstruation, women experience increased appetite, food cravings, and increased food consumption. These findings suggest that

Table 2. Eating behaviours, anthropometry, BMI, perceived stress and dysmenorrhea characteristics

Variables	n=190
Eating behaviour score (mean±SD)	
Emotional [score range: 1−5]	2.63±0.73
External [score range: 1−5]	3.16±0.57
Restrained [score range: 1−5]	2.84±0.83
Eating behaviour type (n (%))	
Emotional	24 (12.6)
External	105 (55.3)
Restrained	61 (32.1)
Anthropometry (mean±SD)	
Height (cm)	156.53±5.30
Body weight (kg)	54.79±11.82
BMI (kg/m^2)	22.31±4.40
BMI Classification (n (%))	
Underweight	31 (16.3)
Normal	115 (60.5)
Overweight/ Obese	44 (23.2)
Perceived Stress Score (mean±SD) [score range: 0−40]	20.89±4.96
Perceived Stress Level (n (%))	
Low	13 (6.8)
Medium	153 (80.5)
High	24 (12.6)
Dysmenorrhea WaLIDD Score (mean±SD) [score range: 1−12]	5.93±2.59
Dysmenorrhea severity levels (n (%))	
Without dysmenorrhea	16 (8.4)
Mild	27 (14.2)
Moderate	97 (51.1)
Severe	50 (26.3)

Data were presented in frequency (percentage) and mean±SD; WaLIDD: Working ability, Location, Intensity, Days of pain, Dysmenorrhea; BMI: Body Mass Index; SD: Standard Deviation

students who indulge in emotional and external eating in reaction to stress and pain during menstruation pose considerable risks to their physical health. Responding to emotional triggers through eating is recognised as a key contributor to the risk of developing chronic conditions such as obesity, diabetes, and cardiovascular disease (Benbaibeche *et al.* 2023). Individuals who engage in emotional eating are often less aware of their internal signals of hunger and fullness, as stress can impair this interoceptive sensitivity, resulting in greater consumption of energy-dense foods (Benbaibeche *et al.* 2023).

The strengths of this cross-sectional study include the examination of multiple factors, allowing for a more comprehensive understanding of the physical and psychological health challenges faced by female university students. Additionally, the sample size exceeded the minimum requirement and included participants from three different higher education institutions, enhancing the diversity and generalisability

Table 3. Correlation between eating behaviour, BMI, perceived stress, and dysmenorrhea

Variables		Eating Behaviour		
		Emotional	External	Restrained
BMI (kg/m^2)	*r*	0.104	0.014	0.320
	p	0.153	0.844	<0.001
Perceived stress score	*r*	0.227	0.183	-0.001
	p	0.002	0.012	0.987
Dysmenorrhea (WaLIDD score)	*r*	0.223	0.288	-0.21
	p	0.002	<0.001	0.771

p-value (*p*) was obtained using Pearson's correlation test; WaLIDD: Working ability, Location, Intensity, Days of pain, Dysmenorrhea; BMI: Body Mass Index; r: Coefficient Correlation

of the findings. This study also highlights the importance of promoting healthier food choices, effective stress management, and maintaining a healthy BMI to support overall well-being.

Despite these strengths, several limitations should be acknowledged. Other potential influencing factors were not assessed and could be explored in future research to provide a more holistic understanding. Future studies should consider variables such as students' residence, financial status, and university-specific factors (e.g. access to healthy food options and campus-related stressors), as these may influence dietary behaviours and stress levels. Including these socioeconomic and environmental factors may help identify subgroups that are more vulnerable to nutritional imbalances and mental health challenges. In addition, future studies may consider evaluating the effectiveness of interventions aimed at managing emotional eating and stress within the university setting to enhance students' overall health and academic performance.

CONCLUSION

The study identified a significant association between restrained eating and body mass index, while emotional and external eating behaviours were notably linked to both perceived stress and dysmenorrhea. These results highlight the complex and interconnected nature of physical and psychological health challenges experienced during university life. The study underscores the need to promote healthier food choices, effective stress management, and menstrual health awareness among students. Universities should consider implementing targeted programmes that address stress, encourage mindful eating, and support menstrual well-being.

ACKNOWLEDGMENT

The authors sincerely thank Universiti Malaysia Sabah, Politeknik Kota Kinabalu and Tunku Abdul Rahman University of Management and Technology for granting permission to carry out this study. Heartfelt appreciation is also extended to all participants for their voluntary involvement, commitment, and cooperation throughout the research process.

DECLARATION OF CONFLICT OF INTEREST

The authors declare that there is no conflict of interest related to this study.

REFERENCES

Abreu-Sánchez A, Parra-Fernández ML, Onieva-Zafra MD, Ramos-Pichardo JD, Fernández-Martínez E. 2020. Type of dysmenorrhea, menstrual characteristics and symptoms in nursing students in Southern Spain. Healthcare 8(3):302. https://doi.org/10.3390/healthcare8030302

Abubakar U, Zulkarnain AI, Samri F, Hisham SR, Alias A, Ishak M, Sugiman H, Ghozali T. 2020. Use of complementary and alternative therapies for the treatment of dysmenorrhea among undergraduate pharmacy students in Malaysia: A cross-sectional study. BMC Complement. Med. Ther 20(1):285. https://doi.org/10.1186/s12906-020-03082-4

Al-Dubai SAR. 2015. The validated Malay version of the 10-item Perceived Stress Scale (PSS-10). Malays J Med Sci. https://doi.org/10.13140/RG.2.1.2749.5127

Aslan I, Ochnik D, Çınar O. 2020. Exploring perceived stress among students in Turkey during the COVID-19 PandemicInt. J. Environ. Res Public Health 17(23):8961. https://doi.org/10.3390/ijerph17238961

Azli MS, Rahim KHM, Hasan H, Ikram EHK. 2024. Body image, eating behaviour, and physical activity among students at national defence University of Malaysia. J Gizi Pangan 19(Supp.2):163–172. https://doi.org/10.25182/jgp.2024.19.supp.2.163-172

Azli NS, Zawawi AM, Ibrahim NS, Mohamed Zukri S, Mohd Fauzi NZ, Suhaimi F. 2021. The prevalence and factors affecting primary dymenorrhea among female students. JQMA 17(2):79–88

Bakro Mohamad R, Farrukh MJ, Rajagopal M, Kristina SA, Ramatillah DL, Ming LC, Paneerselvam GS, Hadi MA. 2023. Assessment of prevalence, knowledge and health-related practices of dysmenorrhea among Malaysian women in Kuala Lumpur: A cross-sectional survey. Ann Med 55(2):2281655. https://doi.org/10.1080/07853890.2023.2281655

Benbaibeche H, Saidi H, Bounihi A, Koceir EA. 2023. Emotional and external eating styles associated with obesity. J Eat Disord 11(1):67. https://doi.org/10.1186/s40337-023-00797-w

Blondin SA, Mueller MP, Bakun PJ, Choumenkovitch SF, Tucker KL, Economos CD. 2015. Cross-sectional associations between empirically-derived dietary patterns and indicators of disease risk among university students. Nutr 8(1):3. https://doi.org/10.3390/nu8010003

Brechan I, Kvalem IL. 2015. Relationship between body dissatisfaction and disordered eating: Mediating role of self-esteem and depression. Eat Behav 17:49–58. http://dx.doi.org/10.1016/j.eatbeh.2014.12.008

Chao AM, Jastreboff AM, White MA, Grilo CM, Sinha R. 2017. Stress, cortisol, and other appetite-related hormones: Prospective prediction of 6-month changes in food cravings and weight. Obesity 25(4):713–720. https://doi.org/10.1002/oby.21790

Choi J. 2020. Impact of stress levels on eating behaviors among college students. Nutr 12(5):1241. https://doi.org/10.3390/nu12051241

Daniel WW. 1999. Biostatistics: A Foundation for Analysis in the Health Sciences. New York (USA): John Wiley & Sons

Elran-Barak R, Sztainer M, Goldschmidt AB, Crow SJ, Peterson CB, Hill LL, Crosby RD, Powers P, Mitchell JE, Le Grange D. 2015. Dietary restriction behaviors and binge eating in anorexia nervosa, bulimia nervosa and binge eating disorder: Trans-diagnostic examination of the restraint model. Eat Behav 18:192–196. https://doi.org/10.1016/j.eatbeh.2015.05.012

Gill T. 2014. Managing and Preventing Obesity. Sawaton (UK): Woodhead Publishing

Gorczyca AM, Sjaarda LA, Mitchell EM, Perkins NJ, Schliep KC, Wactawski-Wende J, Mumford SL. 2016. Changes in macronutrient, micronutrient, and food group intakes throughout the menstrual cycle in healthy, premenopausal women. Eur J Nutr 55(3):1181–1188. https://doi.org/10.1007/s00394-015-0931-0

Graves BS, Hall ME, Dias-Karch C, Haischer MH, Apter C. 2021. Gender differences in perceived stress and coping among college students. Plos One 16(8):e0255634. https://doi.org/10.1371/journal.pone.0255634

Jaiprakash H, Myint KN, Chai L, Nasir BM. 2016. Prevalence of dysmenorrhea and its sequel among medical students in a Malaysian University. Br J Med Med Res 16(9):1–8. http://dx.doi.org/10.9734/BJMMR/2016/25135

Kowalkowska J, Hamulka J, Wadolowska L, Górnicka M, Czarniecka-Skubina E, Gutkowska K. 2024. Restrained eating and disinhibited eating: Association with diet quality and body weight status among adolescents. Nutr 16(21):3601. https://doi.org/10.3390/nu16213601

Laessle R, Hilterscheid E. 2019. Stress-induced release of eating-related hormones in young women classified as restrained and unrestrained eaters. Neuropsychobiology 78(1):27–30. https://doi.org/10.1159/000498866

Ling J, Zahry NR. 2021. Relationships among perceived stress, emotional eating, and dietary intake in college students: Eating

self-regulation as a mediator. Appetite 163:105215. https://doi.org/10.1016/j.appet.2021.105215

Mohammad Radzi KNM, Ibrahim MA, Saad N, Nazori MNM, Shamsuddin AS 2022. Academic stress and emotional eating behaviour among IIUM students. J Allied Health Sci 6(3):2693–2701. https://doi.org/10.31436/ijahs.v6i3.795

Ning CH, Vasanthi RK, Muniandy Y. 2020. A study on the prevalence of dysmenorrhea and its relationship with physical activity among young adults. Int J Health Res 10(10):39−45.

Ragavi M, Muthu MP. 2024. Factors affecting eating behavior and impact of nutrition education on the eating behaviour of adolescents (17–19 years). Nutr Food Sci 55(2). https://doi.org/10.1108/nfs-03-2024-0076

Sen LC, Jahan I, Salekin N, Shourove JH, Rahman M, Uddin MJ, Zhang C, Hamer DH, Islam GR. 2024. Food craving, vitamin A, and menstrual disorders: A comprehensive study on university female students. Plos One 19(9):e0310995. https://doi.org/10.1371/journal.pone.0310995

Sinha R, Gu P, Hart R, Guarnaccia JB. 2019. Food craving, cortisol and ghrelin responses in modeling highly palatable snack intake in the laboratory. Physiol Behav 208:112563. https://doi.org/10.1016/j.physbeh.2019.112563

Sogari G, Velez-Argumedo C, Gómez MI, Mora C. 2018. College students and eating habits: A study using an ecological model for healthy behavior. Nutr 10(12):1823. https://doi.org/10.3390/nu10121823

Souza LBD, Martins KA, Cordeiro MM, Rodrigues YDS, Rafacho BPM, Bomfim RA. 2018. Do food intake and food cravings change during the menstrual cycle of young women? Rev Bras Ginecol Obstet 40(11):686–692. https://doi.org/10.1055/s-0038-1675831

Štefan L, Čule M, Milinović I, Juranko D, Sporiš, G. 2017. The relationship between lifestyle factors and body composition in young adults. Int J Environ Res Public Health 14(8):893. http://dx.doi.org/10.3390/ijerph14080893

Stoliker BE, Lafreniere KD. 2015. The influence of perceived stress, loneliness, and learning burnout on university students' educational experience. Coll Stud J 49(1):146–160.

Subramaniam K, Low WY, Chinna K, Chin KF, Krishnaswamy S. 2017. Psychometric properties of the Malay version of the Dutch Eating Behaviour Questionnaire (DEBQ) in a sample of Malaysian adults attending a health care facility. Malays J Med Sci 24(4):64–73. https://doi.org/10.21315/mjms2017.24.4.8

Teherán AA, Piñeros LG, Pulido F, Mejía Guatibonza MC. 2018. WaLIDD score, a new tool to diagnose dysmenorrhea and predict medical leave in university students. Int J Womens Health 10:35–45. https://doi.org/10.2147/IJWH.S143510

Ulhaq ND, Amalia DP, Rafa KD, Rizkiya I, Astuti YD, Febriyanti F, Alrahmah S, Widayati KA. 2023. Correlation between stress and eating behaviour in college students: A longitudinal study. HAYATI Journal of Biosciences 30(1):88–94. https://doi.org/10.4308/hjb.30.1.88-94

[WHO] World Health Organization. 2010. Everyday actions for better health–WHO recommendations. A healthy lifestyle-WHO recommendations. https://www.who.int/europe/news-room/fact-sheets/item/a-healthy-lifestyle---who-recommendations [Accessed 10th March 2024]

Wong, YN, Aris N. 2024. Effects of examination on perceived stress, eating behaviours and nutritional status. Transactions on Science and Technology 11:4–2.

Yong C, Liu H, Yang Q, Luo J, Ouyang Y, Sun M, Xi Y, Xiang C, Lin Q. 2021. The Relationship between restrained eating, body image, and dietary intake among university students in China: A Cross-Sectional Study. Nutr 13(3):990. https://doi.org/10.3390/nu13030990