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Research Article

Self-Esteem, Body Mass Index Status and Risk of Eating Disorders among Health Sciences Students

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ABSTRACT

This study aimed to ascertain the association between eating disorder risk, Body Mass Index (BMI), and self-esteem level among Universiti Sains Malaysia (USM) undergraduate health sciences students at Health Campus, Kubang Kerian, Kelantan, Malaysia. The self-esteem level and eating disorder risk of 166 USM health sciences students were evaluated in this cross-sectional study using the Rosenberg's Self Esteem Score and the Eating Attitude Test 26 (EAT-26) questionnaire, respectively. Based on their self-reported height and weight, the BMI was computed. The Fisher Exact Test and Chi-Square were used to determine the associations between the self-esteem level and BMI and the risk of eating disorders, respectively. Out of the 166 students, the majority (65.1%) had self-esteem levels within the normal range, while 57.8% had normal BMI. In the meantime, it was found that 19.9% had a high chance of getting an eating disorder. This study demonstrated a substantial association (p=0.012) between self-esteem and BMI status as well as between eating disorder risk and self-esteem (p=0.002). Self-esteem has a major impact on the psychological factors influencing BMI and contributing to the development of eating disorders. Additionally, future research should consider incorporating factors like body perception and body dissatisfaction. Additional research was required to validate the existing findings.

INTRODUCTION

Examining the association between self-esteem among undergraduate health sciences students and their susceptibility to eating disorders is relatively new, but it is gaining recognition as a significant field of research. According to Minev *et al.* (2018), an individual's attitude toward themselves, whether positive or negative, and their overall judgment of their own thoughts and feelings make up their self-esteem. Positive self-assertion is associated with acceptance, cherishing, and confidence in one's appearance and talents. Positive self-assertion also involves focussing on one's advantages (Ümmet 2015). On the other hand, low self-esteem exacerbates problems with body image and unfavourable assessments can result in bulimia and depression (Gilbert & Meyer 2005). Research has shown a substantial association between eating disorders and low self-esteem and elevated Body Mass Index (BMI) among undergraduate university students, with a high prevalence of eating disorders (Naeimi *et al.* 2016; Chaudhari *et al.* 2017).

It makes sense that university students may undergo shifts in their sense of self-esteem due to the transitional period from high school to university and from adolescence to adulthood. Research has demonstrated that self-esteem experiences a substantial decrease during the initial year of university, suggesting that

the transition to university can challenge the individuals' perceptions and self-conceptions (Luciano & Orth 2017). Conversely, though, certain studies argue that self-esteem can form and potentially rise during adolescence, a crucial period for the development of one's personality (Moksne & Espnes 2012).

In terms of BMI status, Suhaimi *et al.* (2020) discovered that the rate of obesity among undergraduate students were 6.3% and 12.9% were underweight at Universiti Putra Malaysia (UPM), while 61.3% of people had normal weight, and 19.6% were overweight. Ren *et al.* (2015) hypothesized that low nutrient intake as a result of improper eating habits may be the cause of university students' increased occurrence of underweight (Ren *et al.* 2015).

A research conducted in Malaysia based on a university in Kuala Lumpur found that an eating disorder was highly likely to affect 13.9% of university students (Chan *et al.* 2020). There aren't many research on the association between undergraduate students' BMI and self-esteem in Malaysia. Studies conducted in Malaysia have demonstrated that undergraduate student's academic performance is significantly influenced by their self-esteem (Zainal *et al.* 2021). Furthermore, Lee *et al.* (2012) have noted that self-esteem is influenced by their BMI. Worldwide, eating disorders are a problem that affects many university students (Pengpid & Peltzer 2018; Abdalla *et al.* 2020).

This study was necessary as a result of previous study, which examined the concerns with one's bodily image and self-esteem. It was suggested that the susceptibility to develop eating disorders may be potentially contributed by their high feelings of body dissatisfaction and low self-esteem (Teixeira *et al.* 2016). This study was conducted among health sciences students due to the potential impact on their careers. It was demonstrated that these students are poised to become future healthcare practitioners and will play a vital role in educating others about lifestyle modification and health promotion. Therefore, it is essential to conduct thorough research among these students (Alotaibi *et al.* 2021). Thus, the purpose of this study was to investigate the association between eating disorder risk, BMI, and self-esteem among health science students at Universiti Sains Malaysia's Health Campus in Kelantan, Malaysia.

METHODS

Design, location, and time

The study was carried out from September 2021 to January 2022, which employed a cross-sectional study design. The study was carried out at the local university in Kelantan, in the northeast of Malaysia, called Universiti Sains Malaysia. The Human Research Ethics Committee (JEPeM) USM granted ethical permission for the project (Reference number: USM/JEPeM/21060447). Conducting research on health sciences students is crucial because these individuals will be working in the healthcare industry. It is essential for them to prioritise leading a healthy lifestyle and maintaining a healthy diet in order to effectively promote health among their patients (Sajwani *et al.* 2009). Investigating whether health sciences students are more vulnerable to an increased risk of eating disorders and low self-esteem is therefore crucial.

Sampling

Convenience non-probability sampling was used in this investigation, and Naing's formula was utilised to determine the sample size (Naing 2009), $n=[Z/\Delta]^2 p (1-p)$ (n=sample size, z=value representing the desired confidence level, p=anticipated population proportion and Δ=precision (0.05). For this study, the level of confidence was set to be 95%. The Z-score value for 95% confidence level was 1.96. Among obese university students, low self-esteem was prevalent (9.8%), as per ALAhmari *et al.* (2019). Based on a research study conducted at King Saud University (KSU), the prevalence of obesity is represented by a p-value of 0.10. In the interim, the precision rate has been established at 5%. The research was predicated on a 20% dropout rate (Bujang 2021). Consequently, this research necessitates the participation of 166 students studying health sciences as undergraduates. The study's inclusion criteria, meanwhile, included anyone who was at least 18 years old, a citizen of Malaysia, and undergraduate students enrolled in Year 1–4 of the School of Health Sciences at Universiti Sains Malaysia who could accurately report their height, current body weight, and body weight from the previous six months. There were instructions on how to precisely self-measure height and body weight for those who were unsure of their self-reported measurements. The study did not include any participants who had long-

term health issues like diabetes, cardiovascular disease, cancer, or chronic kidney disease.

Data collection

After ethical approval was granted, the data collection process commenced. Students received the recruitment link via WhatsApp and email. The class representative distributed the survey invitation to the WhatsApp group of School of Health Sciences students from year 1 to year 4, which included a simple poster and QR code to facilitate the participants' to access the questionnaire. Each participant was guaranteed the confidentiality of their responses. According to the previous study, Google Form has been recognised as an intuitive web interface for the creation and implementation of web-based survey questionnaires for academic research (Vasantha Raju & Harinarayana 2016). Participants who fulfilled the eligibility criteria may participate by submitting the online questionnaire and permission form. Up until the researchers obtained 166 legitimate responses in total, the advertisement study link was submitted repeatedly.

The four-part questionnaire was completed by the participants in approximately 20 minutes. There are four sections for each set of online questionnaires which were: Section A (socio-demographic data), Section B (Anthropometric status), Section C (Self-esteem level) and Section D (Risk of eating disorder).

Section A (socio-demographic data). Section A focuses on students' personal information, such as their age, year of study, programmes, gender, ethnicity, living arrangements, and study sponsorship.

Section B (anthropometric data). In this study, participants self-reported their body weight and height. Following that, it was the researcher's responsibility to use the gathered data to compute BMI. According to the World Health Organisation (WHO), BMI was defined using cut-off points of 18.5 kg/m2 (underweight), 18.5 to 24.9 kg/m^2 (normal), 25.0 to 29.9 kg/m^2 (overweight), and 30.0 kg/m^2 (obesity) (WHO 2000).

Section C (self-esteem level). In order to assess their degree of self-esteem, students were required to complete a questionnaire. The English version of the validated Rosenberg Self-Esteem Scale (RSES) (Rosenberg 1989) was used to measure self-esteem. The 10-item survey had good validity and strong internal reliability (α=0.96). A four-point rating system, ranging from 0 (strongly disagree) to 3 (strongly agree), is used to score responses. The sum of the 10 answers was used to determine the overall self-esteem score. The possible scores are 0 through 30. Higher scores correspond to higher levels of self-worth. A score of 15 to 25 is regarded as normal; a number below 15 denotes poor self-esteem, and a score above 25 denotes good self-esteem. According to García *et al.* (2019), self-esteem levels yield greater accuracy than global ratings.

Section D (risk of eating disorder). The risk of having an eating disorder was evaluated using the validated Eating Attitude Test (EAT-26). The 26 items on the self-administered questionnaire had six components that were graded from 0 to 3 (0 being "Never," "Rarely," and "Sometimes," 1 being "Often," 2 being "Very often," and 3 being "Always"). The enquiries focus on attitudes, convictions, and actions related to food, weight, and body type. Three subscales are produced by this questionnaire: dieting, bulimia, and oral control. A total score is also generated. According to Garner (2004), the total score varied from 0 to 78, where scores less than 20 indicated a low risk of developing an eating disorder and scores more or equal than 20 indicated a higher chance of developing disordered eating attitudes or behaviours.

Data analysis

Version 26.0 of the Statistical Package for Social Sciences (SPSS) was used to analyse the data in this study. The normalcy distribution represents numerical data as mean (Standard Deviation (SD)), whereas frequency (percentage) represents categorical data. To calculate the variables' means, percentages, standard deviations, and frequencies, descriptive statistics were used. Weight (kg)/height (m^2) was used to calculate the Body Mass Index (BMI). The individuals' BMI levels were classified into groups based on the WHO BMI cut-off point. Categorical data was used to present each variable. Using Pearson's Chi-Square if the predicted count is less than 20% of the cells or Fisher's Exact if the expected count is more than 20% of the cells, the associations between self-esteem level and BMI status and the likelihood of eating disorders are evaluated. Statistical significance was defined as a p-value of less than 0.05 (two-tailed) at a 95% confidence level.

RESULTS AND DISCUSSION

Demographic characteristics

This investigation comprised 166 undergraduate health science students. There were 166 students, with 120 females (72.3%) and 46 males (27.7%). The students' mean age was 21.39±1.94 years. Majority of the students were at the age group of 18 to 21 years old (48.8%), Year 4 (45.8%), dietetics programme (23.0%), Malay (80.7%), living with parents (60.2%) and received scholarship as their sponsorship during study (44.0%). The demographic details of the study's health sciences students are displayed in Table 1.

Female students outnumbered male students in this study may be due to a gender imbalance in higher education. A supporting study conducted by Tienxhi (2017), found a gender disparity between male and female students enrolled in Malaysian public universities. This disparity is primarily due to the fact that female enrolment is higher than male enrolment. Since the COVID-19 outbreak, most educational systems have switched from in-person instruction in classrooms to an online learning environment (Azman *et al.* 2021). This explains why the vast majority of students (60.2%) live with their parents. Students were not required to be on campus because the education was delivered virtually to prevent the spread of COVID-19. Approximately 35.0% of students live in hostels, which were typically associated with clinical or practical learning activities. This required them to be on campus to meet specific credit hour requirements. On the other hand, a smaller portion (4.8%) of participants choose to live off-campus or independently. This could be because final-year students were doing internships away from their usual residences or campuses.

In terms of anthropometric data, the study's findings indicated that nutritional problems among the health sciences students included issues related to being underweight in addition to overweight or obese. The average BMI for 166 students was 24.50 kg/m^2. The majority of them, 96 students (57.8%), have a normal BMI, followed by 33 students (20.0%), who are underweight, and 19 (11.4%) and 18 (10.8%) of them are overweight and obese.

Level of self-esteem and eating disorder risk

Table 2 shows the level of self-esteem and the risk of eating disorders among health

Table 1. Demographic characteristics and body mass index status of health sciences students

Characteristics	n (%) (N=166)	Mean±SD
Gender		
Male	46 (27.7)	
Female	120 (72.3)	
Age, years		21.39±1.94
18–21	81 (48.8)	
22–25	78 (47.0)	
>25	7 (4.2)	
Ethnicity		
Malay	134 (80.7)	
Chinese	14 (8.5)	
Indian	10 (6.0)	
Others	8 (4.8)	
Year of study		
Year 1	51 (30.7)	
Year 2	15 (9.0)	
Year 3	24 (14.5)	
Year 4	76 (45.8)	
Programmes		
Audiology	7 (4.2)	
Biomedicine	16 (9.6)	
Dietetics	38 (23.0)	
Environmental and Occupational Health	30 (18.1)	
Forensic Science	9 (5.4)	
Medical Radiation	21 (12.7)	
Nursing	9 (5.4)	
Nutrition	16 (9.6)	
Speech Pathology	2 (1.2)	
Exercises and Sport Science	18 (10.8)	
Living arrangement		
With parents	100 (60.2)	
Hostel	58 (35.0)	
Living outside/ Alone	8 (4.8)	

Continue from Table 1

Characteristics	n (%) (N=166)	Mean±SD
Sponsorship		
Parents	25 (15.0)	
Scholarship	73 (44.0)	
Loan	63 (38.0)	
Others	5 (3.0)	
Anthropometric data		
BMI kg/m^2		24.50±23.05
Underweight (<18.5 kg/m^2)	33 (20.0)	
Normal (18.5–24.9 kg/m^2)	96 (57.8)	
Overweight (25.0–29.9 kg/m^2)	19 (11.4)	
Obese (≥30.0 kg/m^2)	18 (10.8)	

BMI: Body Mass Index; SD: Standard Deviation

science students. The students' self-esteem scores averaged 16.64. Among the 166 students, 108 (65.1%) had normal self-esteem, 50 (30.1%) had low levels, and 8 (4.8%) had high levels. The students had a mean EAT-26 score of 13.01. The majority of the students, n=133, or 80.1%, had a minimal chance of acquiring an eating disorder, while the remaining 33 students, or 19.9%, had a higher risk.

When comparing this study to other studies among Malaysian undergraduate university students, the prevalence of obesity was nearly identical (10.8% and 10.1%) (Pitil & Ghazali 2022). Furthermore, Tan *et al.* (2021) discovered that the proportions of overweight or obese Malaysian students remained stable during the epidemic, despite the fact that the majority of them walked. The fact that self-reported body weight and height were employed in both research accounts for the findings' similarity. The results of this study showed that most of the students had normal self-esteem. The findings of this study were close to those of a previous study conducted among Malaysian undergraduate students, where the mean self-esteem was normal at 17.44 (Fakaruddin & Tharbe 2018). A study by Keshk *et al.* (2019) among university students in Egypt revealed that only 34 out of 366 (8.5%) of students at Cairo University have poor self-esteem, however this study's sample of low self-esteem is substantially more frequent than average (Keshk *et al.* 2019). These disparities in the prevalence of low self-esteem could be attributed to environmental and psychosocial factors. Online learning, stress from a heavy workload, a lack of adequate technological infrastructure, or an unfavourable learning environment were the stressors that were most frequently mentioned as having an impact on participants' psychological aspects. Additionally, it's probable that a significant risk factor for the long- or short-term development of mental health problems may be low self-esteem (Keane & Loades 2017). The majority of the research in a systematic review conducted among university students and based on 115 studies published from 1970 to 2017 found an association between higher self-esteem and healthier behaviour (Arsandaux *et al.* 2020).

The current study's findings indicated that most students have a minimal chance of acquiring eating disorders. The prevalence of eating disorders is quite low (19.9%), with students having a mean risk of 13.01±11.38. However, this study's high-risk eating disorder prevalence is much higher than that of a study by Abdalla *et al.* (2020) that involved college students at a private university (Abdalla *et al.* 2020). In that study, only 18 out of 300 students (6.0%) were found to have high risk eating disorders. Meanwhile, a worrying discovery from research conducted in Indonesia revealed that 23% of teenage girls are susceptible to eating disorders (Sari *et al.* 2021). Pengpid and Peltzer's (2018) study indicated that Malaysia has the second-highest prevalence of eating disorder risk among university students among ASEAN nations, at 13.8% (Pengpid &

Table 2. Self-esteem level and risk of eating disorders among health sciences students

Variables	n (%) (N=166)	Mean±SD
Self-esteem level		16.64±4.68
Low self-esteem	50 (30.1)	
Normal self-esteem	108 (65.1)	
High self-esteem	8 (4.8)	
Risk of eating disorders		13.01±11.38
Low risk	133 (80.1)	
High risk	33 (19.9)	

SD: Standard Deviation

Peltzer 2018). Furthermore, the current study, conducted between 2021 and 2022, may have been influenced by the COVID-19 outbreak. Individuals at risk of eating disorders could have experienced psychosocial stress factors related to disrupted daily routines, social distancing measures, and restricted access to certain foods (McLean *et al.* 2022).

Association between self-esteem and BMI status

Table 3 showed the association between self-esteem and BMI status. Using Fisher's Exact Test, the study discovered a substantial correlation ($p=0.012$, $p<0.05$) between undergraduate health sciences students' BMI status and self-esteem. The results of the current study indicated a pattern in which obese undergraduate students were reported to have low self-esteem on a regular basis. As per the results, 9 (27.3%) of the 33 underweight students have low self-esteem, 23 (69.7%) have normal self-esteem, and 1 (3.0%) have high self-esteem. The majority of participants with a normal BMI, 70 (72.9%), have normal self-esteem, while 21 (21.9%) have low self-esteem and 5 (5.2%) have high self-esteem. Eight (42.1%) overweight participants have low self-esteem, while the other nine (47.4%) have normal self-esteem and the remaining two (10.5%) have high self-esteem. Of the 18 obese participants, 12 (66.7%) have low self-esteem, while the remaining six (33.3%) have normal self-esteem. The current study revealed that obese undergraduate students have a higher prevalence of low self-esteem.

The results of the current study show a statistically significant association between the BMI status and self-esteem of undergraduate health sciences students at USM's Health Campus. According to Kiviruusu *et al.* (2016), there is a stronger association between BMI and self-esteem between the ages of 22 and 32. This illustrates how self-esteem and BMI status can be greatly impacted by the start of young adulthood, which is probably connected to a new environment and new obstacles in life. People with high BMI may also experience stigma connected to their body weight, which could be linked to low self-esteem. Body weight stigma, also known as weight-based discrimination, is the stereotyping of a person's body type according to societal perceptions of body shape and weight (Tomiyama *et al.* 2018). This is because the potential for weight stigmatisation to have an impact on young people is high, as they are overly preoccupied with adhering to social standards of appearance, which could potentially adversely affect their health.

Association between self-esteem and risk of eating disorder

Table 4 indicates a strong link between undergraduate health sciences students' self-esteem and their likelihood of eating disorders, as determined by the Pearson Chi Square Test [χ^2 (2)=12.576, p=0.002]. Of the participants, 15 (13.9%) had a higher chance of developing an eating disorder, compared to the majority (86.1%) who have normal self-esteem. A high risk for an eating disorder, as shown by an individual's score on the EAT-26, which usually indicated a significant level of concern over disordered eating attitudes and practices. An elevated score on the EAT-26 denoted a stronger endorsement of attitudes and behaviours linked to eating disorders, such as binge eating disorder, bulimia nervosa, and anorexia nervosa. There is a low probability of having an eating disorder for 32

Table 3. Association between self-esteem level with body mass index among health sciences students

Body mass index status	Self-esteem, n (%) (N=166)			*p*
	Low	Normal	High	
Underweight	9 (27.3)	23 (69.7)	1 (3.0)	0.012*
Normal	21 (21.9)	70 (72.9)	5 (5.2)	
Overweight	8 (42.1)	9 (47.4)	2 (10.5)	
Obese	12 (66.7)	6 (33.3)	0 (0.0)	

*Fisher Exact Test significant at $p<0.05$

Table 4. Association between self-esteem level and risk of eating disorders among health sciences students

Self-esteem	Risk of eating disorder, n (%) (N=166)		X^2 (df)	*p*
	Low risk	High risk		
Low	32 (64.0)	18 (36.0)	12.576 (2)	0.002*
Normal	93 (86.1)	15 (13.9)		
High	8 (100.0)	0 (0.0)		

*Pearson's Chi Square significant at p<0.05

students (64.0%) who have low self-esteem, and a high risk for 18 students (36.0%). Despite having strong self-esteem, 8 (100%) of the participants had little chance of getting an eating issue.

The results of this study showed a strong association between the likelihood of developing an eating disorder and one's level of self-esteem. This result is in line with earlier studies that discovered a strong link between a high risk of eating disorders and a low self-esteem score (Yusoff & Shukri 2020) maybe due to distorted and negative body view as a result of low self-esteem, and thus raises the risk of disordered eating. Self-esteem is also thought to be a key factor in determining how one feels about their body (Stavrou 2018). It is important to follow the guidelines to avoid the emergence of poor self-esteem, which may eventually result in eating disorders. It is important to have personalized treatment plans that cater to the unique needs of each patient, as well as a multidisciplinary approach that combined psychological, medical, and nutritional interventions. This comprehensive approach is crucial for effectively addressing eating disorders (Wilson *et al.* 2007). The findings of this study can be employed to conduct future intervention studies that aim to mitigate the risk of developing an eating disorder among health sciences students. This investigation, nevertheless, was subjected to numerous constraints. Above all, convenience sampling was used, which may have introduced bias, and participant self-reported body weight and height were the only sources of information used for data assessment. In addition, the study was carried out in the midst of the COVID-19 outbreak. During the COVID-19 quarantine, the effect of psychological factors on students' likelihood of acquiring eating disorders is yet unknown. A limitation of this research was that it only examined the association between BMI, eating disorder risk, and self-esteem. It did not take into account other important factors like body dissatisfaction and media influences. Future studies should incorporate these measures for a more comprehensive analysis.

CONCLUSION

In summary, university students are thought to be a particularly sensitive population that could become afflicted with an eating disorder. Undergraduate health science university students from USM Health Campus exhibited a significantly high prevalence of risk of eating disorder (19.9%) despite the high prevalence of normal self-esteem and normal BMI status. Additionally, the results of this investigation show a connection between BMI and eating disorder risk as well as self-esteem. Still, more investigation is required to pinpoint the precise variables that raise the risk of eating disorders and low self-esteem. This will make it easier to create methods for prevention. Further research on the incidence of eating disorders among university students in Malaysia may also include non-health sciences students and students from other universities in the country.

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DECLARATION OF CONFLICT OF INTERESTS

The study's authors affirm that they have no competing interests, either financial or non-financial.

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