ORIGINAL ARTICLE

The Association between Physical Activity Status and Mental Wellbeing among Overweight and Obese Female University Students

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ABSTRACT

Introduction: Physical activity (PA) is essential in fighting obesity, and it may also improve one's mental wellbeing. Nonetheless, the association between PA and mental wellbeing among female university students with non-ideal body mass index (BMI) is still fragmented. Hence, this study aims to determine the association between PA status and mental wellbeing among overweight and obese female students in a university in Malaysia's East region. **Method:** A cross-sectional study was conducted among 102 overweight and obese female students. An online survey of the International Physical Activity Questionnaire (IPAQ) and The Warwick-Edinburgh Mental Wellbeing Acreda Scale (WEMWBS-ACREDA) was distributed using convenience sampling and analyzed. **Results:** The results show that 43.2% of the participants have a high and 18.6% have a low PA level. Meanwhile, the finding revealed that the majority of the participants have a moderate state of mental wellbeing (59.8%). Additionally, physical activity levels were found to be a significant predictor of mental wellbeing in overweight and obese female university students (β = 0.341, p 0.001). **Conclusion:** This study proposed that PA may influence the mental wellbeing of female university students with non-ideal BMI. Therefore, incorporating more physical-related activities into their learning objectives may promote a better quality of life during their campus life.
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INTRODUCTION

Obesity is a public health threat regardless of someone's age and gender. World Health Organization (WHO) defines obesity as having a body mass index (BMI) of more than or equal to 30 kg/m2 and overweight as having a BMI of more than or equal to 25 kg/m^2 (1). Evidence suggested that the prevalence of obesity was higher among females than males (2–4). Similarly, based on the National Health and Morbidity Survey (NHMS 2015), Malaysia also showed the same trend in which the prevalence of obesity was higher in females (20.6%) compared to males (15.0%) (5). In addition, evidence also suggests that female university student has lower physical activity (PA) level compared to male (6) and female students with high BMI tend to have lower self-esteem and higher depressive mood than normal BMI students (7).

Lack of PA is a risk factor for obesity. Obesity among female students has been associated with negative body image, which eventually may lead to mental problems (8,9). Conversely, mental problems are also a risk factor for obesity as they may disrupt energy homeostasis (10) and induce uncontrolled eating behaviour among female university students (11,12). Hence, it is implied that obesity and mental problems are interrelated to each other, and these two entities may jeopardise the quality of life of female university students during their campus life.

Meanwhile, raising the PA level may enhance both physical and mental health. PA can boost energy expenditure, which helps with weight loss (13). Additionally, Carek et al. stated that PA is a type of cognitive-behavioral therapy that has demonstrated to be an effective and economical method of increasing mental wellness (14). Additionally, Strohle in his research claimed that PA could enhance the general wellbeing of people with mental illnesses (15).

Nonetheless, the association between PA and mental wellbeing among overweight and obese female university students in Malaysia is still fragmented. Thus, this study aims to investigate the association between those two domains among the targeted group of participants. The findings of this study will be able to identify the current PA and mental wellbeing status of female university students with non-ideal BMI. Then the association between those two variables may provide an insight into the relevant authorities in the management of the students.

MATERIALS AND METHODS

Study design
This cross-sectional study was conducted via online survey due to the Covid-19 pandemic. The data collection period was between March and July 2020.

Study setting and study population
The study setting was International Islamic University Malaysia (IIUM), Kuantan campus. The inclusion criteria include female, 18 years old and above, BMI of greater than or equal to 23 kg/m^2 (classified as overweight based on the Malaysian cut-off points), currently studying in IIUM Kuantan campus, able to understand English, and willing to take part in the study. Those with a history of psychological disorders and have physical disabilities are excluded from the study. A screening checklist was included on the front page of the online survey form to ensure that only participants that fit the inclusion and exclusion criteria will move forward to answer the questionnaire.

A convenience sampling technique was applied to recruit the participants. The sample is calculated using the Raosoft sample size calculator with a margin error of 5% and a confidence interval of 95%. A total sample of 334 participants was needed to make inferences about the population. A convenience sampling technique will be applied to recruit the study samples.

Study tools
This study used two questionnaires, namely the International Physical Activity Questionnaire (IPAQ) and the Warwick-Edinburgh Mental Wellbeing Acreda Scale (WEMWBS-ACREDA). The IPAQ is a validated tool to evaluate PA among the Malaysian population (16). Participants were asked to count the number of days they engaged in vigorous PA, moderate PA

(excluding walking), and walking in the previous seven days, as well as the number of hours and minutes they spent doing each of these three activities. The minutes were determined for each participant's participation in vigorous, moderate, and walking activities. The number of MET minutes per week is calculated by multiplying the MET value (walking = 3.3, moderate activity = 4, vigorous exercise = 8) by the minutes spent doing the activity and then by the number of days spent doing it. The individuals are then divided into three groups based on their MET values: insufficiently active or low PA (less than 600), moderately active or moderate PA (600–3000), and highly active or high PA (more than 3000). The WEMWBS-ACREDA, on the other hand, is a psychological instrument specifically designed to assess mental well-being in people and normal populations (17). The questionnaire employs a 5-point Likert scale and contains 20 positively worded items. This scale has a minimum score of 20 and a maximum score of 100, with a higher score indicating a higher level of mental health wellbeing (18). Permission to use both questionnaires was granted by the original authors. The survey was completed online using Google Forms in the English language.

Data analysis
IBM Statistical Package Social Science (SPSS) version 20.0 was used for data analysis. Descriptive statistics presented the socio-demographic background, PA status, and mental status. Meanwhile, regression analysis was used to determine the association between physical activity status and mental wellbeing status. The level of significance was set to a p-value ≤ 0.05.

Ethical consideration
Ethical approval was obtained from the IIUM Research Ethical Committee (reference: IREC/2020/KON/1617690). All study-related information was kept confidential, and data collected was entered into a computer protected by a password known by only the researcher.

RESULT

Socio-demographic background
A total of 102 participants completed the questionnaire and were analysed. The study participants' mean (sd) age was 23.2 (± 1.30). All participants were Malay and Malaysians. The participants come from various faculties, namely nursing (42.2%), medicine (20.6%), science (15.7%), allied health sciences (8.8%), pharmacy (6.9%), and dentistry (5.9%). The majority are in their fourth year of study (58.8%). Regarding the BMI status, the mean (sd) was 27.6 kg/m^2 (3.95). Most reported no history of diseases (84.2%) (Table I).

Physical activity status
The findings from the IPAQ showed that the majority of the participants are physically active (43.2%), followed

Table I Socio-demographic background of the study participants (N=102)

Variable		Frequency (n)	Percentage (%)	Mean (sd)
Age (years)				23.23 (1.30)
Kulliyyah	Medicine	21	20.6	
	Dentist	6	5.9	
	Pharmacy	7	6.9	
	Nursing	43	42.2	
	Allied Health Science	9	8.8	
	Science	16	15.7	
Year of study	Year 1	2	2.0	
	Year 2	18	17.6	
	Year 3	11	10.8	
	Year 4	60	58.8	
	Year 5	11	10.8	
Weight (kg)				68.62 (11.36)
Height (cm)				157.40 (5.79)
BMI (kg/m^2)				27.64 (3.95)
Past and current medical history	No	86	84.2	
	Asthma	7	6.8	
	Allergic Dermatitis	2	2.0	
	Atopic Dermatitis	1	1.0	
	Mild Psoriasis	1	1.0	
	Anemia	1	1.0	
	Gastritis	2	2.0	
	GERD	1	1.0	
	Eczema	1	1.0	

by moderately active (38.2%) and low levels of physical activity (18.6%) (see Table II). The mean (±sd) score of the metabolic equivalent of task (MET) among the participants was 4022.76 (±4000.37) minutes/week.

Table II Physical activity status of the study participants (N=102)

PA status	MET Score (minutes/week)	Frequency (n)	Percentage (%)
Low	<600	19	18.6
Moderate	600-3000	39	38.2
High	>3000	44	43.2

Mental wellbeing status

The WEMWBS-ACREDA questionnaire revealed that the mean (sd) mental wellbeing score was 74.55 (12.27), indicating that the study participants have a moderate mental wellbeing level on average (see Table III). The observation of responses to mental wellbeing score is presented in Table IV. The highest mean (sd) response was "I believe God is the best helper" (4.69 0.563), followed by "I believed my problems could be easily solved if I am near to God (4.56 0.590) and "I believe I am blessed by God" (4.48 0.793). "I've been feeling interested in other people" (3.14 1.044) had the lowest mean response.

Table III Mental wellbeing status of the study participants (N=102)

Classification	Score	Frequency (n)	Percentage (%)
Low	≤ 50	4	3.9
Moderate	51-79	61	59.8
High	≥80	37	36.3

Table IV Analysis of responses for mental wellbeing status of study participants (N=102)

Items	Response	Frequency	Percentage	Mean	sd
I've been feeling optimistic about the future	None of the time	2	2.0%	3.43	0.862
	Rarely	7	6.9%		
	Some of the time	50	49.0%		
	Often	31	30.4%		
	All of the time	12	11.8%		
I've been feeling useful	None of the time	1	1.0%	3.53	0.805
	Rarely	6	5.9%		
	Some of the time	44	43.1%		
	Often	40	39.2%		
	All of the time	11	10.8%		
I've been feeling relaxed	None of the time	2	2.0%	3.56	0.863
	Rarely	7	6.9%		
	Some of the time	37	36.3%		
	Often	44	43.1%		
	All of the time	12	11.8%		
I've been feeling interested in other people	None of the time	7	6.9%	3.14	1.044
	Rarely	19	18.6%		
	Some of the time	38	37.3%		
	Often	29	28.4%		
	All of the time	9	8.8%		
I've had energy to spare	None of the time	1	1.0%	3.62	0.821
	Rarely	8	7.8%		
	Some of the time	31	30.4%		
	Often	51	50.0%		
	All of the time	11	10.8%		
I've been dealing with problems well	None of the time	3	2.9%	3.52	0.876
	Rarely	6	5.9%		
	Some of the time	39	38.2%		
	Often	43	42.2%		
	All of the time	11	10.8%		
I've been thinking clearly	None of the time	1	1.0%	3.49	0.853
	Rarely	11	10.8%		
	Some of the time	37	36.3%		
	Often	43	42.2%		
	All of the time	10	9.8%		
I've been feeling good about myself	None of the time	4	3.9%	3.37	0.943
	Rarely	11	10.8%		
	Some of the time	40	39.2%		
	Often	37	36.3%		
	All of the time	10	9.8%		

CONTINUE

Table IV Analysis of responses for mental wellbeing status of study participants (N=102) (CONT.)

Items	Response	Frequency	Percentage	Mean	sd
I've been feeling close to other people	None of the time	2	2.0%		
	Rarely	21	20.6%		
	Some of the time	32	31.4%	3.30	0.963
	Often	38	37.3%		
	All of the time	9	8.8%		
I've been feeling confident	None of the time	3	2.9%		
	Rarely	19	18.6%		
	Some of the time	40	39.2%	3.23	0.943
	Often	32	31.4%		
	All of the time	8	7.8%		
I've been able to make up my own mind about things	None of the time	1	1.0%		
	Rarely	13	12.7%		
	Some of the time	30	29.4%	3.56	0.918
	Often	44	43.1%		
	All of the time	14	13.7%		
I've been feeling loved	None of the time	1	1.0%		
	Rarely	9	8.8%		
	Some of the time	29	28.4%	3.70	0.910
	Often	44	43.1%		
	All of the time	19	18.6%		
I've been interested in new things	None of the time	6	5.9%	3.43	1.086
	Rarely	13	12.7%		
	Some of the time	30	29.4%		
	Often	37	36.3%		
	All of the time	16	15.7%		
I've been feeling cheerful	None of the time	1	1.0%	3.65	0.886
	Rarely	8	7.8%		
	Some of the time	34	33.3%		
	Often	42	41.2%		
	All of the time	17	16.7%		
I think God is the best helper	Rarely	1	1.0%	4.69	0.563
	Some of the time	2	2.0%		
	Often	25	24.5%		
	All of the time	74	72.5%		
I have strength to hinder wrong deeds	None of the time	2	2.0%	3.75	0.852
	Rarely	4	3.9%		
	Some of the time	29	28.4%		
	Often	50	49.0%		
	All of the time	17	16.7%		
I feel easy to perform prayers	Rarely	3	2.9%	4.12	0.762
	Some of the time	15	14.7%		
	Often	51	50.0%		
	All of the time	33	32.4%		

CONTINUE

Table IV Analysis of responses for mental wellbeing status of study participants (N=102)(CONT.)

Items	Response	Frequency	Percentage	Mean	sd
I believed my problems could be solved easily if I am close to God.	Some of the time	5	4.9%	4.56	0.590
	Often	35	34.3%		
	All of the time	62	60.8%		
I think I am being guided by God	Rarely	1	1.0%	4.44	0.712
	Some of the time	10	9.8%		
	Often	34	33.3%		
	All of the time	57	55.9%		
I think I am blessed by God	Rarely	4	3.9%	4.48	0.793
	Some of the time	7	6.9%		
	Often	27	26.5%		
	All of the time	64	62.7%		

Association between PA and mental wellbeing status

A regression test was used to assess the relationship between the PA score and the study participants' mental wellbeing. A simple linear regression was used to test if physical activity level quantified by the total MET score significantly predicted the mental wellbeing score. The overall regression was statistically significant ($R2 = 0.116$, $F (1, 100) = 13.19$, $p < 0.001$). In other words, physical activity levels were found to be a significant predictor of mental wellness in overweight and obese female university students ($^{\beta} = 0.341$, p 0.001) (see Table V).

Table V Regression analysis summary for physical activity (total MET score) predicting mental wellbeing score

Variable	B	95% CI	β	t	p
(Constant)	70.34	[67.10 – 73.58]		43.13	0.000
Total MET	0.001	[0.000 – 0.002]	0.341	3.63	0.000

Note: R^2 adjusted = 0.108. CI = confidence interval for B

DISCUSSION

This study aims to determine the association between the level of physical activity (PA) and the mental wellbeing of female university students with a non-ideal body mass index (≥ 23 kg/m^2). This study revealed that most female university students who are overweight or obese have moderate to high PA levels with an average MET value of 4023 minutes per week. In accordance with the classification of PA presented in NHMS 2019, the Malaysian adult population can be classified as active when they have exceeded the minimum recommendation of physical activity, which is; a) vigorous-intensity

activity for at least three days, achieving a minimum of 1500 MET-minutes/week, or b) 7 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum of 3000 MET-minutes/week [19]. Despite the fact that the participants in this study have a moderate to high level of physical activity, strategies to enhance and maintain PA levels in order to achieve an optimal BMI level are necessary. According to Hussin et al., the most significant barrier to committing to physical activity among female university students was a lack of time due to social and family commitments [20]. In this circumstance, students should be encouraged to create an exercise regimen or plan that fits into their hectic schedule. For example, students could schedule a fitness session in their diary or smartphone, commit to exercising with someone else or do a half-hour workout before starting a busy day [21]. As a result, a planned exercise that becomes a habit could help university students improve mental wellbeing substantially [22]. In addition, the PA level of female students with non-ideal BMI status was revealed to have a significant positive association with their mental wellbeing. In a comparable study setting among medical students, regular physical activity was found to be a protective factor against mental disorders [23]. Dinas et al. also suggested, based on a review, that PA as an intervention has beneficial effects on mental wellness that are comparable to those of pharmacological interventions [24]. In short, increasing the PA level and interventions to encourage the maintenance of the PA among female university students with non-ideal BMI is critical to enhancing their mental wellbeing.

Besides, the higher university authority may also play a role in encouraging female university students to engage in physical activities. There are many ways to incorporate PA into campus life. For instance, the university may organise sports tournaments so that the students can build a team for sports activities, provide pedometers or smartwatches for the students to track their PA, and organise a weight loss challenge program that requires the students to increase their PA level in order to lose extra weight. These activities may indirectly force the students to engage in physical activities and enhance their awareness of the importance of physical activity in optimising their mental wellbeing. Besides, these efforts may also nurture a healthy lifestyle habit that integrates PA in all aspects of their campus life.

University students' mental health has recently received attention from the public health community because this population is vulnerable to mental disorders [25]. The WEMWBS-ACREDA scale was used in this study to demonstrate that overweight and obese female university students have a moderate level of mental wellbeing. Additionally, it was discovered from the study that the participants performed better on the spiritual components. The spiritual component, according to Shafie et al., is the idea of surrender to God and how it affects one's thoughts, feelings, and behaviour [18]. Moreover, religion and spirituality are also usually considered protective factors against negative health outcomes [25]. Therefore, a high score on the spiritual components among the study participants may have contributed to their motivation to engage in physical activity to the recommended levels while following the spirituality base.

CONCLUSION

In conclusion, this study found a significant relationship between the PA level and mental wellbeing among female university students who are overweight and obese. Hence, incorporating more activities that can increase the PA stIn conclusion, this study discovered a significant association between the PA level and mental wellbeing among overweight and obese female university students. Therefore, adding more activities that can raise PA status among this population, particularly during their demanding campus life, may help to improve their mental wellness and eventually result in successful undergraduate students.atus among this population, especially during their stressful campus life, may help in improving their mental wellbeing and ultimately produce productive undergraduate students.

Limitations
This study does, however, have some limitations. First of all, because this is a single-center study, it's possible that the convenience sampling may not accurately reflect the general population. Second, the findings' generalizability may be constrained by a small sample size brought on by Covid-19-related restricted mobility. The findings' validity could also be impacted by the self-reported BMI level.

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