

Sociodemographic and body image measures associated with overall and domain-specific physical activity among a group of Malaysian university undergraduates

Sociodemographic and body image measures

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Rosnah Sutan, Kamilah Muhammad Amir and Azmi Mohd Tamil
Department of Community Health, Universiti Kebangsaan Malaysia Medical Centre, Kuala Lumpur, Malaysia

Abstract

Purpose – This study aims to determine the prevalence of overall and work, transport and leisure domain physical activity (PA) and their associated factors among Malaysian university undergraduates.

Design/methodology/approach – This is an online cross-sectional study, which gathered data on sociodemographic parameters, PA and body image. Global Physical Activity Questionnaire (GPAQ) was used to collect data on PA while Multidimensional Body-Self Relation Questionnaire-Appearance Scale (MBSRQ-AS) for body image constructs. Three faculties were chosen through stratified random sampling where all its undergraduates were invited. A total of 898 students responded, of which 718 were accepted for analysis.

Findings – Prevalence of overall work, transport and leisure domain PA among the students was 82.2%, 47.8%, 36.1% and 51.4% respectively. Overall PA was associated with male students (adjusted odds ratio [AOR]: 1.840, 95% confidence interval [CI]: 1.182–2.865); work PA was associated with the Malay race (AOR: 1.728, 95% CI: 1.240–2.409) and having part-time jobs (AOR: 3.098, 95% CI: 1.680–5.714); transport PA was associated with medical faculty (AOR: 1.677, 95% CI: 1.214–2.317) and leisure PA was associated with male students (AOR: 3.836, 95% CI: 2.746–5.360) and high overweight preoccupation (AOR: 1.486, 95% CI: 1.089–2.028).

Research limitations/implications – Self-reported variables may be subjected to overestimation and bias.

Practical implications – Distributions of PA and its associated factors may be used as guidance for health promotions catering to university students.

Social implications – Factors affecting PA among the youth are correlated with social life events.

Originality/value – Focus on domain-specific PA in association with body image measures may add values to existing PA studies, which is lacking in Malaysia.

Keywords Body image, Physical activity, Youth, Malaysia

Paper type Research paper

Introduction

Promoting increased physical activity (PA) is a crucial strategy to combat obesity and the increasing trend of cardiovascular diseases in Malaysia and elsewhere, affecting young adults [1, 2]. Early promotion of PA is essential to teach good habit and lifestyle among the young. However, designing targeted programs for young people requires more information on factors influencing overall and domain-specific PA. Therefore, updates on PA prevalence within the population are needed to detect trends that may be key to forging effective health promotions.

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PA is defined as any bodily movements produced by skeletal muscles that require energy expenditure [1]. All PA forms can provide health benefits if done regularly with sufficient duration and intensity [1]. Due to this, several studies on PA have focused not only on the prevalence of overall PA but also on its specific domains, often divided into work, transport and leisure activity [3, 4]. Work PA refers to activity done at work and may include household chores, while transport PA relates to travel by walking or cycling, and leisure PA includes sports and exercise [5]. It is found that correlates of PA may differ for each domain. For example, work and transport PA is higher in low to middle-income countries [6], and the likelihood of sports/exercise may be influenced by age and gender, where it is lesser in older people and women [7]. Currently, to our knowledge, no recent data is focusing on domain-specific PA and its correlates within the Malaysian university students' population.

Many factors are positively or negatively associated with PA among university students. Apart from sociodemographic factors such as gender, year of study and type of faculty, psychological aspects such as body image may influence participation in PA [8, 9]. Body image can be complex as it involved a multidimensional construct encompassing self-perception and attitudes toward one's physical appearance with two core facets in its perspective, mainly evaluation and investment [8]. Previous studies have addressed body image and eating behavior with PA [9]. In another study, body image and self-concept have been identified as themes for factors that influence PA behavior [10].

This study examines the relationship between sociodemographic factors and body image with overall and domain-specific PA, specifically among university undergraduates. Currently, we have a lack of domain-specific PAs among this group of interest. Domain-specific measurement of PA will allow us to identify environmental support areas that can be improved in promoting PA among the students. Additionally, knowledge on the relationship between body image and domain-specific PA to university students is crucial as they are within the group of young people affected by body-image-related issues, including dissatisfaction that may influence health behavior choices.

Methodology

Study design and participants

A cross-sectional study was conducted online among undergraduate students from several faculties in the National University of Malaysia. Three faculties (1) Faculty of Medicine, (2) Faculty of Engineering and Built Environment and (3) Faculty of Economy and Management were chosen through stratified random sampling from 12 faculties in the university. Universal sampling was then used to invite all the undergraduate students from the two nonmedical faculties and the medical students from the Faculty of Medicine. In total, there were 4,002 emails sent for the invitation to participate in the study.

Instruments and measures

The research instrument included a self-administered questionnaire that gathered sociodemographic information such as age, gender, race, faculty, year of study and part-time employment. In addition, two other validated and reliable questionnaires, namely the Global Physical Activity Questionnaire (GPAQ) developed by WHO [11] and Multidimensional Body-Self Relation Questionnaire- Appearance Scale (MBSRQ-AS), were also used.

Overall PA and domain-specific PA (work, transport and leisure activity) were measured using GPAQ, which has 16 questions. Respondents recall their PA for the past seven days and to estimate the duration of PAs performed in a typical day within that time. The number of days per week and duration per day spent in vigorous work, moderate work, transport, vigorous leisure and moderate leisure activity were recorded. The number of minutes spent

for vigorous activity is multiplied by 8.0 MET, while for moderate activity, by 4.0 MET. PA is the total MET values across the three domains. Total MET count for vigorous and moderate activity was considered only for work-domain physical activity (WPA) and leisure-domain physical activity (LPA). The cutoff point adopted for each domain (overall, WPA, TPA and LPA) was 600 MET-minutes per week, where values ≥ 600 MET were considered active [6]. GPAQ had been translated into many languages. A Malay version with known validity and reliability adequate for assessing the different domains and PA levels among healthy Malaysian adults is also available [12].

The MBSRQ-AS was used to measure body image constructs. It has 34 items covering five subscales: appearance evaluation, appearance orientation, overweight preoccupation, self-classified weight and body areas satisfaction scale (BASS). In this study, only three body image subscales deemed adequate to represent the two core facets in the body image attitudes of evaluation and investment were measured: appearance evaluation, appearance orientation and the overweight preoccupation subscales. Appearance evaluation is defined as physical attractiveness or unattractiveness and satisfaction or dissatisfaction with one's looks. High scorers feel primarily joyous and satisfied with their appearance, while low scorers have general unhappiness with their physical appearance. Appearance orientation is defined as the extent of investment in one's appearance. High scorers place more importance on looks, paying attention to their appearance and engaging in extensive grooming behaviors. Low scorers, on the other hand, are apathetic about their appearance. Their looks are not especially important; hence less effort is put into it. Lastly, the overweight preoccupation scale assesses a construct reflecting fat anxiety, weight vigilance, dieting and eating restraint with high scorers deemed more preoccupied [13].

The MBSRQ-AS has been widely used in body image research and is suitable to be used among adults and adolescents aged 15 years and above. The reliability of subscales evaluated in the MBSRQ-AS noted that the Cronbach's alpha for both female and male populations ranged from 0.7 to 0.9. Furthermore, the respondent's mean value for each subscale was calculated and compared to the expected mean values for adults provided by Cash through the purchase of the MBSRQ-AS [13]. Hence, the mean values provided would act as cutoff points for each subscale to determine whether the respondents' aspects of body image regarding the subscale were high or low.

Ethical consideration

Approval for this study was obtained from the Research and Ethics Committee, Faculty of Medicine, National University of Malaysia (FF-2018-255, 22 July 2018).

Data collection

Data collection was carried out using Google Form from September to November 2018. The link containing the Google Form was emailed to 4,002 undergraduates in 3–4 cycles until the calculated sample size of 703 was reached. The Google Form also has another link with a brief description and the purpose of the study. Respondents gave their consent by providing their matrices number and clicking "yes" to agreeing to participate. Access to the questionnaire was enabled once permission was granted. Successful submission could only be performed once all questions have been answered, and these responses were automatically stored in the Google Form database.

Data analysis

Statistical analysis was done using SPSS version 25. It included descriptive univariate statistics, bivariate and multivariate analysis. In the bivariate analysis, associations between

categorical variables and outcome were tested using the Chi-square test and Chi-square test with Yates correction where applicable. All associations with a p-value less than 0.05 with a 95% confidence interval (CI) were considered significant.

In the multivariate analysis, multiple logistic regressions were used to describe the strength of association between factors of interest and outcome, adjustment of covariates or confounders and to determine predictor variables for overall PA, work PA, transport PA and leisure PA. A significant level was set at $p < 0.05$, and factors with a value of $p \leq 0.1$ in the bivariate analysis were added in the multiple logistic regression analysis.

Results

Out of 4,002 email invitations sent, only 898 students responded (response rate 22.4%). After the data cleaning process, responses from 718 (80.0%) students were valid for analysis. Therefore, the study sampled is above the minimum sample size required. For the body image constructs consisting of appearance evaluation, appearance orientation and overweight preoccupation scale, the Cronbach’s alpha was 0.742, 0.735 and 0.776, indicating that the instrument provided consistent response for each score within the student’s population.

Table 1 shows that the majority of students were female (64.6%), aged between 18 and 33 years with the mean age of 21 (SD 1.87) years, Malay (70.3%), from the Faculty of Engineering and Built Environment (34.7%), in the first year (24.8%) and not having part-time jobs (91.9%). Table 1 also shows how the students fared in regard to their body image construct. The majority of the students were satisfied with their looks (98.3%),

Variables		n (%)
<i>Sociodemographic variables</i>		
Gender	Male	254 (35.4)
	Female	464 (64.6)
Race	Malay	505 (70.3)
	Chinese	133 (18.5)
	Indian	47 (6.5)
	Others	33 (4.6)
	Faculty	Economy and Management
	Engineering and Built Environment	249 (34.7)
	Medicine	235 (32.7)
Year of study	1	178 (24.8)
	2	154 (21.4)
	3	164 (22.8)
	4	126 (17.5)
	5	96 (13.4)
Having part-time jobs	Yes	58 (8.1)
	No	660 (91.9)
<i>Body image variables</i>		
Appearance evaluation (<i>Satisfaction or dissatisfaction with one’s look</i>)	Satisfied	706 (98.3)
	Dissatisfied	12 (1.7)
Appearance orientation (<i>Extent of investment in one’s appearance</i>)	Invested	713 (99.3)
	Apathetic	5 (0.7)
Overweight preoccupation (<i>Reflection of fat anxiety, weight vigilance, dieting and eating restraint</i>)	High preoccupation	344 (47.9)
	Low preoccupation	374 (52.1)

Table 1. Sociodemographic and body image characteristics among the respondents (n = 718)

invested in their appearance (99.3%) and reported less preoccupation with their weight (52.1%).

The prevalence of overall and domain-specific PA is shown in Table 2. The percentage prevalence of overall PA with MET values \geq of 600 MET minutes per week was 82.2%. Domain-specific PA for work, transport and leisure showed 47.8%, 36.1% and 51.4%, respectively. Based on domain-specific PA, leisure PA had the highest percentage of physically active students.

Based on the bivariate analysis in Table 3 and multivariate analysis in Table 4, overall PA significantly affected gender ($p = 0.004$) and overweight preoccupation ($p = 0.027$). Still, multivariate analysis showed it was only associated with gender (AOR: 1.840, 95% CI: 1.182–2.865). Male students were found to be almost twice more likely to be physically active compared to female students. For work-domain PA, significant association was found for race ($p = 0.0001$, AOR: 1.728, 95% CI: 1.240–2.409) and having part-time jobs ($p = 0.0001$, AOR: 3.098, 95% CI: 1.680–5.714). Malay students were found to have almost twice the likelihood of being physically active in the work-domain activity. Those with part-time jobs were three times more likely to be physically active in the domain.

Transport-domain PA significantly associated with the type of faculty ($p = 0.001$, AOR: 1.677, 95% CI: 1.214–2.317), where students from the medical faculty were almost twice more likely to be involved in active transport. Lastly, for leisure-domain activity, a significant bivariate relationship was found with gender ($p = 0.0001$), having part-time jobs ($p = 0.049$) and having overweight preoccupation ($p = 0.002$). However, multivariate analysis showed that leisure-domain PA was significantly associated with gender (AOR: 3.836, 95% CI: 2.796–5.360) and overweight preoccupation (AOR: 1.486, 95% CI: 1.089–2.028). Thus, male students were almost four times more likely to be physically active in the leisure-domain activity. Additionally, those who were more preoccupied with their weight were more likely to be physically active in the domain.

Discussion

In this study, the prevalence of overall physically active students was 82.2%, higher than the national prevalence of overall PA among 20–24 years old, which was 67.9% [14]. According to the latest national survey in 2019, the prevalence of physical inactivity within the same age group was only 26.8% [2], indicating that most individuals from the group were considered physically active. Regarding university students' population, the prevalence of PA in another local university was 72.2%, slightly lower than the finding in this study but is still higher than the national prevalence [15]. The high prevalence in this study may be due to the acceptance of a minimum cutoff point of ≥ 600 MET minutes per week as active. GPAQ also relied on memory recall, resulting in overestimation or response bias depending on the students' honesty. Additionally, during active semester classes, data collection was done, leading to many student movements in attending classes and collecting curriculum activities point performance. Some prevalence of PA was noted to be much lower within the university

Table 2. Prevalence of overall, work, transport and leisure PA among respondents meeting the WHO recommendation of MET value ≥ 600 MET-minutes per week. ($n = 718$)

Variables	<600 MET-minutes/week (Inactive)	≥ 600 MET-minutes/week (active)	Median (IQR)
	<i>n</i> (%)	<i>n</i> (%)	
Overall PA	128 (17.8)	590 (82.2)	2570 (960,6000)
Work PA	375 (52.2)	343 (47.8)	480 (0,2400)
Transport PA	459 (63.9)	259 (36.1)	360 (80,840)
Leisure PA	349 (48.6)	369 (51.4)	620 (0,2160)

Note(s): Physical activity (PA); metabolic equivalent of task (MET); interquartile range (IQR)

Table 3.
Bivariate analysis
between study
variables with overall
and domain-specific
physical activity

Variables	Overall PA			Work PA			Transport PA			Leisure PA		
	Active n (%)	Inactive n (%)	p-value	Active n (%)	Inactive n (%)	p-value	Active n (%)	Inactive n (%)	p-value	Active n (%)	Inactive n (%)	p-value
Gender												
Male	223 (87.8)	31 (12.2)	0.004*	118 (46.5)	136 (53.5)	0.602	100 (39.4)	154 (60.6)	0.173	184 (72.4)	70 (27.6)	0.0001*
Female	367 (79.1)	97 (20.9)		225 (48.5)	239 (51.5)		159 (34.3)	305 (65.7)		185 (39.9)	279 (60.1)	
Race												
Malay	417 (82.6)	88 (17.4)	0.665	264 (52.3)	241 (47.7)	0.0001*	171 (33.9)	334 (66.1)	0.057	259 (51.3)	246 (48.7)	0.931
Non-Malay	173 (81.2)	40 (18.8)		79 (37.1)	134 (62.9)		88 (41.3)	125 (58.7)		110 (51.6)	103 (48.4)	
Faculty												
Medical	197 (83.8)	38 (16.2)	0.418	109 (46.4)	126 (53.6)	0.603	105 (44.7)	130 (55.3)	0.001*	113 (48.1)	122 (51.9)	0.216
Nonmedical	393 (81.4)	90 (18.6)		234 (48.4)	249 (51.6)		154 (31.9)	329 (68.1)		256 (53.0)	227 (47.0)	
Seniority												
Junior (Year 1-2)	265 (79.8)	67 (20.2)	0.127	154 (46.4)	178 (53.6)	0.490	114 (34.3)	218 (65.7)	0.369	162 (48.8)	170 (51.2)	0.197
Senior (Year 3-5)	325 (84.2)	61 (15.8)		189 (49.0)	197 (51.0)		145 (37.6)	241 (62.4)		207 (53.6)	179 (46.4)	
Part-time jobs												
Yes	53 (91.4)	5 (8.6)	0.056	43 (74.1)	15 (25.9)	0.0001*	22 (37.9)	36 (62.1)	0.759	37 (63.8)	21 (36.2)	0.049*
No	537 (81.4)	123 (18.6)		300 (45.5)	360 (54.5)		237 (35.9)	423 (64.1)		332 (50.3)	328 (49.7)	
Appearance evaluation	581 (82.3)	125 (17.7)	0.784**	338 (47.9)	368 (52.1)	0.669	255 (36.1)	451 (63.9)	1.000	363 (51.4)	343 (48.6)	0.922
Satisfied	9 (75.0)	3 (25.0)		5 (41.7)	7 (58.3)		4 (33.3)	8 (66.7)		6 (50.0)	6 (50.0)	
Dissatisfied	588 (82.5)	125 (17.5)	0.059**	341 (47.8)	372 (52.2)	1.000**	258 (36.2)	455 (63.8)	0.777**	367 (51.5)	346 (48.5)	0.950**
Invested	2 (40.0)	3 (60.0)		2 (40.0)	3 (60.0)		1 (20.0)	4 (80.0)		2 (40.0)	3 (60.0)	
Apathetic orientation	294 (85.5)	50 (14.5)	0.027*	174 (50.6)	170 (49.4)	0.148	123 (35.8)	221 (64.2)	0.865	198 (57.6)	146 (42.4)	0.002*
Body weight	296 (79.1)	78 (20.9)		169 (45.2)	205 (54.8)		136 (36.4)	238 (63.6)		171 (198)	203 (54.3)	
Low preoccupation												

Note(s): Physical activity (PA); *p value < 0.05; **p value using Yates's correction

Table 4. Multiple logistic regression for determinants of overall and domain-specific physical activity

Outcome/variables	<i>B</i>	SE	AOR	95% CI
<i>Overall PA</i>				
Constant	2.335	0.491	10.334	
Gender (Male vs Female)	0.610	0.226	1.840	1.182–2.865
Nagelkerke R^2	0.046			
<i>Work PA</i>				
Constant	−0.562	0.143	0.570	
Race (Malay vs Non Malay)	0.547	0.169	1.728	1.240–2.409
Part-time jobs (Yes vs No)	1.131	0.312	3.098	1.680–5.714
Nagelkerke R^2	0.052			
<i>Transport PA</i>				
Constant	−0.570	0.157	0.566	
Faculty (Medical vs Nonmedical)	0.517	0.165	1.677	1.214–2.317
Nagelkerke R^2	0.025			
<i>Leisure PA</i>				
Constant	−0.627	0.123	0.534	
Gender (Male vs. Female)	1.345	0.171	3.836	2.746–5.360
Overweight preoccupation (High vs Low)	0.396	0.158	1.486	1.089–2.028
Nagelkerke R^2	0.142			

Note(s): Physical activity (PA); versus (vs)

student population [16, 17]. One of the reasons for this was using a pedometer or a higher cutoff point to differentiate the active and inactive students.

Regarding domain-specific PA, the prevalence of work, transport and leisure-domain PA among the students was 47.8%, 36.1% and 51.4%, respectively. Students were least active in the transport-domain activity and most active in the leisure-domain activity. As compared to the general Malaysian population, domain-specific PA prevalence among adults aged 20–29 years showed the highest to be in the work domain (41.7%) and lowest to be in the transport domain (12.6%) [18]. In a study among university students in Bangladesh, it was noted that transport-domain PA had the highest prevalence of active students (53%) and the lowest prevalence in the work domain (33%) [4]. Understandably, the work-domain PA prevalence among university students is lower as most of them may be full-time students and may not hold any part-time jobs. On the other hand, students in this study showed a high prevalence for leisure-domain activity, which is partly encouraged by the university's requirement for students to participate in extracurricular activities such as sports. As the university imposed the merit unit system among its students, each participation earns them points, which subsequently are influential when applying for on-campus residence.

Overall PA was associated with male students who were twice more likely to be physically active than their female counterparts. It is similar to most studies where higher prevalence was found among males [4, 15]. Generally, males have higher PA across all the domains, making them physically active overall. However, this is not always the case as it was noted among Croatian university students; female students had a significantly higher level of domestic PA [3]. Therefore, different PA pattern may be observed between the genders when it comes to domain-specific activity.

The unequal number of female and male students in this study in which females were significantly higher reflected the actual enrollment situation in the university. Additionally, more female students may be interested in participating due to the body image component resulting further in their high numbers. However, our final analysis of the total study population used an adjusted odds ratio in which gender was included in the multivariate

logistic regression model to address it as a confounding variable. We could also analyze the data for gender separately if the number of male students is higher. Gender-based study on domain-specific PA needs to be considered for future studies.

Work-domain PA was found to be associated with race and part-time employment. Malay students were more likely to be active in this domain compared to the non-Malay students. The fact that out of 58 students who reported having part-time jobs, only six were non-Malay. However, a local study comparing medical and nonmedical university students showed that race had no significant association with PA levels [19]. Regarding part-time employment, students in this study who had part-time jobs were more likely to be physically active in the work-domain PA. Having part-time jobs may contribute to higher work-domain PA if the jobs require higher energy expenditure, such as those working in the sales and service sector.

As for the transport domain, PA was associated with the type of faculty where students from the medical faculty were more likely to participate in active transport than students from the nonmedical faculties. Generally, nonmedical students were more physically active [19], but it was not so for transport-domain activity in this study. Medical students have a higher likelihood for active transport, which the environmental factor may influence. The medical faculty is situated in a different location from the main campus. Most of its buildings are within walking distance and are easier to access by foot, making it more practical to walk.

Lastly, leisure-domain PA was associated with gender, where male students were almost four times more likely to be active in this domain than female students. Pedisic *et al.* [3] found that the male students were significantly more involved in the leisure-time domain. Leisure-domain PA was also associated with overweight preoccupation, where students with high preoccupation were more likely to be active in the domain. Heavy preoccupation is the only body image construct showing a significant relationship and association to PA in this study.

According to Kilpatrick *et al.* [20], college students' motivations for PA and exercise focused on appearance, weight and stress management. The students in this study may be prompted to engage in various practices to manage weight due to their preoccupation, resulting in a significant relationship to leisure-domain PA. Furthermore, Ramos-Jiménez *et al.* [21] mentioned that having the desired body shape could determine university students' involvement in sports activities by 30%. Another study, however, found that there was no association between body shape concerns and exercise [9]. Furthermore, having a positive body image is not linked to disengagement in healthy activity, eating and self-care [21].

Limitation of study

The main limitation of this study was the low response rate of only 22.4%. However, the valid 718 participating students surpassed the calculated sample size of 703 respondents required for this study, thus making the generalizability among this population acceptable. Other than that, self-reported data may be prone to overestimation. Bias in response hinders the accurate picture of PA prevalence and its associating factors among the students. However, recall memory may be more valid for the young age group than the older age group.

Conclusion

Prevalence of overall PA among the undergraduate students was high. Still, the distribution of prevalence in domain-specific activities was not equal in which leisure-domain activity was highest while transport domain was the lowest in this study. In addition, different sociodemographic factors were found to be associated with the other domains, and only overweight preoccupation from the body image construct had a significant relationship and is associated with PA. Findings from this study may add values to existing PA studies in Malaysia and hopefully be helpful for future health promotions targeting university students.

Recommendations

Due to the different prevalence patterns for domain-specific PAs, focus can be given to the low domain. For the nonmedical students whose faculties are located at the main campus, where different venues sprawl extensively across the campus, environmental and safety factor may play a role. Active transport is possible and deemed practical, and a safe and green zone may be created to encourage the students to walk or cycle. Work-domain activities among the students can also be encouraged, although the majority of them may not have part-time jobs by focusing on domestic work that involves household chores while staying in the college residences.

Future research recommends that involving undergraduate students from other higher institutions such as private universities would be beneficial to reflect a more wholesome picture of PA prevalence and its associating factors in the general university students' population.

Conflict of Interest: None

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Corresponding author

Rosnah Sutan can be contacted at: rosnah_sutan@yahoo.com