

## **GENDER DIFFERENCES BETWEEN BODY COMPOSITION AND PHYSICAL ACTIVITY AMONG FACULTY OF SPORTS SCIENCE AND RECREATION STUDENTS**

Muhammad Danial Noor Hamidi

Nurul Najwa Aminul Mahzan

Noor Fatihah Ilias

*Faculty of Sport Science and Recreation, Universiti Teknologi MARA Shah Alam, Selangor*

**Received: 23 April, 2021**

**Accepted: 9 August, 2021**

**Published: 15 Sept, 2021**

### **Corresponding Author**

**Muhammad Danial Noor Hamidi**

*E-mail: [\\*danial95.19@gmail.com](mailto:*danial95.19@gmail.com)*

*Faculty of Sport Science and Recreation,  
Universiti Teknologi MARA*

## **GENDER DIFFERENCES BETWEEN BODY COMPOSITION AND PHYSICAL ACTIVITY AMONG FACULTY OF SPORTS SCIENCE AND RECREATION STUDENTS**

*Muhammad Danial Noor Hamidi<sup>1</sup>, Nurul Najwa Aminul Mahzan<sup>2</sup>, & Noor Fatimah Ilias<sup>3</sup>*

*<sup>1,2,3</sup>Faculty of Sport Science and Recreation, Universiti Teknologi MARA Shah Alam, Selangor*

### **ABSTRACT**

*Physical activity was linked with lower risk of mortality and developing non -communicable diseases. Strong evidence shows that physical inactivity increases the risk of most chronic diseases, decreases life expectancy and it was widely reported as having unambiguous effect on obesity level. Physical inactivity and obesity are seen in both gender. Therefore, the purpose of this study was to identify the differences between physical activity level (PA) and body composition (BC) among male and female Faculty of Sports Science and Recreation students in Universiti Teknologi MARA (UiTM). The International Physical Activity Questionnaire Short Form (IPAQ-SF) was used to measure physical activity level and the InBody 270 machine was used to measure the body composition of participants. Based on the results obtained there was no significant differences of Body Mass Index (BMI) ( $p = 0.64$ ), Waist to Hip Ratio (WHR) ( $p = 0.92$ ), Physical Activity Level (PA) ( $p = 0.12$ ) among male and female students. The present study confirms that there was no significant different between gender on BMI and WHR among university students. Being physically active reduce the risk of getting chronic diseases. Students must practice a healthy and active lifestyle as they were valuable assets of the university and they played an important role to ensure the development of the whole country.*

**Keywords:** *Body mass index, waist to hip ratio, physical activity, university students.*

## INTRODUCTION

Physical Activity (PA) is defined as any bodily movement produced by skeletal muscles that requires energy expenditure including activities undertaken while working, playing, carrying out household chores, travelling, and engaging in recreational pursuits (World Health Organization, 2018). Abundant scientific evidence has shown that physically active individuals of all age groups and races have low risk of developing numerous chronic medical conditions relative to those who are physically inactive and even modest levels of physical activity have preventive health benefits (Fletcher et al., 2018). Besides that, extensive proof has been found regarding the positive effect of physical activity on body weight (Cheong et al., 2017).

In many countries, insufficient physical activity is on the rise, adding to the burden of non-communicable diseases (NCDs) and affecting global health and people who are physically inactive have a 20% to 30% increased risk of death compared to people who are active (National Health and Morbidity Survey, 2015). In Malaysia, 35.2% Malaysian aged 18 and above were physically inactive (National Health and Morbidity Survey, 2011). A slight decrease was shown in a report which found that 33.5% adults above 18 years old were physically inactive (National Health and Morbidity Survey, 2015). This shows that out of approximate 14 million Malaysian, 4.7 million were still physically inactive even though the prevalence were decreasing in the year 2015.

The decrease in physical activity is one of the most widely reported as having unambiguous effect on obesity level (Davis, Plaisance, & Allison, 2018). In Malaysia, the obesity rates and non-communicable diseases linked to physical inactivity have risen substantially over the past 20 years and more worrying, the country has been identified as one of the least physically active countries in the world (Cai Lian, Bonn, Si Han, Chin Choo, & Chee Piau, 2016). Evidently, the prevalence of obese population in Malaysia rose from 10.5% in 2010 to 13.3% in 2014 (Hassan, 2018). Since the prevalence of obese people had steadily increased over the years, there is a high probability that the momentum will continue throughout the following years.

University students have been found to have poor physical activity habits leading to unhealthy body composition (Rajappan, Selvaganapathy, & Liew, 2015). While physical inactivity is seen in both males and females, there is a significantly higher prevalence of physical inactivity in females compared to males (Rajappan et al., 2015). Female is found to be less physically active than man and this may refer to conventional, especially Islamic, conceptions of the women's role in which physical activity is deemed unfeminine and correlated with a lower social status (Kaur et al., 2015). A previous study showed that 11.7% female were obese compared to 8.6% male (Niranjan, Kumar, Adhikari, & Saxena, 2016). This was also supported another study which found out that 52.9% female were obese and 49.7% men were in the same category (Cheong et al., 2017). Another study conducted on university students in Terengganu also shows that 13.2% female were obese while only 3.7% male were obese (Mohd Yusoff et al., 2018).

However, contrary to these findings, it was reported that obesity among males was significantly higher than among females with males recording 21% and females 10.7% (Gopalakrishnan, Ganeshkumar, Prakash, Christopher, & Amalraj, 2012). This was also supported by a study done on students in Ipoh which reported that 21% male were obese and 10.7% female were in the same condition (Sugathan & Bagh, 2014). There was contradict finding regarding the gender differences. Therefore, the purpose of this study is to identify the differences between physical activity (PA) level and body composition (BC) among male and female Faculty of Sports Science and Recreation students in Universiti Teknologi MARA (UiTM) Shah Alam.

## **METHOD**

### *Study Population*

A number of 242 participants aged between 18 and 30 years were recruited from Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Shah Alam. Both genders were included with male (n=134) and female (n=108). All participants were required to sign the consent form inform if they agree to participate in this study. The inclusion criteria for this

study are only bachelor's degree students in Faculty of Sports Science and Recreation Students, UiTM Shah Alam. The exclusion criteria were participants who had chronic diseases or any conditions that may cause harm to them if they involved in physical activity. This study was approved by the UiTM ethic committee: 600-IRMI (5/1/6).

*Table 1 Participants Characteristics*

Variable	Mean (SD)
Number of participants	242
Gender (M/F)	134/108
Age	22.89 ± 1.68
BMI (kg.m <sup>2</sup> )	23.88 ± 3.10
WHR	1.74 ± 0.72
Physical Activity Level	2147.85 ± 1439.66

### *Study Design*

This study was a non-experimental study and uses causal comparative design to identify the differences between physical activity level and body composition among male and female students in Faculty of Sports Science and Recreation, UiTM Shah Alam. Participants were recruited from September 2019 to January 2020 based on the inclusion and exclusion criteria that had been set by the researcher. Participants were being briefed by the researcher and were required to fill in the consent form. Next, body composition measured using the InBody 270 machine and after that participants were required to answer the International Physical Activity Questionnaire Short Form (IPAQ-SF). Analyzed using the SPSS software. For the descriptive statistic, the mean, and standard deviation were calculated to describe the demographic variables of the students such as age, height, and weight. As for the inferential statistics, independent t-test method used to test out the research hypothesis.

### *Instrumentation*

In Body 720 device used a direct segmental multi-frequency bioelectric analysis method, a patented technology, to precisely measure body composition by sending multiple electrical voltages through the inner body, resulting in up to six different impedance readings for the trunk and four limbs. The procedures of BIA took place as measurement was collected by a

researcher during a single laboratory session in clinic of faculty of sports science and recreation that lasted approximately two hours. The detail of the student filled in BIA machine record digitally by researcher before the body composition assessment take place. Students also asked to wear lightweight, loose-fitting clothing, free of metal and to remove all jewelry and shoes during measurement. Standing height was measured without shoes to the nearest 0.5 cm using a portable stadiometer. Researchers gave instruction on the BIA assessment. Printed results kept by researcher as confidential information. Next, the administered IPAQ-SF covered four domains of physical activity: work related, transportation, housework/gardening, and leisure time activity. The questionnaire also included questions about time spent sitting as an indicator of sedentary behavior. In each of the four domains the number of days per week and time per day spent in both moderate and vigorous activities are recorded. The questionnaire explained by the researcher. Questionnaire distributed after the BIA assessment had done. All scores were expressed in MET-minutes/week. Then Statistical analysis used Pearson correlation to investigate the relationship between physical activity level and body composition measurement, which was body mass index, waist to hip ratio, percentage body fat and visceral fat level among students of Faculty of Sports Science and Recreation.

### *Statistical analysis*

Data were analyzed using Statistical Package for Social Sciences (SPSS 2.0). Descriptive analysis used to describe the demographic data. The t-test was used to identify the relationship between BMI and WHR, PBF and VF. All data was presented in mean and standard deviation with significant level set at  $p < 0.05$ .

### *Results and Discussion*

Based on the data analyzed, BMI was categorized into normal, overweight, pre-obese and obese. From table 2 showed that 45.6% male and 48.2% female were reported to have normal BMI. Meanwhile, 21.6% male and 24.1% female were overweight. Next, in pre-obese it was reported that 29.1% were male and 23.1% were female. As for obese category 59.5% male and 40.5% female falls in this category.

*Table 2 Descriptive Statistics for BMI*

	Male		Female	
	Frequency	Percent	Frequency	Percent
Normal	61	45.6	52	48.2
Overweight	29	21.6	26	24.1
Pre-obese	39	29.1	25	23.1
Obese	5	3.7	5	4.6

WHR was categorized into excellent, good, average and at risk. In Table 3 showed 39.5% male and 41.7% female were classified into the excellent category. Meanwhile, 46.3% male and 48.1% female fall into the good category. Next, in average category it was reported that 12.7% were male and 10.2% were female. As for at risk category, 1.5% male falls in this category while no female was reported to be in this category.

*Table 3 Descriptive Statistics for WHR*

	Male		Female	
	Frequency	Percent	Mean	SD
Excellent	53	39.5	45	41.7
Good	62	46.3	52	48.1
Average	17	12.7	11	10.2
At Risk	2	1.5	0	0

Physical activity level was categorized into low, moderate, and high. Table 4 described the physical activity level of the participants. From this table, male 23.9% have low physical activity level, 33.6% moderate physical activity level and 42.5% high physical activity level. Meanwhile female was 44.8% low physical activity level, 28.7% moderate physical activity level and 47.2% high physical activity level.

*Table 4 Descriptive Statistics for Physical Activity Level*

	Male		Female	
	Frequency	Percent	Frequency	Percent
Low	32	23.9	26	44.8
Moderate	45	33.6	31	28.7
High	57	42.5	51	47.2

Table 5 showed the results for the independent T-Test. There was no significant difference of body mass index between male (M=23.96, SD=3.013) and female (M=23.77, SD=3.234);  $t(240)=.464, p =.643$ . Next, there was no significant difference of waist to hip ratio between

male ( $M=.86$ ,  $SD=.029$ ) and female ( $M=.86$ ,  $SD=.031$ );  $t(224)=.099$ ,  $p=.921$ . Besides that, there is no significant difference of physical activity between male ( $M=2277$ ,  $SD=1511$ ) and female ( $M=1988$ ,  $SD=1334$ );  $t(238)=1.578$ ,  $p=.116$ . The results in table 10 also showed that there was a significant difference of body fat percentage between male ( $M=26.1$ ,  $SD=7.521$ ) and female ( $M=27.9$ ,  $SD=7.034$ );  $t(240)=-2.008$ ,  $p=.046$ .

*Table 5 Independent T-Test for BMI, WHR, PBF and Physical Activity Level*

	Male		Female		<i>t</i> -value	<i>p</i> -value
	Mean	SD	Mean	SD		
BMI	23.96	3.01	23.77	3.23	0.46	0.64
WHR	0.86	0.03	0.86	0.03	0.09	0.92
Physical Activity Level	2277	1511	1988	1334	1.58	0.12

## DISCUSSION

In this study, it was reported that 46.7% participants were normal BMI. 45.6% male and 48.2% female fall into this category. Somehow, there were 53.2% participants who were reported to have abnormal BMI which falls into the overweight, pre-obese and obese category. In this category, 54.4% were male and 51.8% were female. As for WHR, it was reported that more than 80% participants were classified as having normal WHR while 12.4% was poor WHR. In the normal category, 85.8% was male and 89.8% as female. Meanwhile in the poor category, 14.2% was male and 10.2% female. Based on these results, it was found that male had poor BMI and WHR as compared to female students in Faculty of Sports Science and Recreation. Physical activity level was also examined in this study. 76% participants were reported to be physically active. In this category, 76.2% male and 75.9% female. Meanwhile 24% of the participants were physically inactive. 23.8% male and 24.1% female was in this category. This result showed that male reported to have higher physical activity level than female.

From the result and data interpretation in this study, there was no significant difference of BMI and WHR between male and female students  $p=0.64$  and  $p=0.92$ , respectively. This was in agreement with a study conducted by Yousif, Kaddam, and Humeda (2019) which



concluded that there were no significant difference in obesity among male and female students in Sudan. Another study also reported that there was no significant difference of BMI between male and female (Mitolo, Dare, & Chris-Ozoko, 2015). Possibly this was due to the same nature of the participant environment. In addition, behaviors among both genders may had a same sport perspective. To add up, it may because both genders were engaged in academic program that involved gym activities and professional activities such as taekwondo, basketball, and swimming. So, both genders were actively participating in sport activities. Hence, there was no differences on BMI and WHR.

However, it was reported that there was significant difference between male and female BMI (Mascherini, Castizo-Olier, Irurtia, Petri, & Galanti, 2018). Significant difference were also found between male and female BMI (Veghari et al., 2016). In addition, another study conducted showed that there was a significant difference of BMI and WHR between male and female student (Rašeta, Đurić, Zeljković, Simović, & Vujnić, 2016). Another study also resulted in the same outcome (Arabmokhtari, Khazani, Bayati, Barmaki, & Fallah, 2018).

Furthermore, recent study reported significant difference of WHR among male and female university students were found (Muaidi & Ahsan, 2019). This result contradicts may because of the different population used. As the participants were only recruited from Faculty of Sports Science and Recreation, both genders may physically active. As reported other study recruited participants from other faculties such as Faculty of Economics and Faculty of Medicine (Rašeta et al., 2016) and Faculty of Applied Medical Science (Muaidi & Ahsan, 2019). This possibly influence by conventional, especially Islamic, conceptions of the women's role in which physical activity is deemed unfeminine and correlated with a lower social status (Kaur et al., 2015). As predicted, this may contribute to the different findings. Generally, Sports Science and Recreation students were typically active students because their social environment allows them to engage in physical activities. In order to enhance physical activities, social environment plays an important role (Zanovec, Lakkakula, Johnson, & Tuuri, 2009).

This study also found that there was no significant difference of physical activity between male and female. This result were also strengthen by a study which reported no

significant difference of physical activity level between gender (Simona, Radu, & Vanvu, 2015). As there was no significant between both gender may cause by the regular weekly physical activity. Finding from this study reported that 99.5% were moderate to high physically active were male. While 98% was female. It showed that both gender in sport science and recreation students were active. It was only about less than 2% were physically inactive. Thus, there was no difference as both gender in this population as they were engaging in active lifestyle.

However, a recent study in 2019 contradicted with our results and reported a significant difference of physical activity level between male and female university students in India (Singh, 2019). As mentioned before this possibly influence by conventional, especially Islamic, conceptions of the women's role in which physical activity was deemed unfeminine and correlated with a lower social status (Kaur et al., 2015).

## CONCLUSION

Based on the results and data interpretation, there were no significant difference of BMI, WHR and physical activity level between male and female. Essentially, any academic programs that related to sport and recreation allows students to be physically active and results in better body composition thus lowering the risks of getting chronic diseases such as obesity.

### *Acknowledgment*

I would like to express my deepest gratitude and greatest appreciation for all the support, guidance, motivation, and time invested by both co-researcher Nurul Najwa Aminul Mahzan and Noor Fatimah Ilias. This study would possibly not able to be completed without their help and cooperation.

## REFERENCES

- Arabmokhtari, R., Khazani, A., Bayati, M., Barmaki, S., & Fallah, E. (2018). Relationship Between Body Composition and Cardiorespiratory Fitness In Students at Postgraduate Level. *Zahedan Journal Of Research In Medical Sciences*, 20(2), E12109.
- Cai Lian, T., Bonn, G., Si Han, Y., Chin Choo, Y., & Chee Piau, W. (2016). Physical Activity and Its Correlates Among Adults In Malaysia: A Cross - Sectional Descriptive Study. *PLOS ONE*, 11(6), E0157730. Cheong, S. M.,
- Khoo, Y. Y., Baharudin, A., Ling, M. Y., Omar, M. A., & Ahmad, N. A. (2017). Physical Activity And Overweight/Obesity Among Malaysian Adults: Findings From The 2015 National Health And Morbidity Survey (NHMS). *BMC Public Health*, 17(1), 733.
- Davis, R. A. H., Plaisance, E. P., & Allison, D. B. (2018). Complementary Hypotheses On Contributors To The Obesity Epidemic. *Obesity*, 26(1), 17-21.
- Fletcher, G. F., Landolfo, C., Niebauer, J., Ozemek, C., Arena, R., & Lavie, C. J. (2018). Promoting Physical Activity And Exercise: JACC Health Promotion Series. *Journal of The American College Of Cardiology*, 72(14), 1622-1639.
- Gopalakrishnan, S., Ganeshkumar, P., Prakash, M. V., Christopher, & Amalraj, V. (2012). Prevalence Of Overweight/Obesity Among The Medical Students, Malaysia. *Medical Journal Of Malaysia*, 67(4), 442-444.
- Hassan, H. (2018). Obesity And Overweight Issues Could Undermine Malaysia's Competitiveness. *International Journal Of Human Rights In Healthcare*, 11(3), 204-213.
- Kaur, J., Kaur, G., Ho, B. K., Yao, W. K., Salleh, M., & Lim, K. H. (2015). Predictors of Physical Inactivity Among Elderly Malaysians: Recommendations For Policy Planning. *Asia Pacific Journal Of Public Health*, 27(3), 314-322.
- Mascherini, G., Castizo-Olier, J., Irurtia, A., Petri, C., & Galanti, G. (2018). Differences Between The Sexes In Athletes' Body Composition And Lower Limb Bioimpedance Values. *Muscles, Ligaments And Tendons Journal*, 7(4), 573-581.
- Mitolo, L. T., Dare, W. N., & Chris-Ozoko, L. E. (2015). Body Mass Index (BMI) And Waist Hip Ratio (WHR) Among Young Adults Of Delta State Origin. *World Journal of Medical Sciences*, 12(1), 21-25.
- Mohd Yusoff, N., Ganeson, S., Ismail, K., Juahir, H., Razif, S., Lua, P., . . . Rajikan, R. (2018). Physical Activity Level Among Undergraduate Students In Terengganu, Malaysia Using Pedometer. *Journal of Applied And Fundamental Sciences*, 1.

- Muaidi, Q. I., & Ahsan, M. (2019). Measurement Of Visceral Fat, Abdominal Circumference and Waist-Hip Ratio To Predict Health Risk In Males And Females. *Pakistan Journal of Biological Sciences* (22), 168-173.
- National Health And Morbidity Survey. (2011). National Health And Morbidity Survey 2011(NHMS 2011). Vol. II: Noncommunicable Diseases.
- National Health And Morbidity Survey. (2015). National Health And Morbidity Survey 2015 Vol. II: Non-Communicable Diseases, Risk Factors & Other Health Problems. Kuala Lumpur: Ministry Of Health.
- Niranjan, A., Kumar, M., Adhikari, P., & Saxena, M. (2016). Prevalence And Determinants of Overweight And Obesity Among Undergraduate Medical Students Of Shyam Shah Medical College, Rewa. *International Journal Of Medical Science And Public Health*, 5, 1.
- Rajappan, R., Selvaganapathy, K., & Liew, L. (2015). Physical Activity Level Among University Students: A Cross Sectional Survey. *International Journal Of Physiotherapy and Research*, 3(6), 1336-1343.
- Rašeta, N., Đurić, S., Zeljković, N., Simović, S., & Vujnić, M. (2016). Interrelations Between Body Mass Index, Percentage Of Body Fat, And Waist-To-Hip Ratio Among Different Groups Of Students At The University of Banja Luka. *The Facta Universitatis, Series Physical Education and Sport*, 14(3), 331-345.
- Simona, F., Radu, L., & Vanvu, G. I. (2015). The Level Of Physical Activity of University Students. *Procedia -Social And Behavioral Sciences*, 197, 1454-1457.
- Singh, A. (2019). Gender Differences of Physical Activity In University Students. *International Journal Of Yogic, Human Movement And Sports Sciences*, 4(1), 374-377.
- Sugathan, S., & Bagh, D. S. (2014). Prevalence And Correlates Of Overweight And Obesity Among Medical Students In Ipoh, Malaysia. *Journal Of India*, 2(1), 22-24.
- Veghari, G., Sedaghat, M., Banihashem, S., Pooneh Moharloe, Angizeh, A., Tazik, E., . . . Honarvar, M. R. (2016). Prevalence Of General, Abdominal And Waist-To-Hip Ratio Obesity Among Adults In The North Of Iran: An Ethnical Comparative Study. *International Journal Of Medical Research & Health Sciences*, 5(1), 219-225.
- World Health Organization. (2018). Physical Activity. Retrieved From <https://www.who.int/en/news-room/fact-sheets/detail/physical-activity>
- Yousif, M. M., Kaddam, L. A., & Humeda, H. S. (2019). Correlation Between Physical Activity, Eating Behavior And Obesity Among Sudanese Medical Students Sudan. *BMC Nutrition*, 5(1).

Zanovec, M., Lakkakula, A., Johnson, L., & Tuuri, G. (2009). Physical Activity Is Associated With Percent Body Fat And Body Composition But Not BMI In White And Black College Students. *International Journal Of Exercise Science*, 2