



ANTHROPOMETRIC STATUS AND PHYSICAL ACTIVITY OF B40'S WOMEN DURING COVID-19 PANDEMIC

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INTRODUCTION



BACKGROUND STUDY

- ❑ The prevalence of obesity and overweight has continued to rise and now obesity has become a global epidemic, and the term “Globesity” has been used by WHO to describe the rise of obesity among the world’s population (Vasileva et al., 2018).
- ❑ Evidence showed that **obesity** could **increase the risk of cardiovascular diseases (CVD)** (Kim et al., 2016; Koliaki et al., 2019; Sardu et al., 2019).
- ❑ Despite the physical activity benefits, the physical activity level is declining globally as more than 25% of adults do not meet the requirement set by WHO (World Health Organization, 2018).

BACKGROUND STUDY

- ❑ Studies showed that high physical activity is negatively associated with BMI and waist circumference (Pate et al., 2015)
- ❑ Regarding socioeconomic status (SES), the prevalence of low physical activity is higher in low SES group (46.4%) compared to the higher SES group (41.8%) (Sahebkar et al., 2018).
- ❑ Anthropometric measures are commonly preferred compared to other methods of determining an individual's nutritional status since it is non-invasive, requiring inexpensive and simple equipment (Gallagher et al., 2013; Thornton & Villamor, 2016).

BACKGROUND STUDY

- ❑ Malaysia's first nationwide lockdown (MCO) was implemented on 18 March 2020. However, the MCO order was extended multiple times due to the sudden increase of Covid-19 cases.
- ❑ Full Movement Control Order (FMCO) implemented again in 1 June 2021 and on 15 June 2021, Prime Minister introduced a four-phase National Recovery Plan (NRP) where each phase is based on the certain criteria and used to indicate whether a state was ready to move up next phase.
- ❑ Trough various approach in handling, the number of new and active Covid-19 cases started showing evident downtrends, however these strategies have consequences that adversely affect physical and mental health (de Matos et al., 2020); the economic crisis resulted from business closures and rising unemployment in a variety of industries (Khalifa et al., 2021).

PROBLEM STATEMENTS

- ❑ During the lockdown, people reported an **increase in body weight and decreased physical activity**, as well as an increase in overall food consumption (Pellegrini et al., 2020).
- ❑ Adult that achieves sufficient physical activity before the pandemic (74.6%) was reported to **decrease physical activity** during the pandemic (54.7%) (Katewongsa et al., 2020).
- ❑ Zachary et al., 2020 reported that roughly 22% of the respondents reported **gaining weight** during self-quarantine, with a significant relationship with time spent in physical activity.
- ❑ Even though the effect of the pandemic on the physical activity equally on both gender, Togni et al. (2021) has raised concern toward physical activity among women during the pandemic as prior COVID-19 outbreak, women were already more inactive than the men.
- ❑ So, this study was conducted based on the imposition of movement control orders (MCOs) during the pandemic COVID-19. Thus, the data from this study will generate knowledge of physical activity level and anthropometric status as a reference for future research.



OBJECTIVES

1. To determine anthropometric status (Body mass index & waist to hip ratio) among B40's women during COVID-19 pandemic.
2. To determine the physical activity level of B40's women during COVID-19 pandemic.
3. To determine the relationship between anthropometric status with physical activity among respondents.



MATERIAL AND METHODS



RESEARCH DESIGN

Cross sectional study

Study duration: July – November 2021

Data collected based on convenient sampling - demographic profile and anthropometric status via Google form and physical activity level via telephone interview.

Ethical approval for the study was obtained from Human Ethical Committee, UMT.

STUDY LOCATION

Kuala Terengganu,
Terengganu

142 respondents

RESPONDENTS

☐ Inclusion criteria:

- ✓ Women
- ✓ Lives in Kuala Terengganu
- ✓ Age between 20-39 years old, a range of young adults (Katewongsa et al., 2020).
- ✓ Classified in B40's income, income below than RM 4,850 per month (Department of Statistics Malaysia, 2020)

☐ Exclusion criteria:

- ✓ Does not suffer from any physical disability
- ✓ Not pregnant.

Household group	Household income distribution
B1	Less than 2,500
B2	2,500 - 3,169
B3	3,170 - 3,969
B4	3,970 - 4,849

(Department of Statistics Malaysia, 2020)

RESEARCH INSTRUMENTS

Questionnaires

Section A

Demographic data

- Age
- Marital status
- Household income

Section B

Anthropometric status

- Height
- Weight
- Waist circumferences
- Hip circumferences

Section C

Assessment of physical activity

- Global Physical Activity Questionnaire (GPAQ) Version 2 in Malay



Via Online Survey



Via telephone interview



METHODOLOGY

ANTHROPOMETRIC STATUS



BMI

- ❑ BMI was calculated by dividing the self reported weight (kg) by height (m) using the formula:

$$BMI = \frac{Weight\ (kg)}{Height\ (m^2)}$$

- ❑ The data later classified respondents as follows:

Classification	WHO cut-off kg/m ²
Underweight	<18.5
Normal Weight	18.5–24.9
Overweight	25–29.9
Obesity	≥30.0

(Institute for Public Health, 2020; WHO expert consultation, 2004).





METHODOLOGY

ANTHROPOMETRIC STATUS



WHR

- ❑ The waist-to-hip ratio (WHR) was calculated by using formula below:

$$WHR = \frac{\text{Waist circumference (cm)}}{\text{hip circumfernce (cm)}}$$

- ❑ Participants then were categorized based on the WHO cut-off points:

Classification	WHR
Normal	<0.85
Abdominal obesity	≥ 0.85

(World Health Organization, 2008)





METHODOLOGY

ASSESSMENT OF PHYSICAL ACTIVITY (GPAQ)

The questionnaire contains **16 items** which measure in three domains and one item measure sedentary in typical week:

- 1) Work-related (paid and unpaid, including household chores)
- 2) Transport-related (walking and cycling)
- 3) Recreational activity

For the analysis of GPAQ data, metabolic equivalents (METs) minutes per week was used to calculate the total physical activity (World Health Organization, 2012).

- ☐ The Global Physical Activity Questionnaire short-form version 2.0 in Bahasa Melayu (GPAQ-M) was used to measure the degree of physical activity among the B40's women.
- ☐ The GPAQ in the Malay version has been validated by Soo et al. (2015) and has been used in studies to assess the physical activity level of the Malaysian populations (Abu Saad et al., 2020; Chan et al., 2020; Stephen et al., 2021; Su et al., 2019).

- ❑ Respondents physical activity were described by calculating their physical activity using METs-minutes per week.



Domain	METs value
Work	Moderate MET value = 4.0 Vigorous MET value = 8.0
Transport	Cycling and walking MET value = 4.0
Leisure/ Recreational	Moderate MET value = 4.0 Vigorous MET value = 8.0

(World Health Organization, 2012a; World Health Organization, 2012b)

- ❑ Physical activity levels was calculated by adding the total MET min of activity for each domain will then classified into three levels depending on intensity and duration: high, moderate, and low (Stephen et al., 2021).


Physical activity level	Description
High	<ul style="list-style-type: none"> 3 or more days of vigorous-intensity activities AND total physical activity MET minutes per week is ≥ 1500. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> 7 or more days any combination of the three domains AND total physical activity MET minutes per week is ≥ 3000.
Moderate	<ul style="list-style-type: none"> 3 or more days of vigorous-intensity activities AND ≥ 75 min per week. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> 5 or more days of any combination of the three moderate-intensity activities AND ≥ 150 min per week. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> 5 or more days of any combination of the three domains AND total physical activity at a minimum of 600 MET min per week.
Low	<ul style="list-style-type: none"> The value does not meet either the high or moderate physical activity standards.

(World Health Organization, 2012; Abu Saad et al., 2020)

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- ❑ The total physical activity MET minutes per week also used to classified the frequency of respondent meeting WHO recommendation.

Physical activity level	Description
Meeting WHO recommendations	Total Physical Activity MET minutes per week is ≥ 600 (Any combination of moderate and vigorous-intensity physical activity)
Not meeting WHO recommendations	Total Physical Activity MET minutes per week is < 600

(World Health Organization, 2012a; World Health Organization, 2012b)



DATA ANALYSIS

IBM SPSS Statistics Standard Edition 26.0

Data cleaning, coding and processing for the GPAQ was based on GPAQ analysis guides (World Health Organization, 2012b).

Normality test

Kolmogorov-Smirnov

- ❑ To determine the data distribution of the variables.
- ❑ Most of data were not normally distributed, the data were presented as median (IQR).

Descriptive test

- Determine the percentage, frequency, median, and interquartile range of
 - Demographic profiles
 - Anthropometric status (height, weight, BMI, waist circumference, hip circumference, WHR)
 - Physical activity

Inferential test

Spearman 's Rho correlation coefficient

- ❑ Determine relationship between physical activity and anthropometric status (BMI and WHR).



RESULT AND DISCUSSION



RESULTS

DEMOGRAPHIC PROFILE

Table 4.1.1 shows the demographic characteristics among the respondents. All the respondents were female with a median (IQR) age was 29 (10.0) years old.

50.7% of respondents were single and 49.3% were married.

Table 4.1.1 Demographic characteristic of respondents
(n=142)

	Frequency (n)	Percentage (%)	Median
Age (years)			29.0 (10.0)
Marital status			
Single	72	50.7	
Married	70	49.3	

RESULTS

DEMOGRAPHIC PROFILE

Table 4.1.1 Demographic characteristic of respondents
(n=142)

	Frequency (n)	Percentage (%)
Household income (SES)		
B1 (< RM2500)	40	28.2
B2 (RM2500 - RM3169)	51	35.9
B3 (RM3170 - RM3969)	29	20.4
B4 (RM3970 - RM4849)	22	15.5

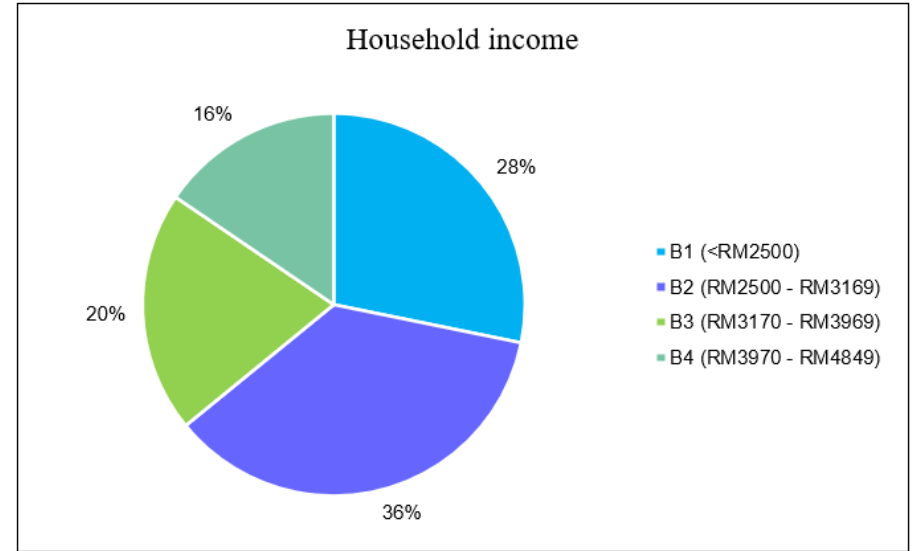


Figure 4.1.4 Household income among respondents

RESULTS

ANTHROPOMETRIC STATUS

Table 4.1.2 Anthropometric status among respondents

	Median (IQR)
BMI (kg/m²)	24.0 (5.9)
Weight (kg)	62.0 (17.0)
Height (cm)	159.0 (10.0)
WHR (cm/cm)	0.83 (0.1)
Waist circumference (cm)	77.8 (11.3)
Hip circumference (cm)	96.0 (9.7)



Table 4.1.3 BMI categories of respondents

	Frequency (n)	Percentage (%)
Body mass index (BMI) categories		
Underweight	12	8.5
Normal Weight	52	36.6
Overweight	46	32.4
Obesity	32	22.5
Waist to hip ratio (WHR) categories		
Normal (Below 0.85 cm)	47	33.1
Abdominal Obesity (More than 0.85 cm)	95	66.9

- ❑ This study showed that most respondents in this study were in normal BMI categories (36.6%) → lower than the national prevalence which is 43.3% (NHMS, 2019).
- ❑ However the percentage of respondents who were in overweight and obese categories (32.4% and 22.5% respectively) were higher than the national prevalence (30.4% and 19.7%, respectively) (NHMS, 2019).
- ❑ A study conducted among 1319 Malaysian adults in 2021 during MCO period show that half of the respondents (54.7%) have normal BMI and 25.5% and 12.1% were overweight and obese respectively, where 1/3 of respondents gain weight while 32.2% loss weight (Chin et al., 2022).
- ❑ During the first lockdown in Italy (in April/June 2020), 65.1% of the respondent had a normal weight, with mean BMI of women was 23.1 ± 4.0 (Füzéki, Schröder, Carraro, et al., 2021).
- ❑ Besides, the same finding can be seen in research from Füzéki, Schröder, Groneberg, et al. (2021), German adults had a BMI of 24.6 ± 5.4 with an average BMI for women was 24.1 ± 5.2 during the first lockdown (April/September 2020).
- ❑ Seal et al. (2022) found that 18.4% of participants gained more than 2 kg after three months of stay-at-home order. However, they also found that 65.7% of respondents-maintained weight within 2 kg.

DISCUSSION (cont.)



- ❑ The findings also showed that, more than half of the respondent (66.2%) have waist to hip ratio (WHR) $>0.85 \rightarrow$ abdominal obesity.
 - ❑ WHR, when paired with BMI, offers a more robust indicator for assessing normal-weight central obesity in an adult population and strong predictor of higher hazards of all-cause and CVD mortality than BMI (Abeywickrama et al., 2020; Haregu et al., 2020).
 - ❑ Thus, combining BMI and WHR help to assess normal-weight central obesity in an adult population.
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RESULTS

PHYSICAL ACTIVITY

Table 4.1.5 WHO recommendations on physical activity for health

Physical activity (MET minutes/week)	Frequency (n)	Percentage (%)
Do not meet WHO's recommendation (<600 MET minutes/week)	66	46.5
Meet WHO's recommendation (≥600 MET minutes/week)	76	53.5

Table 4.1.6 Level of physical activity among respondents

Characteristics	Frequency (n)	Percentage (%)
High	4	2.8
Moderate	72	50.7
Low	66	46.5

RESULTS

PHYSICAL ACTIVITY

Table 4.1.7 Median minutes of physical activity on average week among respondents



Physical activity	Median (IQR)
Total physical activity (minutes/week)	140 (81)
Work	105 (60)
Vigorous intensity	0 (0)
Moderate intensity	105 (70)
Travel	0 (0)
Recreational activity	20 (60)
Vigorous intensity	0 (40)
Moderate intensity	0 (20)
Total physical activity (MET minutes/week)	620 (340)
Work	420 (240)
Travel	0 (0)
Recreational activity	100 (410)

DISCUSSION

- ❑ This study revealed that 53.5% of respondents meet the WHO recommendation for physical activity per week while 46.5% of them do not meet WHO recommendations for physical activity (Table 4.1.6) .
- ❑ These result was nearly similar to those reported by Rahman et al. (2020), where almost 40% of participants were inactive during the COVID-19 pandemic.
- ❑ Meanwhile, previous reports from the national health survey estimated that 25% of the Malaysian adults were insufficiently active, with 28% of them being women participants, and 30% was among respondents from Terengganu state (Institute for Public Health, 2020).
- ❑ Even though this study does not consider the physical activity level before outbreaks of COVID-19, compared to the nationally representative samples, the result among women in Kuala Terengganu was notably more physically inactive during restrictions strategies imposed by the Malaysian government.

DISCUSSION (cont.)



- ❑ In Thailand, those who have a sufficient level of Moderate-vigorous physical activity (MVPA) was reduced from 74.6% to 54.7% during the imposition of lockdown (Katewongsa et al., 2020).
 - ❑ 46% of 1100 highly active women respondents were classified as very active, reduced to 39% due to social distancing (Puccinelli et al., 2021).
 - ❑ Meanwhile, in Poland, over 40% of respondents believe they had decreased physical activity levels during the pandemic when asked to describe their physical activity change (Górnicka et al., 2020).
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DISCUSSION (cont.)

- ❑ According to the Table 4.1.7, we found that women were most likely to engage in moderate intensity in the work domain by spending a median time of approximately 105 minutes per week. However, the median time spent for recreational activity was only 20 minutes per week with nearly zero minutes in the travel domain.
- ❑ There are several possible explanations for this result. A study conducted using IPAQ instead showed that women were physically active in the household-related domain while in the work domain, women were less active than men (Lee et al., 2019).
- ❑ In IPAQ, work and household activities presented as a separate domain, while in GPAQ, both work-related and household-related were in the same domain, which household activity considered as moderate-intensity physical activity.
- ❑ Therefore, this could explain the more median time spent by women (Table 4.1.7) in the moderate intensity of the work domain.

DISCUSSION (cont.)



- ❑ According to Limbers, McCollum, & Greenwood (2020), due to COVID-19, women, especially those working, their responsibilities had increased as some of them had to work from home and be the caregiver since some of the day-cares were close in addition to taking care of the family's daily needs.



DISCUSSION (cont.)

- ❑ Table 4.1.7 showed that the respondent spent nearly zero minutes on travel-related physical activity.
- ❑ Travel related activity was commonly low among Malaysian as most people go from one place to another by using passive transportation like a car instead of walking or cycling (Lee et al., 2019).
- ❑ Katewongsa et al. (2020) found a similar finding, in which travel-related activity was least among all domains. As the study conducted during pandemic COVID-19, mitigation strategies such as movement restriction generally affect the cumulation minutes of travelling by walking or cycling of population.
- ❑ COVID-19 pandemic had changed people's routines of activity in numerous aspects of their everyday life (Katewongsa et al., 2020)
- ❑ It also reported that during the second lockdown in Germany, under domain travel, walking and cycling MET minutes reduced compared to before COVID-19 (Füzéki, Schröder, Reer, et al., 2021).

RESULTS ANALYSIS

RELATIONSHIP BETWEEN ANTHROPOMETRIC STATUS AND PHYSICAL ACTIVITY OF B4O'S WOMEN

Table 4.1.8 Correlation analysis between physical activity MET minutes/week, BMI and WHR

Physical activity	BMI		WHR	
	r_s	p-value	r_s value	p-value
Total physical activity MET-minutes/week	-0.263**	0.002	-0.011	0.901
Total physical activity work (MET/min/week)	0.219**	0.009	0.208*	0.013
Total physical activity travel (MET/min/week)	-0.184*	0.028	-0.051	0.545
Total physical activity recreation (MET min/week)	-0.431**	0.000	-0.164	0.051
Total sedentary activity/day	0.197*	0.019	0.145	0.085

Spearman Correlations analysis was used.

* Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

- ❑ The results obtained showed that BMI has a significant relationships with physical activity in different domains (Table 4.1.8).
- ❑ Total physical activity MET-minutes/week and BMI were found to have a weak negative correlation($r = -0.263$, $p = 0.002$)→ that respondents with lower total physical activity MET-minutes/week have higher BMI and vice versa.
- ❑ Higher BMI was linked to lower physical activity levels during the lockdown (Robinson et al., 2021b).
- ❑ Meanwhile, Pellegrini et al. (2020) reported that during the lockdown, bodyweight increase with the decrease of physical activity. Dobrowolski & Włodarek (2021) also found where a higher increase in body weight was observed with a reduction of physical activity.

DISCUSSION (cont.)

- ❑ Total physical in activity travel and recreation domain (MET min/week) indicate a significant negative correlation with BMI → lower total physical activity travel and recreation (MET min/week), higher BMI of respondents, and vice versa.
- ❑ Besides, there was a significant positive correlation between total physical activity work (MET min/week) with BMI and WHR.



CONCLUSION




SUMMARY

- ❑ Median BMI of the respondents in this study was 24.0 (5.9) kg/m²→ while most respondents (66.9%) were categorized as having abdominal obesity according to WHR measurement.
- ❑ 50.7% respondents have a moderate level of physical activity while 46.5% of them have low physical activity during the COVID-19 pandemic.
- ❑ There were significant relationship found between physical activity and BMI while no relationship was found between physical activity and WHR (except total work physical activity).



LIMITATION

- ❑ In the present study, respondents acquired a self-administrated anthropometric measurement and researcher-administrated survey (GPAQ), given that face-to-face data collection was not feasible. Thus those who had limited internet access might not be selected.
 - ❑ Moreover, the self-reported anthropometric measurements and survey might potentially be reporting biases.
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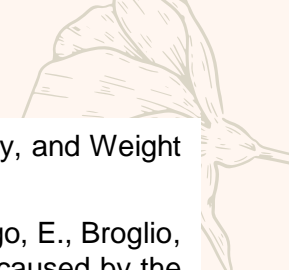
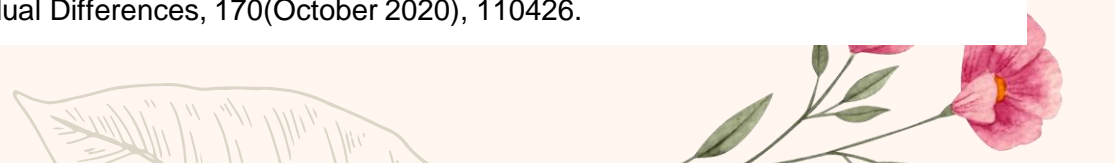
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