THE CORRELATION OF BODY MASS INDEX, SOCIO-ECONOMIC STATUS, AND MOTIVATION WITH PHYSICAL ACTIVITY AT PRODUCTIVE AGE AT 'AISYIYAH YOGYAKARTA UNIVERSITY

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THE CORRELATION OF BODY MASS INDEX, SOCIO-ECONOMIC STATUS, AND MOTIVATION WITH PHYSICAL ACTIVITY AT PRODUCTIVE AGE AT 'AISYIYAH YOGYAKARTA UNIVERSITY

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ABSTRACT

The lack of physical activity was one of the causes of several health problems and deaths whose prevalence was increasing throughout the world. University was a gathering place for all university members including students, lecturers and teaching staff who were at risk of low physical activity and other lifestyle behaviors. Penelitian ini bertujuan untuk mengetahui hubungan indeks massa tubuh (IMT), status sosial ekonomi dan motivasi terhadap aktivitas fisik pada usia produktif di Universitas 'Aisyiyah Yogyakarta. A cross-sectional method was used, and a random sampling technique was taken. The sample was 380 respondents with an age range of 20-59 years. Data analysis used the chi square test to determine the relationship between physical activity and its determinants and logistic regression to determine the predictors of physical activity. Based on 380 respondents, 47.2% were in the inactive category with an average of Metabolic Equivalent Task (METs)= 402.56 ± 121,140 and duration = 88.67 ± 59,600 per minute per week. There was a significant correlation between age, occupation, body mass index (BMI), motivation, availability of sports facilities with physical activity. Based on multivariate analysis, it was found that BMI, age and motivation had an influence on physical activity. The level of physical activity among university members was still low and there was a need for university strategies to increase knowledge and behavior to become an active campus with healthy campus campaigns, organizing health checks, championships between campus sports clubs and other strategies.

Keywords: physical activity, body mass index, socio-economic status, healthy campus

Introduction

Physical activity has an important role in maintaining health, well-being, quality of life, helping control weight, reducing the risk of premature death, heart disease, type 2 diabetes, and reducing the risk of cancer. Apart from that, it can also improve mental health by reducing depression and anxiety.[1] Lack of physical activity was a risk factor for the emergence of non-communicable diseases and had a 20% to 30% increased risk of death compared to people who were quite active.[2] Globally, 7.2% of deaths due to non-communicable diseases were due to lack of physical activity.[3]

World Health Organization (WHO) reported 1.14 billion or 27.5% of the world's adult population was physically inactive. The highest prevalence was in countries in the Eastern Mediterranean region, women at 43% of men (23%), followed by America, women at 39% and men at 25%.[4] In Asian countries, Malaysia had a high prevalence of physical inactivity (37.3%).[5] In Indonesia's population aged ≥ 10 years in 2018, the proportion of physically inactive increased to (33.5%) compared to 2013 (26.1%). The Special Capital Region (DKI) of Jakarta had the highest proportion (47.8%) then North Kalimantan had the second highest (46.1%) and the lowest was East Nusa Tenggara (25.2%). Yogyakarta Province (28.1%) was in 5th place in provinces with low levels of physical activity. Based on data, from the 5 districts/cities in Yogyakarta province, Sleman district was in the second place which had the highest proportion (33.93%).[6]

Insufficient physical activity was closely related to a person's nutritional status, one of which was measured by Body Mass Index (BMI). By measuring BMI, it could be seen whether a person was obese and healthy. Physical activity affected BMI values and body composition.[7] Despite the importance of having a normal BMI and being physically active, a study showed that as many as 30% of respondents were overweight and obese, the majority of whom spent about 5 hours a day physically inactive.[8] Based on the research conducted in Indonesia, population groups with high socio-economic status were more at risk of obesity because the higher the amount of food income, the more consumptive behavior towards food and drink appeared, and individuals with high socio-economic status generally had busy jobs, so physical activity decreased.[9] Furthermore, the lack of facilities and space, a research in China showed that limited space and facilities such as free playgrounds and sports centers on campus were the factors that influenced physical activity.[10] Lack of time, fatigue and lack of motivation became the obstacles to physical activity due to high academic pressure.[11] Other influencing factors were demographic factors such as; age, gender, occupation, income.[12]

Productive age was a stage in life development, which was at the peak of activity and tended to be more active. These health problems raised from adopting a poor lifestyle, including a level of physical activity that was not very effective, because it raised the risk of non-communicable diseases.[13] The productive age according to WHO was the population aged 15-59 years, while the

productive age according to the Indonesian Central Bureau of Statistics was the age range 15-64 years.[14] Based on The World Bank Data, the population aged 15-64 years in the world reached 64.89% in 2021.[15] The Directorate General of Population and Civil Registration (*Dinas Kependudukan dan Pencatatan Sipil or Dukcapil*) of the Ministry of Home Affairs, the total population of Indonesia in the productive age category reached 69.3% or 190.83 million people in 2022.[16]

A preliminary study was conducted at 'Aisyiyah University, Yogyakarta. The total respondents were 132 including students, academics and employees, It was found that 33.3% of the campus community was not physically active and only 9.8% met the recommended standards for physical activity. 'Aisyiyah University Yogyakarta was a health-oriented campus as the right place to increase literacy about health. However, at 'Aisyiyah University Yogykarta, there was no program or regulation regarding physical activity, facilities and accessibility that supported exercise and had quite busy learning hours for lecturers and students, which resulted in a reduction in physical activity and increased the risk of non-communicable diseases. Penelitian ini dilakukan untuk mengetahui hubungan IMT, status sosial ekonomi, dan motivasi terhadap aktivitas fisik pada usia produktif di Universitas 'Aisyiyah Yogyakarta.

Methods

This type of research was an analytical survey in the terms of a cross sectional approach. Participants in this research were the students, lecturers and active employees at 'Aisyiyah University Yogyakarta. The total population was 7,102 people registered in 2023. The samples were taken by using random sampling techniques. In determining the number of samples using the Slovin formula, and the results obtained 380 samples who were research participants. The sample was selected according to the inclusion criteria: aged 20-59 years, students, lecturers and active employees at 'Aisyiyah University Yogyakarta. Anthropometric data (body weight and height) were obtained by measuring body weight using a stepping scale. Respondent height data was obtained by direct measurement using a microtoise. Body Mass Index (BMI) data was obtained through calculations using the formula:

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

How Body Mass Index (BMI) measurement worked:

1) Provide the tools to be used.
2) Record the names of respondents whose height and weight will be measured.
3) Measure the respondent's height by standing up straight then height is measured using a height meter or tape measure.

4) Measure the respondent's weight by getting the respondent onto the weight scale. Then record the results of the respondent's weight listed on the measuring instrument.
5) The results of height and weight that have been obtained are calculated using the body mass index formula. Then they are categorized as thin, normal, fat, obese I, obese II.

Data were collected by using a demographic instrument/questionnaire to determine the respondent's identity, age, gender, occupation, income and availability of sports facilities, then the Indonesian version of the International Physical Activity Questioner Short Form (IPAQ-SF) questionnaire was used to measure the level of physical activity for seven days finally with Metabolic Equivalent Task (METs) units - minutes/week with the criteria for low activity <600 METs, moderate activity 600-3000 METs and high activity >3000 METs. IPAQ-SF was used in the age range 15 – 69 years and had a high test-retest reliability of 0.884 and a validity correlation with accelerometers of 0.00 with good reliability and validity scores.[17] There were criteria for measuring METs Physical activity:

1) METs-minutes/week for vigorous activity = 8.0 x duration of vigorous activity in minutes x duration of vigorous activity in days.
2) METs-minutes/week for moderate activity = 4.0 x duration of moderate activity in minutes x duration of moderate activity in days.
3) METs-minutes/week for light physical activity = 3.3 x duration of light activity in minutes x duration of light activity in days.
4) METs-minutes/week of total physical activity = sum of METs-minutes/week of vigorous activity + moderate activity + light activity. Then categorized.

Furthermore, the Exercise Motivation Inventory 2 (EMI-2) questionnaire was used to determine the type of motivation with a total of 51 items containing fourteen sub-domains which were then categorized into two parts: intrinsic motivation (stress management, revitalization, entertainment, maintaining health and pain, positive health, strength and endurance and agility) and extrinsic motivation (Challenge, social recognition, affiliation, competition, health pressure, weight management and appearance). EMI-2 had been translated into Indonesian and tested for validity and reliability on College of Health Sciences (*Sekolah Tinggi Ilmu Kesehatan* or *STIKES)* Muhammadiyah Samarinda students .[18] The results of the validity test was used by product moment correlation and it was found that 51 question items in the questionnaire were declared valid. This was indicated by the calculated r value being greater than the r table value, 0.449 (1% significant level). The reliability test used Cronbach's alpha reliability, and it showed that the r alpha value and the calculated r value were at a very reliable reliability level.

The data obtained from the research day was then analyzed using statistical applications through univariate analysis to get an overview of the frequency distribution of the research variables, and bivariate analysis was carried out to determine the relationship between variables

using the Chi Square test. Multivariate analysis was carried out to determine the relationship between more than two variables simultaneously using the Logistic Regression test with the condition that the variables entered were variables in the bivariate analysis that had a p value <0.25. This research had been approved by the Research Ethics Commission of 'Aisyiyah Yogyakarta University No.2801/KEP-UNISA/IV/2023.

Results

Based on table 1, karakteristik responden paling banyak terdapat pada usia rentang 15-24 tahun (63,7%). Jenis kelamin lebih dari 50% didominasi oleh perempuan (77,1%). Berdasarkan pekerjaan didapatkan jumlah terbanyak pada mahasiswa (63,2%). Pendapatan paling banyak pada kategori sedang-rendah (1 juta-2 juta) yaitu 45,5%. IMT responden mayoritas pada kategori normal (46,6%). Secara motivasi responden memiliki motivasi intrinsik (54,5%). Sedangkan secara fasilitas olahraga 58,7% diantaranya tidak tersedia fasilitas olahraga di sekitar lingkungan tempat tinggal.

Table 1. The Respondent Characteristics

Variable	Frequency (n)	Percent (%)
Age		
20-24 years	242	63.7
25-34 years	108	28.4
35-44 years	25	6.6
45-54 years	2	0.5
55-59 years	3	0.8
Gender		
Male	87	22.9
Female	293	77.1
Occupation		
Lecturer	70	18.4
Staff	70	18.4
Students	240	63.2
Income		
High (≥5 million)	8	2.1
Middle (2-5 million)	94	24.7
Average – Low (1-2 million)	173	45.5
Low (≤ 1 million)	105	27.6
Body Mass Index		
Underweight (<18.5)	37	9.7
Normal (18.5-22.9)	177	46.6
Fat (23-24.9)	79	20.8
Obese I (25-29.9)	78	20.5
Obese II (≥ 30)	9	2.4
Availability of Sports Facilities		
Available	157	41.3
Not available	223	58.7
Motivation		
Extrinsic	173	45.5
Intrinsic	207	54.5
Total	380	100.0

Frequency of physical activity of respondents in table 2 showed that light physical activity was mostly light physical activity with a percentage of 47.2% with an average of METs ± SD

402.56 ± 121,140 and duration ± SD 88.67 ± 59.600 per minute per week. Meanwhile, only 10.5% of respondents had high physical activity with an average of METs ± SD 4820.48 ± 1382.898 and duration ± SD 404.38 ± 211.966.

Table 2. The Frequency of Physical Activity

Physical Activity	Frequency (n)	Percent (%)	METs Mean ± SD	Duration Mean ± SD
Not active/mild (≤ 600 METs)	181	47.2	402.56 ± 121.140	88.67 ± 59.600
Medium (600- 3000 METs)	159	41.8	1320.92 ± 607.898	208.37 ± 102.061
High (≥3000 METs)	40	10.5	4820.48 ± 1382.898	404.38 ± 211.966
Total	380	100.0		

Table 3 showed that the results of bivariate analysis that age, occupation, BMI, motivation, availability of sports facilities had a relationship with physical activity because the p value was <0.05 and was tested in multivariate analysis.

Table 3. The Bivariate Analysis Results

Variable	Physical Activity						Total	*P Value*
	Not active		Medium		High			
	n	%	n	%	n	%		
Age								0.000
20-24 years	106	27.9	115	30.3	21	5.5	242	
25-34 years	61	16.1	39	10.3	8	2.1	108	
35-44 years	10	2.6	5	1.3	10	2.6	25	
45-54 years	2	0.5	0	0.0	0	0.0	2	
55-59 years	2	0.5	0	0.0	1	0.3	3	
Occupation								0.027
Lecturer	37	9.7	22	5.8	11	2.9	70	
Staff	40	10.5	22	5.8	8	2.1	70	
Students	104	27.4	115	30.3	21	5.5	240	
Body Mass Index								0.000
Underweight <18,5	19	5.0	15	3.9	3	0.8	37	
Normal 18,5-22,9	54	14.2	102	26.8	21	5.5	177	
Fat 23-24,9	31	8.2	34	8.9	14	3.7	79	
Obese I 25-29,9	68	17.9	8	2.1	2	0.5	78	
Obese II ≥ 30	9	2.4	0	0.0	0	0.0	9	
Motivation								0.000
Extrinsic	10	2.6	124	32.6	39	10.3	173	
Intrinsic	171	45.0	35	9.2	1	0.3	207	
Availability of Sports Facilities								0.002
Available	58	15.3	79	20.8	20	5.3	157	
Not available	123	32.4	80	21.1	20	5.3	223	

Based on Table 4, the results of the multivariate analysis showed that BMI, Motivation, Age had an influence on physical activity. Respondents with normal BMI were the productive age 1,815 times (95% CI : 0,166 – 13,840), it was higher to show good physical activity behavior, then the productive age group who had intrinsic motivation or that came from within themselves had an influence 0,073 times (95% CI : 0,009 – 0,613) on good physical activity behavior, while

productive age had an effect of 620 million times (95% CI : 0,000 – 37736867876,050) higher levels showed better physical activity behavior compared to other age groups.

Table 4. The Multinomial Logistic Regression Test Analysis Results

Variable	Odds Ratio	95% CI	*P*
Body Mass Index	1.815	0.166 – 13.340	0.000
Motivation	0.073	0.009 – 0.613	0.000
Age	620789422.579	0.000 – 37736867876.050	0.005
Occupation	1.812	0.004 – 168.533	0.337
Sports Facilities	0.808	0.365 – 1.790	0.871

Discussion

An individual's activities were influenced by several factors, one of which was age. Age had a transition period from adolescence to adulthood with an age range of 18 – 25 years which was categorized as productive age.[19] Factors that influenced the high prevalence of physical inactivity in the 18-25 years age group were the academic or career demands. In this age range, they had busy productivity schedules such as lecture hours or work hours from morning to evening, so they thought they did not have free time to do physical activity.[20] Other research suggested that as many as 50% of young adults did not engage in physical activity according to WHO standards. Meanwhile, in late adulthood, there was a high level of physical activity and in accordance with WHO standards, meaning that the older a person got, the more they maintained their health so that the physical activity they did will be more intense.[21] However, research in England at Oxford University showed that age did not affect physical activity because there was an insignificant peak in total activity in the age groups 20 - 30 years and 50 - 60 years.[22]

Work had an influence on reducing the level of physical activity, work that required staying still in place, such as university employees who spent their time sitting in front of a computer screen for long periods of time, had an impact on an unhealthy lifestyle because employees were more likely to be in a static position than for move. A study conducted at a Bulgarian university, the majority of employees spend a lot of time sitting (87%).[23] Research regarding the evaluation of physical activity levels among university employees in the United Kingdom employees tended to be in static positions because they only had one space to move due to work demands which of course triggered a decrease in physical activity levels in contrast to academic staff who still engaged in physical activity because they had space different when teaching so that they had a dynamic position.[24] Other research conducted at the Muhammadiyah University of Yogyakarta showed that the decline in physical activity levels in lecturers was caused by busy teaching schedules, resulting in feelings of fatigue and laziness in doing physical activity.[25]

Low levels of physical activity caused the increased levels of protein in the blood which was related to low fat burning in the body and causes high rates of obesity.[26] Based on the research results, it was found that obese BMIs have a high prevalence of physical inactivity. This was because someone who had an obese BMI experiences physical limitations such as getting tired easily, having difficulty breathing or feeling uncomfortable when moving around a lot. In contrast to someone with a normal BMI who had good physical fitness and a balance between fat and muscle in their body. This allowed them to perform physical activities more easily without experiencing limitations or discomfort.[27]

Motivation influenced the level of physical activity. Semakin tinggi motivasi yang berasal dari diri sendiri akan meningkatkan keinginan untuk memiliki perilaku aktivitas fisik yang lebih baik.[11] However, research in Spain at one university stated that students who had intrinsic motivation tended to have low levels of physical activity due to busy lectures and perceived lack of time for physical activity.[28] Other research showed that friend support and social support were related to physical activity. One extrinsic motivation came from friends and social support. Having support from friends and social support was 2 times more likely to be physically active compared to not having support from friends and social support.[29] Research at Malaysia universities stated that environmental factors played an important role in motivation for physical activity, such as sports facilities (38%) and motivation from friends (34%) had a large influence in increasing physical activity.[30]

The availability of sports facilities had an important role in physical activity. In this study, it was found that respondents who did not have sports facilities had a higher prevalence of being physically inactive compared to respondents who had sports facilities. The availability of sports facilities had an important role in encouraging physical activity levels. A study in China in a systematic review showed that restrictions on space and facilities were one of the main obstacles for students in exercising. Many students preferred free playgrounds or sports centers on campus, but these facilities are inadequate.[10] Living in an environment with good road access really helped to increase physical activity through walking, the presence of green spaces such as parks or other open areas were an alternative to increase overall physical activity.[29] The availability of sports facilities increased physical activity levels and supports a healthy lifestyle throughout the year.[31] In contrast, a research conducted in Japan found that there was no significant change in the number of people who met moderate to high physical activity guidelines. The availability of sports facilities did not always have a significant impact on physical activity participation, other factors such as facility accessibility, environment, and individual motivation also influenced physical activity participation.[32]

Conclusion

Based on the research results, it was concluded that the prevalence of physical inactivity in productive age at 'Aisyiyah University Yogyakarta was still relatively high and the factors that influenced physical activity behavior were age, occupation, BMI, motivation and availability of sports facilities. Based on these results, universities created policies regarding healthy campus programs or regulations such as Health Promotion University which aimed to create a learning environment and organizational culture that improved health for the entire campus community, as well as promote campaigns such as "Move Day" which aimed to achieve a healthy lifestyle. It was more active for students and the academic community if it was held twice a week.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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THE CORRELATION OF BODY MASS INDEX, SOCIO-ECONOMIC STATUS, AND MOTIVATION WITH PHYSICAL ACTIVITY AT PRODUCTIVE AGE AT 'AISYIYAH YOGYAKARTA UNIVERSITY

ORIGINALITY REPORT

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