Relationship between Physical Activity and Eating Patterns Toward Body Mass Index (BMI) in Nursing Students

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Abstract: Physical activity and eating patterns affect human health. Lack of physical activity and wrong eating patterns will increase BMI, leading to obesity and other diseases. The study aims to determine the relationship between physical activity and eating patterns toward body mass index (BMI) in nursing students. The design of the study was an observational cross-sectional study. The selection of a total of 98 respondents used the technique of a simple random sample collected with the International Physical Activity Questionnaire (IPAQ) for physical activity, eating patterns questionnaire, and measurement of BMI with digital weight scales and height meters. The statistical test used was Spearman's rank correlation. The results of this study indicated a relationship between physical activity, eating patterns and BMI, with a p-value of 0.004 and 0.003, respectively. To conclude, students had a significant relationship between physical activity and eating patterns on BMI. The nursing curriculum should emphasize the importance and benefits of physical activity and eating habits.

Keywords: physical activity; eating pattern; body mass index; nursing students

INTRODUCTION

Physical activity can be defined as any movement in the body by skeletal muscles that requires power and energy.[1] Regular physical activity positively affects humans, including reducing anxiety and stress. For this reason, physical activity is very significant in humans.[2] In addition to having the benefits of physical activity, it also has a negative impact. Physical inactivity is the fourth leading cause of death globally, responsible for 6-10% of major non-communicable diseases.[3]

A sedentary lifestyle is also known as physical inactivities, such as watching television, reading, working with computers, cell phones, etc.[4] The data showed that the behavior of less active physical activity at the age of 10 in Indonesia reaches 26.1%, while in the Special Region of Yogyakarta, it reaches 20.8%.[5] A person's physical activity will affect muscle strength and weight. Therefore people who often do physical activity are better at physical fitness than people who rarely or do not. Someone with excellent and regular physical activity usually has a standard range of weight values.[6] Measuring height and weight is the index most often used in evaluating the nutritional status of the community. The most common metric for measuring obesity is body mass index (BMI), a valuable surrogate for adiposity and obesity.[7-9]

Physical activity and BMI are factors that support the balance of the body. The previous research showed that among 107 respondents aged 18-22, the dominant category of physical activity was 41 (38.3%), and the dominant BMI in the overweight category was 27 (25.2%). The study also found a relationship between the body's dynamic balance and gender, with an unbalanced result in women by 29.9% and a balanced one in men by 32.7%.[10]

Numerous epidemiological factors, such as eating habits, physical activity, alcohol use, stress, and family history of chronic health issues like obesity, diabetes, hypertension, diet, and others, have been identified as potential causes of increasing body weight.[11] Diet influences the quality of human life, especially in the modern era, where many types of food are not necessarily healthy. Diet is associated with the quantity

and quality of a meal. The improper diet is one of the risk factors that increase disease, and excessive fat intake causes fat levels in the body to increase, causing weight gain. Eating irregularities such as poor eating habits and irregular and hasty schedules can cause problems in the body.[12]

A study explained that more than half of the participants (65.3%) stated they consumed processed foods daily or more than once daily. According to the survey, 89.3% agreed or strongly agreed that consuming processed meals was terrible. These results showed that many students understand that processed meals are unhealthy. They regularly consume vast amounts as they value comfort and flavor over anything else.[13] According to the previous study, most students ate fast food regularly. The findings could be attributed to nursing students spending more time in the nursing faculty receiving theory and practical courses, so they prefer fast food to save time. On the other hand, students believed that unhealthy fast food was less expensive than preparing a healthy meal at home.[14–16]

As a result, nursing students constitute a significant segment of the population, and their health is linked to societal advancement. They also play an essential role in promoting community health and, despite contradictory research findings, a regional difference in lifestyle. Furthermore, there is inconsistency in the nature and magnitude of the relationship between physical activity and eating habits toward BMI among nursing students. Due to the scarcity of studies on the relationship between physical activity and eating patterns toward BMI, the current study aims to investigate the relationship between physical activity and eating patterns toward BMI in nursing students.

MATERIAL AND METHOD

The study was a cross-sectional study conducted at the Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta. The sample size was 98 students calculated using $n = N/1 + N(D)^2$. The participants were selected by simple random sampling from the official list of 4th-year nursing students. Only students who are domiciled or are currently in Yogyakarta were included in this study. Furthermore, students diagnosed with renal disease, endocrine disease, or chronic illness were excluded.

The data collected in this study used a questionnaire through Google Forms distributed to all respondents. The following demographic factors were evaluated: gender (male or female), age, amount of physical activity, eating habits, and BMI. The data were analyzed using the Spearman Rank test to assess the association between variables. A *P* value of .05 or less was considered statistically significant. The Ethical Commission of the Faculty of Medicine and Health Sciences at Universitas Muhammadiyah Yogyakarta approved this study with the approval number 051/EC-KEPK FKIK UMY/II/2021.

Physical Activity Level

The short form of the International Physical Activity Questionnaire (IPAQ) was used to gauge the degree of physical activity. The IPAQ was developed by WHO, 1998 and has been validated and advised as an effective technique to quantify physical activity. Participants listed their weekly strenuous, moderate, and walking physical activity frequency and duration. Walking has a metabolic equivalent of task (MET) of 3.3, moderate activity has a MET of 4.0, and intense activity has a MET of 8.0. The participant may have a high, moderate, or low degree of physical activity. The reliability test result for the validated IPAQ questionnaire showed a score of 0.33 (95% CI=0.26-0.39) and a score of 0.33 (95% CI=0.26-0.39).

Eating pattern

This study utilized a diet questionnaire by Purnamawati, 2014 that consisted of the type of food and the frequency consumed daily for seven days. This questionnaire has seven questions: staple foods, animal side dishes, vegetable side dishes, vegetables, fruits, drinks, and snacks. The answer includes three times a day, two times a day and once a day. The validation results showed a score of 1.00, and a reliability score indicated the number 0.89. The maximum number of scores is 21, classified into frequent = 76%-100%, average = 53-75% and rarely = <55%.

BMI

Each participant's height and weight were noted to calculate their BMI. Weight and height information were used to compute the BMI, measured in kilograms per square meter (kg/m²). An EB 9350 Personal Scale digital weight and height scale was used for the measurement (GEA Medical Co., Ltd). The Indonesian Ministry of Health reported that cut-off points were used to categorize the prevalence of underweight (18.5), normal (18.5-25.0), and overweight (>25.0) conditions.

RESULT

The study aimed to determine the relationship between physical activity and eating patterns toward BMI in nursing students. Ninety-eight nursing students at the Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta, have participated. The characteristics of respondents by gender and age were primarily women, with a total of 73 people (74.5%), and the majority was in the age category of 20-21 years, with a total of 57 people (58.2%) (Table 1).

Table 1. Subject Characteristics

Characteristics	Total	Percentage (%)
Gender		
Male	25	25.5
Female	73	74.5
Age (years)		
20-21	57	58.2
22-23	41	41.8

The majority of physical activities carried out by nursing students were moderate physical activity, with a frequency of 65 people (66.3%); fulfilling their diet is rare, with a frequency of 46 people (46.9%), and the BMI of students is Normal (18.5-25.0) with a frequency of 81 people (82.2%) (Table 2).

Table 2. Physical Activity, Eating pattern, and BMI

Characteristics	Total	Percentage (%)
Physical Activity		
Low	30	30.6
Moderate	65	66.3
High	3	3.1
Eating pattern		
Rare	46	46.9
Moderate	45	45.9
Frequent	7	7.1
BMI		
Underweight	3	3.1
Normal	81	82.2
Overweight	14	14.3

The significance value was 0.004 (p <0.05), indicating a significant relationship exists between physical activity and BMI (Table 3). It also demonstrated that the correlation coefficient was -0.229, indicating that the relationship's strength level was sufficient, with the direction of the relationship being negative, where the lower the physical activity is, the higher the BMI will be.

Furthermore, the data showed that the value was 0.003 (p <0.05), indicating that there was a significant relationship between diet and BMI (Table 3). It also displayed a correlation coefficient of 0.282, indicating that the level of the strength of the relationship was extreme, with the direction of the relationship being positive, where the higher the diet is, the higher the BMI will be.

Table 3. Spearman's Rank Test of Physical Activity, Eating Pattern, and BMI

Characteristics	P Value	R
Physical Activity - BMI	0.004	- 0.229
Eating Pattern - BMI	0.003	0.282

DISCUSSION

Physical Activity

The result showed that most of the respondents carried out physical activity in the moderate range. In moderate physical activity, many respondents carried out activities for 15 to 30 minutes, ranging from 6-7 days. The short version of the IPAQ questionnaire was filled out based on seven consecutive days of activity. The respondents' physical activity was categorized into light, moderate, and walking.[17]

The previous study showed that the activities carried out by students on campus were in the form of student activities and lectures, which could take up free time and affect the level of student physical activity. Students' physical activity level is also influenced by differences in curriculum and the number of class schedules applied by each class and faculty. The results of the age factor found that it did not have a significant influence as the behavior of physical activity carried out by students was shallow depending on previous habits.[18] Another study explained differences in the final results of physical activity in each faculty, where students from the Faculty of Health Sciences had lower activity levels than students from the Faculty of Physical Education and Sports. Physical activity can significantly benefit students, including health and fitness, prolonging life, and others. For this reason, encouragement and motivation are needed so that students tend to carry out routine activities, especially in the current pandemic era, to maintain health.[19]

Similar impediments to physical exercise and a lack of excitement to improve physical activity are reported by nursing students in other studies. Due to a lack of time, university obligations, the time of year, and financial constraints, they do not routinely engage in physical activity. Universities and clinical settings should think more about providing facilities like football fields, exercise centers, and other amenities to encourage students to be physically active. It was proposed to give physical activity surroundings from which the pupils may profit readily to improve their health conditions and encourage people to exercise regularly.[20,21]

Eating pattern

The research showed 46 nursing students had a rare eating pattern (46.9%). Observable eating patterns include eating frequency, meal times and consumption levels. A lack of consumption of staple foods, vegetables, vegetable side dishes and fruits causes irregular eating patterns among university students.

This study follows the previous research showing that nutritional problems in students and college students will negatively impact decreasing learning concentration. It can cause a decrease in physical fitness, dietary problems, and the emergence of other diseases that can endanger health[22]. Another study revealed that most nursing students did not have good eating habits despite being highly educated. Nursing students might benefit from educational programs raising their awareness of nutritious foods and good eating practices.[14]

This present study is supported by other research revealing that 52 respondents (54.7%) of students had a rare or poor eating pattern, and 50 experienced gastritis. The study's results also demonstrated that the respondent had a frequency of eating <2 times a day.[23] According to the Indonesian Ministry of Health, the frequency of eating can be good if daily eating habits include three times the main meals or two times the main meals with a one-time interlude. Based on the eating recommendations, consuming 400 grams of vegetables and fruit daily is necessary.[1]

BMI

BMI is commonly used to measure and determine obesity or weight. This BMI measurement only requires two aspects, namely height and weight.[24] Table 2 shows 81 (82.2%) nursing student respondents had a normal BMI. It is in line with the previous research demonstrating that the BMI of students tends to be normal and leads to thinness caused by lifestyle. Students were also found not to pay attention to balancing a good diet with physical activity.[25]

However, the present study revealed that 14 (14.3%) nursing student respondents were overweight. According to earlier research, 19.8% of nursing students were overweight or obese, with female students being more fat than male students.[26] Weight and BMI are closely related to age, where as you age, the

metabolism in the body decreases, which occurs biologically. With increasing age and less active movement, the muscle mass in the body tends to decrease, which causes a delay in the calorie-burning rate.[27]

Relationship between Physical Activity and BMI

The present study demonstrated that physical activity and BMI among nursing students had a significant link. The findings of this study are consistent with other research revealing a substantial correlation between an individual's BMI and how active they are. It is proven by the frequency of BMI that fewer people are likely to be obese with moderate physical activity than those who rarely do activities. It is because everybody's movement requires energy expenditure.[28] The presence of physical activity will prevent an unbalanced increase in BMI. This study's results also align with previous research that explained a significant relationship between physical activity and BMI, where someone less active in activities has the opportunity to gain weight compared to someone who has functional physical activity and good exercise habits.[29]

Lifestyle modifiers such as lack of physical activity, eating out, and excessive intake of high-fat, calorie-dense foods are primarily responsible for the increased global prevalence of increased BMI and obesity.[30] A high BMI is caused due to lack of balance between energy intake and output. Increasing physical activity such as cycling, sweeping, walking, and other activities can reduce the risk of obesity and increase BMI.[31]

Physical education courses are not given as part of the nursing program; they are available as part of undergraduate courses, but enrollment is not required. Despite the institution providing students with free access to sports facilities, no students use them. It is important to remember that nursing students are future health advocates whose "physical activity" may damage the validity of the information they will communicate.[32]

Relationship between Eating pattern and BMI

The present study showed that a significant relationship exists between diet and BMI. The surrounding environment strongly influences diet. Teenagers and students prefer salty foods containing sodium and foods with high fat but low vitamin and mineral content, such as fast food and snacks. Snacks are usually high in sodium, energy-dense, and fat.[22] The relationship between diet and BMI can be caused by several factors, including food consumption habits, knowledge, peers, social media, and family eating habits.[33] Therefore, it is necessary to monitor diet so that BMI remains normal.

The results of this study followed the previous research that showed a meaningful connection between diet and BMI, where excessive eating patterns in students cause weight gain.[11] However, the present study contrasts with a prior study, revealing no link between eating habits and BMI among nursing students.[14] It might be due to a rise in the percentage of teenagers who follow suggested dietary and physical activity guidelines and a rise in the knowledge of the significance of weight control among nursing students.

However, the study has some limitations. The cross-sectional methodology of the study limited the inferences of causation, while the degree to which the results could be extrapolated was restrained. Additionally, as this study was based on a questionnaire and self-report, the bias of the results cannot be ignored. Furthermore, as the current study was conducted in a single location with just nursing students at a non-governmental university, it is unclear how the results apply to other health disciplines in other contexts. As a result, more research involving students from various disciplines is required.

CONCLUSION

There was a significant relationship between physical activity and diet on BMI in nursing students with a negative relationship, indicating that the lower the physical activity is, the higher the BMI will be. Meanwhile, the relationship between diet and BMI strongly correlated with a positive relationship, indicating that the higher the diet is, the higher the BMI value will be. Medical curricula emphasize the importance and benefits of physical activity and eating habits. Future research must examine the determinant factors between physical activity, eating patterns, and BMI with a large sample from other areas.

CONFLICT OF INTEREST

No conflict of interest.

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