

Recognition of Physical Activity between Physical Therapy and Non-Physical Therapy Students: Cross-Sectional Survey

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Purpose: This study was to investigate recognition of physical activity between physical therapy students (PTS) and non-physical therapy students (NPTS) by measuring the level of physical activity using International Physical Activity Questionnaires (IPAQ).

Methods: A cross-sectional survey was completed by 191 university students. The IPAQ with an additional question (Is physical activity necessary for your future job?) was used to evaluate the recognition and the amount of physical activity. The collected data were calculated as MET-minutes scores and were classified as walking, moderate, and vigorous level of physical activity. The students were analyzed by dividing them into those who had a part-time employment (16 PTS and 12 NPTS) and those who did not have a part-time employment (80 PTS and 83 NPTS).

Results: In students with a part-time employment, no significances were observed between the PTS and NPTS, in terms of MET, frequency and time of physical activity, and sitting time ($p > 0.05$). In students without a part-time employment, the NPTS was significantly higher than the PTS for the MET and frequency of physical activity in a vigorous level ($p < 0.05$), and there were no significant differences in other levels of physical activity ($p > 0.05$). In the additional question, the PTS showed a slightly higher than the NPTS ($p < 0.05$).

Conclusion: The physical therapy students did not remarkable barrier to recognition of physical activity, but there was a difference in their recognition of the vigorous level of physical activity. Therefore, the understanding of physical activity for PTS would play an important role in the recognition of how physical activity can be promoted.

Keywords: Physical activity, IPAQ, Cross-sectional survey, Physical therapy students

INTRODUCTION

Physical activity is defined as bodily movements that increase energy expenditure by contracting skeletal muscles.¹ This is one of the critical energy consumption factors for maintaining energy balance. According to the World Health Organization (WHO), a lack of physical activity is the 4th highest risk factor for mortality worldwide.² Increased physical activity is a major factor in preventing adult diseases.³ Any physical activity in leisure time rather than a sedentary lifestyle provides significant health benefits.^{4,5}

Recently, there has been a lack of exercise because of sedentary lifestyles. In a domestic statistical survey between 2014 and 2019, the physical activity decreased by 10.7%, and the sedentary time increased by 0.8 hours.^{6,7} In addition, the Ministry of Health and Welfare of Korea reported that the proportion of the increase in the total, male and female adults with BMI =

25 kg/m² increased by 3.7%, 5%, and 2.2%, respectively, over the past four years,⁶ showing an increasing trend of metabolic syndrome, which accelerates geriatric diseases and physical deterioration.¹

College students are in early adulthood, which is the healthiest period in their life cycle according to the measured mortality and morbidity,⁸ a critical period for establishing healthy lifestyles to prevent adult diseases and promote health in middle age.⁹ In addition, the possibility of lifestyle modification is high because the lifestyle in college students has not been established with respect to the health promotion habits compared to adults.¹⁰ An early-established healthy lifestyle in adulthood is continued until middle age, which is effective in preventing cardiovascular diseases and other adult diseases.¹⁰ On the other hand, college students have low physical activity and health because of their irregular lifestyles.¹¹

Physical therapy is concerned with developing and maintaining move-

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ment and functional abilities as much as possible throughout life and identifies and maximizes the movement possibilities within the areas of promotion, prevention, treatment, and rehabilitation. This includes both the process of evaluating the movement potential and establishing the treatment goals using the therapist's specialized knowledge and skills.¹² Physical therapists have the knowledge and capabilities to inspire physical activity. They are positioned as a job group that can inspire patients and the public to undergo physical activity through clinical counseling and treatment.¹³ Physical therapy students learn the competency, recognition, and knowledge of physical activity related to health management compared to students of other majors. In addition, according to recognition of physical activity, physical therapy students are believed to have adequate knowledge and skills to undertake a role in physical activity promotion and their practice setting is deemed a feasible avenue for promoting an active lifestyle. Therefore, physical therapy students are exposed to an environment where they can be interested in performing physical activities and can have a high level of recognition of physical activity compared to other majors.

The International Physical Activity Questionnaires (IPAQ) measure physical activity in various situations, languages, and cultures. The questionnaire asks about the level of physical activity over the past week and has high reliability and validity.¹⁴ On the other hand, few studies used IPAQ to examine the level of physical activity recognition compared to physical therapy students and other students. Therefore, this study examined the recognition of physical activity between physical therapy and non-physical therapy students by measuring the level of physical activity using IPAQ.

METHODS

1. Subjects

Two hundred university students from D University located in Cheonan participated in this study, and 9 were dropped out. One hundred ninety-one students were divided into a physical therapy student group (PTS, $n = 96$) and a non-physical therapy student group (NPTS, $n = 95$). All subjects were given an overview of the study purpose and the procedures involved, and they provided written consent to participate. Ethical approval was obtained from the local university research ethics committee.

2. Measurement

1) Korean version of IPAQ

The IPAQ assesses all physical activities performed in a comprehensive range and evaluates the number of days of walking, moderate-intensity, and vigorous-intensity physical activity over the past week. Information on frequency (measured in days per week) and duration (time per day) are collected.¹⁵ The items were structured to provide separate scores on walking, moderate-intensity, and vigorous-intensity activity, as well as a combined total score to describe the overall level of activity. The total score was calculated as the sum of the duration (minutes) and frequency (days) of walking, moderate-intensity, and vigorous-intensity activities. Another measure of activity was calculated by weighting each activity type according to its energy requirements, as defined in METs (MET is a multiple of the resting metabolic rate), yielding a score in MET-minutes. The MET value is based on the MET score for each activity type reported in the IPAQ reliability study conducted in 2000-2001 and previous studies. The average MET score was obtained.¹⁶ The IPAQ scoring method is presented through guidelines divided into three categories.

a. Inactive (Category 1)

This is the lowest level of physical activity. Individuals who do not meet the criteria for Categories 2 or 3 are considered 'insufficiently active'.

b. Minimally Active (Category 2)

The minimum pattern of activity to be classified as "sufficiently active" is any one of the following three criteria.

- (1) Three or more days of vigorous activity of at least 20 minutes per day, or
- (2) Five or more days of moderate-intensity activity or walking of at least 30 minutes per day, or
- (3) Five or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum of at least 600 MET-min/week.

c. Health-enhancing physical activity (HEPA) Active (Category 3)

The two criteria for classification as "HEPA active" are

- (1) Vigorous-intensity activity on at least three days, achieving a minimum of at least 1,500 MET-minutes/week, or
- (2) Seven or more days of any combination of walking, moderate-intensity, or vigorous-intensity activities, achieving a minimum of at least 3,000 MET-minutes/week.

2) Metabolic Equivalent Task (MET)

The MET score (metabolic equivalent of task score) was used as one of the methods to measure the intensity of physical activity when measuring the level of physical activity based on the experience in health and health.¹⁷ Using the MET score, the physical activity could be classified as dynamic or static activity based on the energy metabolism. When sitting, the MET score is 1; 1 MET means an oxygen consumption of 2.5 mL/O²/kg*min per minute. Based on the MET score in a previous study,¹⁸ physical activity was divided into two major parts, dynamic and static, and subdivided into four subunits. A MET score of six or more means vigorous activity, and a MET score of three or more and less than six indicates moderate activity. These two activities consume a large amount of oxygen and correspond to dynamic activities. The remaining static activities with a score of less than three are sedentary activities. Activities other than sedentary activities with a score of less than three are classified as light activities.¹⁹

3) MET calculation

The data collected in this study were calculated as the MET-minutes scores based on the conversion method to IPAQ scores. It is a value obtained by multiplying the reference MET value for each physical activity by the number of days of the corresponding activity in minutes and the corresponding activity time per day in minutes. The points to consider in scoring are as follows. All walking, moderate and vigorous physical activity must not exceed 16 hours. If walking, moderate, or vigorous physical activity is recorded as more than 240 minutes, it is calculated by adjusting it to 240. In addition, physical activity for less than 10 minutes is considered not performed. The method for calculating a MET unit for how many minutes each corresponding physical activity was performed in a week is as follows:¹⁵

- (1) Walking activity MET-min/week = $3.3 \times \text{min of activity/day} \times \text{days per week}$;
- (2) Moderate activity MET-min/week = $4.0 \times \text{min of activity/day} \times \text{days per week}$;
- (3) Vigorous activity MET-min/week = $8.0 \times \text{min of activity/day} \times \text{days per week}$;
- (4) Total amount of physical activity = walking activity MET-min/week + moderate activity MET-min/week + vigorous activity MET-min/week.

4) Additional questionnaires

The question "Is physical activity (exercise) necessary for your future job?"

was added to investigate the recognition of the necessity of physical activity, and the reason why physical activity is necessary was conducted in a multiple-choice format except for the subjective format of the 5th line. In addition, subjects were asked to write subjectively about why physical activity was unnecessary.

3. Experimental procedure

The amount of physical activity was measured using the IPAQ for 191 university students. The recommended amount of vigorous, moderate, and light activity of dynamic activity was presented through a questionnaire. This study investigated how many days each activity was performed in a week. For example, structured questions were used: 'In the past seven days, on how many days did you engage in vigorous physical activity for more than 10 minutes? (an activity that involves strenuous physical exertion or that makes breathing much more difficult than usual. For example, moving heavy luggage, basketball, soccer, hiking, biking, running, and long-distance bike riding)'; 'How many minutes on one of those days do you usually spend doing vigorous physical activity?'; 'Is physical activity (exercise) necessary for your future job?'. Based on the subjective judgment of the respondent, the time spent in the activity was recorded in a short-answer format.

The collected data were calculated as the MET-minutes scores and converted to IPAQ scores based on the conversion method. The students were analyzed by dividing them into those who had a part-time employment (16 physical therapy and 12 non-physical therapy students) and those who did not (80 physical therapy and 83 non-physical therapy students). Each group was divided into criteria corresponding to the three physical activity categories from IPAQ. In addition, this study compared the total amount of physical activity, including the MET of each activity, times per day of each activity, and the number of days of vigorous, moderate, and walking activity between physical therapy and non-physical therapy students.

4. Data analysis

The data collected in this study were encoded and analyzed using the Windows SPSS version 25.0 (IBM Co., USA) program. Descriptive statistics were performed on the general characteristics of the study subjects, such as age, gender, and major. A Kolmogorov-Smirnov test was used for the normality test among the outcome measures. The gender ratio by major, the number of students (with or without a part-time employment), the

three categories ratio of physical activity from IPAQ, and the answer to the question of 'Is physical activity exercise necessary for the future job?' were analyzed using Chi-square tests. A Mann-Whitney test was performed to compare the differences between the physical therapy and non-physical therapy students in terms of time per day, day per week, and MET of each category. A statistical significance level was set to $p < 0.05$.

RESULTS

1. General characteristics

Table 1 lists the demographic data for the two groups. The overall number of students between majors was 191: 96 for the PTS and 95 for the NPTS.

Table 1. General characteristics

Variable	Part-time Employment	Category	PTS (N=96)	NPTS (N=95)	p
Age (yr)	Yes		22.13±1.50	22.25±1.14	0.755
	No		22.40±1.73	22.48±1.80	0.946
Gender (n)	Yes	Male	4	3	1.000
		Female	12	9	
	No	Male	28	40	
		Female	52	43	
IPAQ category (%)	Yes	Inactive	5.23	4.19	0.155
		Minimally Active	3.14	1.05	
		HEPA Active	0	1.05	
	No	Inactive	21.98	18.84	
		Minimally Active	13.61	13.08	
		HEPA Active	6.28	11.51	
Additional questionnaire (n)	Yes		95	87	0.016*
	No		1	8	

Mean ± standard deviation.

PTS: Physical therapy students' group, NPTS: Non-physical therapy students' group, IPAQ: International physical activity questionnaires.

* $p < 0.05$.

The age, gender distribution, and IPAQ category were similar in the two groups ($p > 0.05$). On the other hand, there was a significant difference in an additional questionnaire ($p < 0.05$).

2. IPAQ outcomes in students with a part-time employment

Table 2 lists the calculated MET parameters in each physical activity level. The MET, frequency and time of physical activity, and sitting time were similar in the two groups ($p > 0.05$).

3. IPAQ outcomes in students without a part-time employment

Table 3 lists the calculated MET parameters in each physical activity level. In the Vigorous level, the MET and frequency of physical activity was sig-

Table 2. Comparison of physical activity in students with a part-time employment between PTS and NPTS

	Levels	PTS (n=16)	NPTS (n=12)	p
MET (MET-min/week)	Walking	582.65±382.89	1,189.93±2,606.75	0.209
	Moderate	156.25±358.68	266.67±577.22	0.979
	Vigorous	635.00±1,311.76	3,140.00±7,131.24	0.713
	Total	1,373.91±1,862.95	4,596.59±8,990.95	0.444
Frequency (days per week)	Walking	4.19±2.20	4.42±2.75	0.654
	Moderate	0.88±1.20	0.92±1.56	0.731
	Vigorous	1.25±1.13	1.83±2.66	0.804
Time (minutes per day)	Walking	48.44±53.91	45.92±69.81	0.203
	Moderate	16.56±30.26	20.83±34.23	0.937
	Vigorous	32.19±59.78	57.08±99.51	0.556
Sitting time (minutes per day)	Total	21.31±30.62	25.25±35.25	0.870

Mean ± standard deviation.

PTS: Physical therapy students' group, NPTS: Non-physical therapy students' group.

Table 3. Comparison of physical activity in students without a part-time employment between PTS and NPTS

	Levels	PTS (n=80)	NPTS (n=83)	p
MET (MET-min/week)	Walking	846.66±1431.11	749.26±1001.51	0.910
	Moderate	340.75±492.81	472.82±687.79	0.105
	Vigorous	593.00±1,018.21	1,133.69±1,631.52	0.017*
	Total	1,780.41±1,955.29	2,355.77±2,577.34	0.146
Frequency (days per week)	Walking	4.58±2.07	4.64±2.11	0.780
	Moderate	1.88±1.86	2.37±2.09	0.129
	Vigorous	1.43±1.91	2.34±2.29	0.009*
Time (minutes per day)	Walking	45.44±44.42	40.54±38.67	0.456
	Moderate	27.15±33.88	33.51±34.07	0.132
	Vigorous	26.55±36.11	34.06±38.39	0.096
Sitting time (minutes per day)	Total	39.86±112.94	36.19±68.27	0.219

Mean ± standard deviation.

PTS: Physical therapy students' group, NPTS: Non-physical therapy students' group.

*p < 0.05.

nificantly higher in the NPTS than the PTS ($p < 0.05$), but other levels were similar in the two groups ($p > 0.05$). Furthermore, the physical activity and sitting times were similar in the two groups ($p > 0.05$).

4. Additional questionnaires for the necessity of physical activity

In the PTS, out of 95 students who answered 'Yes', 79 students answered that self-management is necessary for work. Thirteen students answered that knowledge and experience gained through physical activity (exercise) are necessary for future jobs. Two students answered that physical activity is needed to increase the competitiveness over others (e.g., salary, promotion, and incentive), and one student answered that a healthy body shape is helpful for managing the health of others.

In the NPTS, out of 87 students who answered 'Yes', 75 students answered that self-management is necessary for work. Eight students answered that the knowledge and experience gained through physical activity (exercise) are necessary for future employment. Four students who answered 'To increase competitiveness over others (e.g., salary, promotion, and incentive)'.

As to the reason why physical activity is not required for future employment, one student in the PTS answered, 'As the concept of physical space becomes meaningless according to the era of Untact (a new word meaning non-face-to-face), the meaning of the physical activity will also decrease'. In the NPTS, four students answered, 'I am currently healthy and do not need to exercise', and two students answered, 'I do not need to perform physical activity because there are many jobs that use computers'. Two students answered, 'I think I will spend more time sitting'.

DISCUSSION

The IPAQ, which measures the level of physical activity over the past week, was used to assess the recognition of physical activity between physical therapy and non-physical therapy students. The results showed no significant differences in MET, frequency and time of physical activity, and the sitting time between PTS and NPTS students with part-time employment. A previous study examined the relationship between employment and physical activity.²⁰ Employment is positively associated with the activity levels, and the job type is a strong predictor of the daily activity levels in both genders. Therefore, the lack of a difference in recognition of physical activity among students with part-time employment is not surprising.

On the other hand, in the students without part-time employment, the NPTS was significantly higher than the PTS for the MET and frequency at the vigorous level of physical activity. A survey of physiotherapists in Ireland reported that only 51% of participants could state the current physical activity guidelines accurately.²¹ In addition, previous research found that only 16% of physical therapists were aware of the physical activity guidelines, while 62% were inactive.²² The explanations included a lack of time, a lack of belief in the effectiveness of short-term interventions, a lack of perceived knowledge, and the patient's sense of unacceptability.²² This highlights some knowledge gaps on the physical activity guidelines for health among many physical therapy students that need to be addressed. No studies have been examined the knowledge of physical activity guidelines among Korean physical therapy students. Another factor is that physical therapy education emphasizes theory rather than practice on the job.²³ This education is widely acknowledged as a significant barrier to

healthcare professionals properly promoting it.²⁴ Hence, physical therapy students are inactive are because of a large amount of learning and insufficient time. In vigorous physical activity and days per week, the PTS was $593.00 \pm 1,018$.²¹ MET-min/week and 1.43 ± 1.91 days, which was significantly lower than the NPTS mean of $1,133.69 \pm 1,631.52$ MET-min/week and 2.34 ± 2.29 days. It was found that there was a significant difference in the vigorous physical activity compared to the NPTS. A survey of university students in Korea reported that natural science students had the highest physical activity according to major and greater physical activity levels than humanities, social sciences, business, and medicine students.²⁵ This result supports the findings that physiotherapy students have lower physical activity levels because the curriculum in physical therapy is similar to that in medicine. In addition, physical therapy students tend to avoid vigorous activity and high-intensity exercises that have been shown to overload and adversely affect the joints of the body.^{12,26} Therefore, they choose low- or moderate-intensity exercises instead of high-intensity exercises.

In response to the question "Is physical activity required in the future?", the PTS showed a slightly more favorable attitude than the NPTS. Physical therapists are involved in the primary prevention of non-communicable diseases and are also involved in risk reduction for these diseases. These professionals are also more likely than other health personnel to be approached about physical fitness, physical activity, and exercise. The present results showed that physical therapy students have good knowledge of physical activity promotion messages and believe promoting physical activity is feasible for them. Physical activity-related subjects comprise a substantial part of the physical therapy curriculum. Physical therapy students are expected to learn the benefits of physical activity by completing courses that include specific knowledge related to physical activity, such as exercise therapy, therapeutic interventions, and exercise prescription.²³ A previous study reported that physical therapy students had higher satisfaction with the physical therapy profession and a positive job recognition of physical therapy.²⁷ Therefore, most students believe that physiotherapists should be physically active as role models to their patients, indicating that they are aware of the need to remain healthy and 'practice what they preach'. This means that physical therapy students are fully aware of the need for physical activity in the future. In addition, most of the students, regardless of their major, answered that they needed self-management to work. The benefits of physical activity are well known and well publicized. Generally, participation in any type or amount of physical activity can provide important health benefits compared to a sedentary lifestyle. Physically active exercise reduces the all-cause mortality risk significantly com-

pared to insufficient activity²⁸ and has also been shown to improve mental wellbeing by establishing emotional stability.²⁹ During the past few years, there has been growing interest in the necessity of physical activity by increasing information on health issues. These results are believed to result from many students feeling that behavioral changes for a healthy lifestyle are necessary to find employment in the future.

Overall, the physical therapy students in the present study recognized the need for physical activity, but there was a difference in their recognition of the vigorous levels of physical activity. Hence, it can be argued that a lack of knowledge and information on the intensity of exercise that could confer health benefits, rather than a lack of time, or lack of interest, could restrict them from vigorous physical activity. In addition, the physical activity guidelines are insufficiently taught in undergraduate physical therapy curricula, and there is a lack of knowledge among physical therapy students. Therefore, developing physical activity guidelines for physical therapy students would play an important role in recognizing how physical activity can be promoted. This study had several limitations. First, only one university participated, and the number of participants was small. Second, this study did not include a homogeneous assessment of the students with part-time employment due to lack of HEPA activity. Third, the student's academic environment was not considered. Therefore, further study is needed to compensate for these limitations.

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