



Research Article

Physical Activity, Sedentary Behavior, and Fitness Levels in University Students

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ABSTRACT

Background: Physical fitness is crucial for university students as it supports productivity and helps prevent disease. It largely depends on levels of physical activity and sedentary behavior. However, the current student lifestyle relies heavily on technology, resulting in reduced physical activity and increased sedentary behavior. This study aims to investigate the physical activity, sedentary behavior, lifestyle, and physical fitness of university students.

Method: This cross-sectional study was conducted using purposive sampling on active students of UIN Syarif Hidayatullah Jakarta from the 2020-2022 batch.

Results: The findings showed that half of the students (51.6%) had low (normal) sedentary behavior, while a substantial proportion (45.1%) had moderate sedentary levels. Additionally, 32.9% of students were classified as having poor physical fitness, and most students (57.3%) reported low levels of physical activity.

Conclusion: A higher proportion of students demonstrated poor physical fitness, moderate levels of sedentary behavior, and low levels of physical activity. These findings highlight the importance of improving physical fitness through regular exercise and reducing sedentary behavior, particularly non-essential smartphone use. In addition, the university should consider developing and implementing policies that encourage greater physical activity among students, helping them achieve optimal fitness to better support their daily activities.

Keywords: Physical fitness; Physical activity; Sedentary behavior; Lifestyle; Students

INTRODUCTION

One of the major health concerns today is low physical fitness, which increases the likelihood of developing chronic diseases.¹ Physical fitness refers to an individual's ability to carry out daily activities with sufficient energy without experiencing excessive fatigue. It enables individuals to enjoy leisure time and still have the energy to perform additional tasks.² Efforts to maintain physical fitness are therefore crucial, particularly in preventing the risk of non-communicable chronic diseases.³ Physical activity plays a central role in improving physical fitness. A decline in physical activity, often associated with a sedentary lifestyle, negatively affects cardiovascular fitness.⁴ However, technological advancements have had consequences, one of which is the reduction of physical activity among individuals, ultimately fostering sedentary behavior.⁵ Lower levels of physical activity are associated with reduced physical fitness and an increased risk of obesity among college students.⁶

A sedentary lifestyle is characterized by insufficient physical activity and is often associated with inactivity or lack of motivation.⁷ In Indonesia, the prevalence of sedentary behavior increased from 26.1% in 2013 to 33.5% in 2018.⁸ Previous studies have shown a significant negative relationship between sedentary lifestyle and physical fitness, indicating that higher sedentary behavior is associated with lower levels of fitness.⁵ Sedentary behavior and low physical activity are prevalent among university students. They are associated with poorer health-related outcomes, suggesting that insufficient physical activity and prolonged sedentary time can negatively influence physical fitness.⁹ Sedentary lifestyles are frequently observed among university students, whose daily activities are highly dependent on technology.¹⁰ The student lifestyle today allows most tasks to be completed with minimal physical effort. Globally, many students are physically inactive, often spending extended periods sitting, accessing social media, or studying online, a pattern that has become routine.¹¹ Such sedentary behaviors are commonly accompanied by increased snack consumption and lower energy expenditure, both of which negatively impact physical fitness.¹²

Given this background, it is clear that physical fitness is essential for university students. Poor fitness levels may reduce student productivity compared with that of students with better physical fitness.¹³ Research examining risk factors for physical fitness, such as physical activity and sedentary lifestyle, is therefore important. Accordingly, this study aims to investigate the physical activity, sedentary behavior, lifestyle, and physical fitness of students at UIN Syarif Hidayatullah.

METHOD

This study employed a descriptive cross-sectional design. The research was conducted at Syarif Hidayatullah State Islamic University (UIN) Jakarta from September to December 2023. The study population consisted of 29,964 undergraduate students, and a total sample of 246 respondents was determined using a hypothesis test formula for the difference between two proportions. Respondents were selected through purposive sampling with the inclusion criteria of being undergraduate students at UIN Syarif Hidayatullah Jakarta. Exclusion criteria included students who were not enrolled in undergraduate programs at the university or those unwilling to participate.

Sample distribution was adjusted using probability proportional to size across 12 faculties: Faculty of Adab and Humanities (28), Faculty of Economics and Business (27), Faculty of Islamic Studies (6), Faculty of Medicine (3), Faculty of Health Sciences (11), Faculty of Psychology (8), Faculty of Da'wah and Communication (32), Faculty of Ushuluddin (19), Faculty of Science and Technology (28), Faculty of Social and Political Sciences (13), Faculty of Sharia and Law (24), and Faculty of Education and Teacher Training (47).

Data were collected using structured questionnaires distributed both online (via Google Forms shared via WhatsApp) and offline (through direct distribution). The first response was recorded on September 27, 2023, and the final response on October 28, 2023. Collected data included individual characteristics (age, sex, faculty, academic year, body weight, and height), independent variables (physical activity and sedentary behavior), and the dependent variable (physical fitness).

Sedentary behavior was assessed using the Adolescent Sedentary Activity Questionnaire (ASAQ), a 20-item instrument that evaluates sedentary activities over the previous week (5 weekdays and 2 weekend days). Total scores were categorized as normal (<33.4), high (33.4–46.7), or very high (>46.7). Physical activity was measured with the International Physical Activity Questionnaire–Short Form (IPAQ-SF), which consists of seven items assessing activity over the previous week. Physical activity levels were classified as low (<600 MET-min/week), moderate (600–3000 MET-min/week), or high (≥ 3000 MET-min/week). Physical fitness was assessed with the Fitness Quotient (FQ) questionnaire, a derivative of the International Fitness Scale (IFIS). The FQ questionnaire, developed by Wood (2003), comprises 10 items. A modified scoring system was used because the original publication lacked a standardized IFIS scoring guideline.

All three instruments had undergone prior validity and reliability testing. Results showed that all items achieved validity coefficients >0.60 and reliability coefficients >0.70 , indicating that the instruments were valid and reliable for use in this study. Data analysis was conducted using a computer program. Univariate analyses were conducted to describe respondents' characteristics, sedentary behavior, physical activity, and physical fitness. This study received ethical approval from the Research Ethics Committee of the Faculty of Health Sciences, UIN Syarif Hidayatullah Jakarta (approval number: Un.01/F.10/KP.01.1/KE.SP/10.08.013/2023).

RESULTS

Table 1 shows that most respondents were under 20 years old (60.9%) and female (69.9%). Most respondents' sedentary behavior was classified as normal (51.6%). However, most respondents' physical activity was in the low category (57.3%). In contrast, most respondents' physical fitness levels were in the good category (67.1%).

Table 1. Research characteristics

Variable	n = 246	%
Age (years)		
< 20 years	150	60.9
≥ 20 years	96	39.1
Gender		
Male	74	30.1
Female	172	69.9

Variable	n = 246	%
Sedentary Behavior		
Low	127	51.6
Moderate	111	45.1
High	8	3.3
Physical Activity		
Low	141	57.3
Moderate	82	33.3
High	23	9.4
Physical Fitness		
Poor	81	32.9
Good	165	67.1

Table 2. Distribution of Respondents Based on Physical Fitness

Physical Fitness Components	Physical Fitness	
	n	%
Body Weight Condition		
Poor	30	12.2
Good	216	87.8
Weekly Exercise Routine		
Poor	235	95.5
Good	11	4.5
Body flexibility		
Poor	69	28.1
Good	177	71.9
Straight-Line Walking Ability		
Poor	10	4.1
Good	236	95.9
Jogging Stamina		
Poor	109	44.4
Good	137	55.6
Push-up ability		
Poor	174	70.7
Good	72	29.3
Ability to Move Heavy Furniture		
Poor	65	26.4
Good	181	73.6
Jumping Ability		
Poor	130	52.8
Good	116	47.2
Running Ability		
Poor	77	31.3
Good	169	68.7
Ability to Climb Stairs		
Poor	27	11.0
Good	219	89.0

Table 2 shows that most respondents rated themselves as having good body weight (87.8%), good flexibility (71.9%), good stability (95.9%), and good jogging stamina (55.6%). However, most respondents reported poor exercise routines (95.5%) and poor push-up ability (70.7%). Most respondents also reported good muscular strength, including the ability to move heavy furniture (73.6%), good running speed (68.7%), and good stair-climbing ability without fatigue (89%), but they demonstrated poor jumping ability (52.8%).

Table 3. Distribution of Respondents Based on Physical Activity

Physical Activity Components	Physical Activity	
	Average	SD
Frequency of Vigorous Physical Activity per Week (days)	2	2.138
Daily Duration of Vigorous Physical Activity (minutes)	45.78	60.303
Frequency of Moderate Physical Activity per Week (days)	4.75	2.155
Daily Duration of Moderate Physical Activity (minutes)	31.22	37.784
Frequency of Walking ≥ 10 Minutes per Week (days)	5.25	1.910
Duration of Walking per Day (minutes)	27.12	25.875
Duration of Sedentary Behavior per Day (minutes)	271.02	247.01

Table 3 shows that respondents engaged in vigorous physical activity an average of 2 days per week, with a mean duration of 45 minutes per day. Moderate physical activity was performed an average of 4–5 days per week, with a mean duration of approximately 30 minutes per day. Walking for at least 10 minutes was reported an average of 5 days per week, with a mean duration of 27 minutes per day. In addition, the mean daily sitting time was 271 minutes, corresponding to more than 4.5 hours per day.

Table 4 shows that the most common high-intensity sedentary behaviors among students on weekdays were sitting in a relaxed position while using mobile phones (43.9%), followed by watching entertainment videos (32.9%) and using computers or laptops for homework (21.5%). In addition, the prevalence of high-intensity sedentary behaviors increased across nearly all activities on weekends compared with weekdays, except for driving. Notably, high-intensity phone use and watching entertainment videos on weekends increased by approximately 20% compared with weekdays.

DISCUSSION

The results of this study showed that approximately one-third (32.9%) of students in the 2020–2022 cohorts at UIN Syarif Hidayatullah Jakarta had poor physical fitness. This finding suggests that a substantial proportion of students may engage in academic activities under suboptimal physical conditions. Previous studies have shown that physical activity levels and sedentary behavior influence physical fitness.¹

Health and fitness are fundamental human needs that can be achieved through enjoyable and consistent physical activity. Physical fitness refers to the body's ability to perform daily tasks effectively over an extended period without excessive fatigue. Individuals should consider whether their fitness level allows them to work without limitations and achieve optimal performance. Exercise plays a significant role in improving physical fitness and directly influences its components.⁶ This study found that more than half of the participating students had low levels of physical activity (51.6%), a proportion higher than that reported in the 2018 National Basic Health Research (RISKESDAS), which indicated that 33.5% of Indonesians lacked sufficient physical activity. Furthermore, a considerable proportion of students exhibited moderate levels of sedentary behavior (45.1%). Previous studies support this finding

Table 4. Distribution of Respondents Based on Sedentary Behavior

Item measured	Weekday		Weekend	
	n	%	n	%
Watching television				
Low	218	88.6	203	82.5
Medium	24	9.8	35	14.2
High	4	1.6	8	3.3
Watching entertainment videos				
Low	33	13.4	23	9.3
Medium	132	53.7	83	33.7
High	81	32.9	140	56.9
Screen time for leisure activities (computer, laptop, or gadgets)				
Low	114	46.3	119	48.4
Medium	91	37.0	77	31.3
High	41	16.7	50	20.3
Screen time for homework (computer or laptop use)				
Low	36	14.6	86	35.0
Medium	157	63.8	121	49.2
High	53	21.5	39	15.8
Time spent on homework without computer/laptop				
Low	152	61.8	162	65.9
Medium	73	29.7	70	28.5
High	21	8.5	14	5.6
Reading books for fun (not with the intention of studying)				
Low	162	65.9	153	67.1
Medium	65	26.4	68	27.2
High	19	7.7	25	10.2
Studying outside of class time (course, seminars, or self-study)				
Low	145	58.9	165	67.1
Medium	90	36.6	67	27.2
High	11	4.5	14	5.7
Driving while sitting (bicycle, motorcycle, car, bus or besides bicycle)				
Low	124	50.4	161	65.4
Medium	91	37.0	62	25.2
High	31	12.6	23	9.3
Time spent on hobbies				
Low	139	56.5	118	48.0
Medium	87	35.4	94	38.2
High	20	8.1	34	13.8
Leisure sitting time using a Smartphone				
Low	28	11.4	30	12.2
Medium	110	44.7	67	27.2
High	108	43.9	149	60.6

showing that sedentary behavior among university students tends to be high, with social media use being the most dominant activity.¹⁴

The findings of this study showed that although most respondents had low weekly exercise frequency and poor push-up performance, the majority still demonstrated good overall physical fitness. This result is consistent with previous studies reporting that most university students who engage in less than 30 minutes of daily physical activity maintain very good levels of physical fitness. These findings suggest that self-reported physical activity and

performance on a single muscular strength test do not necessarily reflect overall physical fitness.¹³

Regular physical activity has been shown to positively affect brain function, cardiovascular endurance, stamina, and overall health, thereby improving physical fitness and reducing the risk of mortality and chronic disease.¹⁴ Students who engage in higher levels of physical activity tend to have greater muscle strength, endurance, and flexibility. However, regular exercise remains necessary to further enhance cardiorespiratory fitness.¹⁵ This study found that most respondents had low levels of physical activity (57.3%). Declines in physical fitness performance have been largely attributed to monotonous lifestyles and insufficient physical activity.¹⁶

These findings indicate that although most students exhibited high levels of sedentary behavior, a relatively large proportion remained physically fit. This pattern may be influenced by the characteristics of young adulthood, during which the adverse effects of sedentary behavior may not yet be fully manifested. Nevertheless, a prevalence of 32.9% suggests a borderline risk pattern among students, which may lead to future health problems if early interventions are not implemented.

Sedentary behavior is not equivalent to physical inactivity. Physical inactivity is defined as failing to meet recommended levels of physical activity. In contrast, sedentary behavior refers to any waking activity characterized by an energy expenditure of ≤ 1.5 METs while sitting, reclining, or lying down.¹⁴ Sedentary behavior is prevalent among university students, whose daily activities are increasingly dependent on technology. This study found that students spent an average of 271.02 minutes per day, or more than 4.5 hours, sitting outside of class activities.

The most common sedentary behaviors among students include relaxing while using smartphones, watching entertainment videos, and completing assignments on laptops. In this study, more than 40% of students reported spending over five hours per day relaxing while using their smartphones. A previous study among students at UIN Syarif Hidayatullah Jakarta reported that more than 40% of respondents used gadgets such as computers/laptops and smartphones for more than 10 hours per day.¹⁷ This prolonged duration of gadget use is consistent with the sedentary pattern observed in the present study, in which students spent extended periods sitting and engaged in minimal physical activity.

A Canadian study reported that young people who spent more than 2 hours per day on smartphones were at higher risk of obesity and had poorer self-rated health. Excessive gadget use has been linked to reduced physical activity, disrupted sleep, and unhealthy eating patterns, all of which contribute to decreased physical fitness and increased health risks.¹⁸ These findings provide clearer evidence that the consequences of low physical fitness, driven by insufficient physical activity and sedentary behaviors, are beginning to manifest, particularly as increased excess body weight.

Low levels of physical activity and high sedentary behavior contribute to an increased risk of obesity.^{4,12,19} Obesity is driven by an imbalance between energy intake and energy expenditure, a condition commonly associated with consuming energy-dense foods and increased sedentary behavior. This imbalance leads to fat accumulation across multiple tissues and body systems, thereby triggering structural and functional alterations. Abdominal

fat accumulation increases the risk of metabolic disturbances, including arterial stiffness, insulin resistance, hypertension, and glucose intolerance. Regular physical activity has been shown to reduce body fat and body weight, which ultimately helps to lower obesity-related comorbidities.²⁰

In addition to its role in weight control, physical activity is closely associated with cardiorespiratory capacity, which is measured by maximal oxygen uptake (VO_2max), defined as the body's ability to uptake, transport, and utilize oxygen during maximal physical exertion.²¹ Cardiorespiratory endurance, which is practically equivalent to VO_2max , is considered a key indicator of physical fitness.²²

Physical activity stimulates muscle contraction, which helps maintain skeletal muscle homeostasis by increasing energy availability, regulating intracellular calcium ions, and reducing metabolic by-products such as free radicals and lactic acid. These processes also activate several cellular regulatory pathways that play an essential role in muscular adaptation to physical activity. Activation of these pathways subsequently stimulates peroxisome proliferator-activated receptor gamma coactivator-1 α (PGC-1 α), a master regulator of mitochondrial biogenesis and function.²³ Consequently, physical activity contributes to improvements in cardiorespiratory fitness by increasing mitochondrial quantity and efficiency, thereby enhancing muscular energy production efficiency and VO_2max capacity.^{24,25}

The findings of this study highlight a high prevalence of sedentary behavior and low levels of physical activity among students. These results suggest the need for university-level policies to promote regular physical activity. Such policies could include implementing structured, scheduled sports programs, providing easily accessible sports facilities, and running targeted health promotion campaigns that encourage stair use instead of elevators.

This is consistent with the recommendations of the World Health Organization in the Global Action Plan on Physical Activity 2018–2030, which encourages higher education institutions to create campus environments that support physical activity through the provision of recreational facilities, the integration of physical activity into the curriculum, and the routine promotion of active behaviors.²⁶ Several universities that have implemented such strategies have reported that supportive campus environments, characterized by accessible sports facilities and regular, campus-integrated physical activities, contribute to positive changes in physical activity behavior and improve physical fitness among university students.^{27,28}

This study has several limitations. First, the study was descriptive and therefore could not explain the relationships among physical activity, sedentary behavior, and physical fitness. Second, the cross-sectional design did not permit causal inference about the relationship between exercise behavior and fitness levels. Third, physical fitness was assessed using the Fitness Quotient (FQ) instrument, which relies on self-reported data and may be subject to reporting bias.

In addition, the sample distribution was not balanced by age and sex. The male-to-female ratio was unequal, with the majority of respondents female, and the age distribution was skewed toward younger participants, with most respondents under 20 years old. Therefore, the findings should be interpreted with caution, considering the limitations related to study design, measurement methods, and sample characteristics.

CONCLUSION

Based on the findings and discussion, a considerable proportion of students at UIN Syarif Hidayatullah Jakarta in the 2020–2022 cohorts had poor physical fitness (32.9%). The study also revealed that nearly half of the students exhibited moderate levels of sedentary behavior (45.1%), with relaxing while using smartphones the most dominant sedentary activity, and that the majority demonstrated low levels of physical activity (57.3%).

Future studies could use an analytical design with random probability sampling to ensure that each respondent has an equal chance of selection. Students at UIN Syarif Hidayatullah Jakarta are encouraged to increase their physical activity through regular exercise and to reduce sedentary behaviors, particularly nonessential smartphone use, to achieve optimal physical fitness for daily activities. In addition, the university should consider adopting comprehensive institutional policies to increase students' physical activity levels. Such policies may include structured sports programs, improved access to recreational facilities, and behavioral interventions, such as promoting stair use over elevators, to reduce sedentary behavior and foster active lifestyles on campus.

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Declarations

Authors' contributions

A.D.S., M.A., and R.W.F.A. collected and analyzed the data sample. All authors, including A.D.S., M.A., R.W.F.A., and H.N., contributed to the design of the study, the interpretation of results, and the writing of the final manuscript.

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Conflict of interest

There is no conflict of interest in this research.

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