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# Assessment of Physical Activity among Students at Tay Bac University, Vietnam

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## Abstract

**Purpose:** The purpose of this study was to assess the physical activity of Tay Bac university students in the academic year 2020-2021.

**Methods:** A cross sectional descriptive study was carried out on 832 students using the Global Physical Activity Questionnaire (GPAQ) within period from November 2020 to March 2021 at Tay Bac university, Son La province, Vietnam. The data was analyzed following the criteria set by World Health Organization (WHO) and were assessed the recommendation of energy expenditure of MET minute/ week.

**Results:** The percentage of students who met the WHO recommendation (sufficient physical activity) with total energy expenditure due to physical activity ≥ 600MET-minute/week was 54.4%. The proportion of men met the recommendation is higher than that of women 61.9% compared to 49.5% ($p<0.001$). Furthermore, men found a higher amount of physical activity and total energy expenditure due to physical activity than women. Students have a static (inactive) time of 352.39 minutes/day (equivalent to 5.87 hours/day).

**Conclusions:** Physical activity of students was still very low with MET>=600, only 54.4% of total. Specific strategies of education programs should be implicated to strengthen understanding of physical activity benefits, as well as improve the awareness of harmful effects of sedentary behavior and long-term health risks.

**Keywords:** Physical activity; MET; Students; Tay Bac university; GPAQ

## Introduction

Physical activity is the movement of the body that is performed by skeletal muscles and consumes energy; including activities performed while working, playing, household chores, and traveling [1]. Sedentary behavior is one of the leading risk factors for mortality of Non Communicable Diseases (NCDs). Those who lack physical activity (who do not meet WHO recommendations) have a 20% to 30% increased risk of death compared with those who are physically active (who meet WHO recommendations) [2]. The World Health Organization (WHO) has had many practical activities calling on countries to act for the health of their people and making general recommendations on physical activity for each age group [3]. However, the rate of physical inactivity in the world is still alarming, about 28% of adults aged 18 years and older lack physical activity in 2016 (23% male and 32% female). In Vietnam, the rate of physical inactivity accounts for nearly one third of the population (26.1% in 2015) [4]. In particular, the proportion of young people aged 16-24 who very regularly or regularly do sport exercises is very low (with the rate of 5.9%-8.4% and 21.4 respectively 21.9%) [5]. The percentage of students in some schools lacking physical activity is still relatively high, for example; up to 47.8% of medical students at Hue university of medicine and pharmacy, 25% of students at Dak Lak medical college and 12.8% of general medicine students at Hai Phong university of medicine and pharmacy [6-8]. In 2010, a large scale study conducted in Vietnam used DALY (Disability Adjusted Life Year) measurement accounted that physical inactivity caused 2.8% of deaths and 1.5% of disease burden. Strengthening physical activity is an indispensable content in the prevention and control of non-communicable diseases in Vietnam. However, so far in Vietnam there are very few studies on this topic.

At Tay Bac university, physical training for students is mainly done in physical education modules [9]. In addition, students can participate in some other programs such as sports festivals or competitions once or twice a year. However, these sports

festivals or competitions are only competitive and for gifted people, not for all students, not to mention all energy consuming activities such as physical activity at work, travel and recreation. Currently in Vietnam, there are no that have studied on students' physical activity at graduate degree in term of work, travel and leisure aspects. Therefore, the study was carried out to assess the status of students physical activity in order to propose appropriate intervention solutions to enhance physical activity for students in schools. The research results will contribute to supplementing objective scientific evidence about the status of mental health activities of students in the school in particular and in Vietnam in general.

## Materials and Methods

### Study designs and sample

This was a cross sectional study using a multistage, stratified sampling technique. The populations of the study were academic students attending Tay Bac university from November 2020 to March 2021 that randomly selected from 38 of 108 classes. A total of 841 students were invited to participate in the study, and eventually 832 completed the questionnaire.

### Measures

The GPAQ questionnaire was utilized to collect data in three domains, activity at work, travel (walking or cycling), and leisure activities. All activities were assessed by the level of energy expenditure that classified at vigorous and moderate physical levels. Every domain then has been assigned MET value in which the participants spent in doing an activity on the number of minutes. The participants were assessing by the calculated MET value whether they met the criteria set by WHO in which is 75 minutes of vigorous intensity physical activity or 150 minutes of moderate intensity physical activity or a combination of both activities at least 600 MET minutes per week.

### Data analysis

Data were analyzed using Stata 14 and excel office version 2013. Descriptive statistics were performed to estimate frequencies and percentages for dependent and independent variables. A *chi-square* test was conducted to compare the proportion of students physical activity following GPAQ analysis guide with a significant level of 95%.

### Ethic concerns

The study was approved by the ethical committee of Hanoi university of public health and Tay Bac university. All participants were required to sign the consent form and all data collected did not contain any personal information, so that none of ethnic violence were concerned.

## Results

In this study, students in the study were mainly from 18 to 23 years old (accounting for 93.8%), the number of students over 23 years old accounted for a low percentage (6.3%). There are more female students (60.2%) than male students (39.8%). The number of selected students is divided equally among the groups of 1, 2, 3 and 4 year students. In which, 2$^{nd}$ year students accounted for the highest percentage (29.3%), first year students accounted for the smallest rate (20.0%). Students mainly live in area I (58.8%). The number of students living in region III accounts for a relatively high proportion (24.9%). Most of the students participating in the study are from ethnic minorities. In which the percentage of Thai ethnic students is the highest (44.7%). Along with Vietnamese students, students from Laos PDR account for a relatively high proportion (23.9%). The number of students participating in the study includes many different majors such as students in pedagogy, agro forestry, accounting, business administration, information technology and political education. In which, the percentage of students majoring in primary education is the highest (21.8%), followed by preschool education (18.5), Information technology (16.8%), the lowest is agro forestry sector (4.6%) (Table 1).

**Table 1:** Demographic distributions.

| Variables | Percentage (%) N (%) | Variables | Percentage (%) N (%) |
|---|---|---|---|
| Age | | Study areas | |
| 18–23 | 780 (93.8) | Preschool education | 154 (18.5) |
| >23 | 52 (6.3) | Primary education | 181 (21.8) |
| Sex | | Pedagogy | 70 (8.4) |
| Male | 331 (39.8) | Agroforestry | 38 (4.6) |
| Female | 501 (60.2) | Information technology | 140 (16.8) |
| Grade | | Political education | 64 (7.7) |

| | | | |
|---|---|---|---|
| Year 1 | 166 (20.0) | Accounting | 121 (14.5) |
| Year 2 | 244 (29.3) | Business administration | 64 (7.7) |
| Year 3 | 217 (26.1) | Ethics | |
| Year 4 | 205 (24.6) | Kinh | 103 (12.4) |
| Living area | | Thai | 372 (44.7) |
| Zone I | 489 (58.8) | Mong | 89 (10.7) |
| Zone II | 117 (14.1) | Laos | 199 (23.9) |
| Zone III | 207 (24.9) | Others (Dao. Tay. Kho Mu. La ha…) | 69 (8.3) |
| Others | 19 (2.3%) | | |

**Note:** Zone III (particularly difficult communes): Having a poverty rate of 20% or more and is a zone that has not been recognized as meeting new rural standards; Zone I (developing commune): Having a poverty rate of less than 10%; and is a zone that has been recognized as meeting new rural standards; Zone II (commune is still difficult): Zone II belonging to ethnic minorities and mountainous areas are the remaining zone after the zone III and zone I have been identified.

Table 2 shows the differences of participating in physical activity at all levels and also between male and female students. The majority of students physical activity focuses on moderate intensity leisure, accounting for 50.7%. The percentage of students responding by walking or cycling is 35%, the number of students who answered that they participate in physical activities at work with high intensity accounts for the least rate (8.5%). Men were found participated in moderate intensity leisure activities higher than women, 61.3% and 43.7% respectively ($p<0.001$). Regarding to travelling (walking and cycling), women responded more than men (36.5% *versus* 32.6%), but the difference was not found statistically significant ($p>0.05$).

Only 2.4% of students answered that they fully participate in all types of physical activities (in work, travel, leisure) during the week. This ratio did not differ between men and women ($p=0.34$). Up to 28.2% of students responded that they did not participate in any physical activity during the week. In which, 33.9% of female students answered that they did not participate in any physical activity during the week while this rate was lower in boys (19.6%), this difference is statistically significant ($p<0.001$).

**Table 2:** Proportion of students taking part in physical activity at least 10 minutes per week.

| Types of physical activities | Active | Male n (%) | Female n (%) | p | Total n (%) |
|---|---|---|---|---|---|
| Vigorous intensity of work | No | 297 (89.7) | 464 (92.6) | 0.14 | 761 (91.5) |
| | Yes | 34 (10.3) | 37 (7.4) | | 71 (8.5) |
| Moderate intensity of work | No | 261 (78.9) | 357 (71.3) | 0.14 | 618 (74.3) |
| | Yes | 70 (21.1) | 144 (28.7) | | 214 (25.7) |
| Cycling or walking | No | 223 (67.4) | 318 (63.5) | 0.25 | 541 (65.0) |
| | Yes | 108 (32.6) | 183 (36.5) | | 291 (35.0) |
| Vigorous intensity of leisure | No | 254 (76.7) | 449 (89.6) | <0.001 | 703 (84.5) |
| | Yes | 77 (23.3) | 52 (10.4) | | 129 (15.5) |
| Moderate intensity of leisure | No | 128 (38.7) | 282 (56.3) | <0.001 | 410 (49.3) |

| | | | | | |
|---|---|---|---|---|---|
| | Yes | 203 (61.3) | 219 (43.7) | | 422 (50.7) |
| Taking part all activities | No | 321 (97.0) | 491 (98.0) | 0,34 | 812 (97.6) |
| | Yes | 10 (3.0) | 10 (2.0) | | 20 (2.4) |
| None of taking part all activities | No | 266 (80.4) | 331 (66.1) | <0,001 | 597 (71.8) |
| | Yes | 65 (19.6) | 170 (33.9) | | 235 (28.2) |

Table 3 shows that the time participating in physical activity of students in a typical week varies between types of activities among men and women. The average total physical activity time of students per week is 162.23 minutes/week. Men have a total time of physical activity in a week (187.76 minutes/week) more than women (145.37 minutes/week with statistically significant (p<0, 05). The average time of physical activity per day of students was 23.17 minutes/day (for men it was 26.82 minutes/day, for women it was 20.76 minutes/day).

**Table 3:** Duration of physical activities per week (minutes).

| **Duration of physical activities (minutes)** | **Male n=331** | **Female n=501** | **p** | **N=832** |
|---|---|---|---|---|
| | **(Mean ± SD)** | **(Mean ± SD)** | | **(Mean ± SD)** |
| Vigorous intensity of work | 20.67 ± 71.25 | 13.91 ± 58.16 | 0.13 | 16.6 ± 63.74 |
| Moderate intensity of work | 35.58 ± 85.60 | 45.90 ± 92.68 | 0.11 | 41.8 ± 90.0 |
| Travelling (cycling or walking) | 39.29 ± 83.53 | 34.30 ± 71.46 | 0.36 | 36.28 ± 76.48 |
| Vigorous intensity of leisure activities | 29.33 ± 62,39 | 12.35 ± 42.96 | <0.001 | 19.10 ± 52.20 |
| Moderate intensity of leisure activities | 62.87 ± 75.60 | 38.89 ± 60.59 | <0.001 | 48.43 ± 67.94 |
| Total of physical activities | 187.76 ± 261.21 | 145.37 ± 203.09 | 0.009 | 162.23 ± 228.79 |
| Average time duration of physical activities | 26.82 ± 37.31 | 20.76 ± 29.01 | 0.009 | 23.17 ± 32.68 |
| Percentage of working activities/total physical activities (%) | 16.95 ± 28.69 | 28.92 ± 34.88 | <0.001 | 23.58 ± 32.79 |
| Percentage of cycling and walking/total physical activities (%) | 16.0 ± 25.85 | 25.30 ± 32.76 | <0.001 | 21.15 ± 30.21 |
| Percentage of leisure activities/total physical activities (%) | 67.03 ± 36.64 | 45.77 ± 39.28 | <0.001 | 55.25 ± 39.53 |
| Resting time per day | 345.13 ± 194.16 | 357.19 ± 238.76 | 0.44 | 352.39 ± 222.05 |

In a typical week, students had the most total time to engage in moderate intensity recreational activity at 48.43 minutes/week, followed by moderate intensity work engagement of 41.8 minutes/week; engage in mobility by walking or cycling for 36.28 minutes/week; participating in high intensity recreational activities 19.1 minutes/week; and participating in high intensity work activities at 16.6 minutes/week. Men found had more time

to participate in recreational activities (high and moderate intensity) than women (p<0.001).

The results also indicated that students used 55.25% of their total time to engage in recreational activity (high and moderate intensity); 23.58% of total time is spent at work (high and moderate intensity) and 21.15% of total time of physical activity is spent on the move (walking or cycling).

Inactive time is the period of sitting, lying, reclining (not counting sleeping time) of a student in a day. In this study, students had a (inactive) time of 352.39 minutes/day (equivalent to 5.87 hours/day).

Table 4 shows that the energy consumed by students while working, moving, in leisure is different in each activity and between men and women. Men consumed more energy for leisure activities (high and moderate intensity) than women (p<0.001). Total energy expenditure for physical activity in a typical week of students is on average 3016.14 MET-minutes/ week. In this study, men expended more energy (3638.01 MET-minute/week) than women (2605.28 MET-minute/week), the difference was statistically significant (p<0,05).

**Table 4:** MET minutes/week distributions of physical activity.

| Criteria | Male n=501 (Mean ± SD) | Female n=501 (Mean ± SD) | p | N=832 (Mean ± SD) |
|---|---|---|---|---|
| Vigorous intensity of work | 577.20 ± 2238.50 | 378.73 ± 1880.88 | 0.17 | 457.69 ± 2031.72 |
| Moderate intensity of work | 519.85 ± 1381.86 | 680.88 ± 1613.15 | 0.14 | 616.82 ± 1526.52 |
| Travel | 750.21 ± 1716.06 | 696.61 ± 1685.34 | 0.66 | 717.93 ± 1696.80 |
| MET minute per week of vigorous intensity of leisure | 889.23 ± 2322.09 | 342.54 ± 1438.41 | <0.001 | 560.03 ± 1859.53 |
| MET minute per week of moderate intensity of leisure | 901.51 ± 1390.57 | 506.50 ± 837.98 | <0.001 | 663.65 ± 1108.07 |
| Total of MET minute per week | 3638.01 ± 6006.517 | 2605.28 ± 4325.29 | 0.004 | 3016.14 ± 5078.12 |

The percentage of students with total moderate intensity physical activity that met the recommended level of ≥ 150 minutes/week was 30.2%, which was similar between men and women. Conversely, percentage of them did not meet the recommendation (≥ 150 minutes/week) was 69.8%.

The percentage of students whose total energy expenditure due to physical activity was above the recommended ≥ 600MET minute/week was 54.4%. In which, the proportion of men reaching the recommendation is higher than that of women (61.9% compared to 49.5%) with p<0.001. The percentage of students who did not meet 600MET minutes/week was 45.6%.

## Discussion

According to the recommendations of the World Health Organization (WHO), adults should do at least 30 minutes/day of moderate intensity physical activity for at least 5 days/week (150 minutes/week) or intense intensity at least 75 minutes/week or combinations of both for a total energy level of ≥ 600 MET minutes/week [10]. Research results Table 5 show that, when compared the different levels of recommendations, the percentage of students meeting the recommendations on physical activity is different. If using the recommendation that students have a total time of doing high intensity physical activity ≥ 75 minutes/week, only 15.5% of the total meet the recommendation, 84.5% do not meet the recommendation. If using the recommended level of total moderate-intensity physical activity ≥ 150 minutes/week, 30.2% of students met the recommendation, 69.8% of students did not meet the recommendation. The result of this study has a higher percentage of students who did not meet the recommendation compared to other studies in Vietnam on subjects from 18 to 29 with a rate of 33.4% (48.9% of women and 18.2% of men lack sexual activity).

**Table 5:** Proportion of students meet WHO physical activity criteria.

| Criteria | Meet | Male N=331 n (%) | Female N=501 n (%) | p | Total N=832 n (%) |
|---|---|---|---|---|---|
| Vigorous intensity of work and leisure ≥ 75 min/week | Yes | 72 (21.8%) | 57 (11.4%) | <0.001 | 129 (15.5%) |
| | None | 259 (78.2%) | 444 (88.6%) | | 703 (84.5%) |
| Moderate intensity of work, travel and leisure ≥ 150 min/ week | Yes | 104 (31.4%) | 147 (29.3%) | 0,52 | 251 (30.2%) |
| | None | 227 (68.6%) | 354 (70.7%) | | 581 (69.8%) |
| Energy expenditure ≥ 600MET-min/week | Yes | 205 (61.9%) | 248 (49.5%) | <0,001 | 453 (54.4%) |
| | None | 126 (38.1%) | 253 (50.5%) | | 379 (45.6%) |

In fact, students not only participate in a separate activity with high or moderate intensity, but often combine many activities with different intensities in work, travel and entertainment. A student may not get 150 minutes/week of moderate intensity physical activity or 75 minutes/week of high intensity physical activity. However, they did a combination of the two and got a total of 600MET minutes/week. Therefore, using the recommendation by calculating the total amount of energy consumed for activities will be more comprehensive and convenient in assessing the percentage of students who meet the recommendation. In this study, the percentage of students who met the recommendation with a total energy expenditure of ≥ 600MET-minute/week was 54.4%, the rate that did not meet the recommendation was 45.6%. This result is equivalent to the study at Hue university of medicine and pharmacy with 52.2% of students meeting the recommendation, 47.8% not meeting the recommendation and lower than the study at Dak Lak medical college (with 75% of students meeting the recommendation, 25% not meeting the recommendation). The results of this study are lower than another study in Vietnam on people aged 25-64 years (with about 70% meeting the recommendations and about 20% not having any physical activity during the week) [11].

The results of this study are much lower than that of the general medical students at the university of Malaya (87.4% of the students met the recommendation) [12]. The results of this study are higher than those of medical students in Southern Thailand (49.5% met the recommendation and 50.5% did not meet the recommendation) [13]. In India, 84.7% of people in urban areas and 78.8% of people in rural areas met the recommendations for physical activity [14]. The difference could be caused of COVID-19 period. All students studied online and did not have a chance to exercise, participate in sports, or cycle to schools during COVID-19 time. Klaus Greier indicated a similar explanation among high school Australian students, as well as in Malaysia students [15,16].

There are several strengths in this study, firstly the number of students participating in the study had a high response rate of 98.8%. The number of students is diverse and inclusive in terms of gender, field of study, academic year, ethnicity, especially more than 60% of the students participating in the study are ethnic minorities and over 23% are students from the democratic republic of Laos [17]. Secondly, the study refers to the cross-sectional descriptive method by online self-completed questionnaires combined with direct measurement of anthropometric indices, which should ensure the objectivity of the information. In order to control the errors caused by the self-information process of students, we have clearly explained the purpose of the study, using the international questionnaire on physical activity and the questionnaire was standardized by steps in Vietnam. Finally, the findings in this study are specific to the Northwest region of Vietnam, where similar results have not been published elsewhere.

In the data tables, it is shown that women have not reached the recommended level of physical activity higher than men, so they need to focus more on improving women's physical activity. These results are consistent with a number of studies showing that these problems are pervasive and persistent among female populations globally [18]. And this race is a concern for university leaders to take care of student life to improve physical activity among students.

## Conclusion

This study was conducted on a relatively large sample size representing a good representation of the student population. The results indicated that the percentage of students achieving the WHO recommended level of physical activity was low, especially among female students. Habits of physical inactivity and inactivity have many potential risks that are harmful to health. Therefore, health education and cognitive behavioral change on physical activity need to be widely deployed and there must be specific strategies to increase physical activity at different levels for students.

## Limitations of this Study

The study was conducted at a very early stage of COVID-19 in Vietnam. Some restrictions were required, such as allowing no more than 20 attendees for each event. It may affect student's daily activities and study results. However, findings about students' physical activity are reliable due to the large sample size.

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## Conflict of Interest

The authors declare that they have no competing interests.

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