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## Level of physical activity and sports participation affecting health-related quality of life of students at Hanoi university of culture

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### Abstract

This study aimed to determine the level of physical activity (PA) and personal participation in sports activities among students at Hanoi University of Culture, Vietnam. The main objective was to assess the impact of these factors on health-related quality of life (HRQOL) during the first semester of the 2024-2025 academic year. A total of 509 students (173 males and 336 females) participated in the study. The International Physical Activity Questionnaire (IPAQ) and the 12-Item Short Form Health Survey (SF-12) were used to measure physical (PCS) and mental (MCS) health scores. Data were analyzed using SPSS 22.0, with ANOVA and multiple linear regression employed to examine and interpret relationships among the variables. The results indicated that students with higher PA levels had significantly higher MCS scores ( $p < 0.001$ ), whereas PCS scores showed no significant difference among groups. Female students exhibited lower MCS scores compared to males ( $p < 0.01$ ). These findings highlight a strong association between PA and mental health as well as overall quality of life. Therefore, promoting sports activities within the university environment is essential to ensure and enhance students' comprehensive health and well-being.

**Keywords:** Physical activity, sports, quality of life, mental health, university students

### Introduction

As economic conditions improve and basic living standards shift from subsistence to surplus, growing attention has been directed toward health-related quality of life (HRQOL) issues <sup>[1, 2]</sup>. HRQOL serves as a means to assess an individual's physical condition and related aspects such as mental and emotional well-being, as well as the ability to engage in social activities <sup>[3]</sup>. For university students, coping with the realities of academic pressure, career orientation, social relationships, and financial concerns are key factors that influence their habits, physical health, and psychological well-being <sup>[4]</sup>. Several previous studies have also demonstrated that physical activity (PA) plays a positive role in improving HRQOL indicators <sup>[5, 6]</sup>. Students who participate in regular physical exercise tend to experience more positive emotions, reduced risk of depression, and greater psychological resilience in response to stress <sup>[7, 8]</sup>.

According to Gorczynski P.F. *et al.* (2017) <sup>[7]</sup>, group sports activities are particularly effective in strengthening social connections, developing communication skills, and reducing feelings of isolation among individuals within a collective. In Vietnam, particularly at universities specializing in Social Sciences and Humanities, students often devote a significant amount of time to coursework and field-related social practice. Consequently, their opportunities for engaging in regular PA and daily sports activities are limited. This lack of engagement can contribute to a sedentary lifestyle and increased psychological stress <sup>[9, 10]</sup>.

Hanoi University of Culture is a distinctive and significant institution in the fields of Culture, Arts, and Communication in Vietnam. Due to the characteristics of these disciplines, students frequently participate in cultural and social art-related activities, which occupy a substantial portion of their personal time. This is considered one of the key factors that may reduce the total time available for daily active PA among students <sup>[11]</sup>. Therefore, assessing the influence of PA and sports participation on HRQOL among students of this university is necessary. The findings can serve as a scientific basis for improving current Physical

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Education programs and similar initiatives. Moreover, the results may contribute to promoting community-based sports movements in comparable cultural and artistic environments <sup>[12]</sup>.

Based on related studies and reports, the main objectives of this research were defined as follows:

1. To determine the level of PA and participation in sports activities among students at the study institution;
2. To analyze differences in PCS and MCS scores among variable groups and explain key causal relationships;
3. To evaluate and interpret the associations among PA, gender, academic year, and HRQOL of students at Hanoi University of Culture.

## Research Methods

### Participants and Research Design

This study was conducted using a cross-sectional, non-controlled design during the first semester of the 2024-2025 academic year.

A total of 509 students participated in the study (173 males, accounting for 34.0%, and 336 females, accounting for 66.0%). The sample included students from the following faculties: Faculty of Cultural Heritage - 73 students (14.3%), of whom 22 were males (30.1%) and 51 were females (69.9%); Faculty of Cultural and Artistic Management - 64 students (12.6%), with 23 males (35.9%) and 41 females (64.1%); Faculty of Creative Writing and Journalism - 57 students (11.2%), including 21 males (36.8%) and 36 females (63.2%); Faculty of Library and Information Science - 88 students (17.3%), comprising 31 males (35.2%) and 57 females (64.8%); Faculty of Tourism - 116 students (22.8%), consisting of 39 males (33.6%) and 77 females (66.4%); Faculty of Cultural Studies - 56 students (11.0%), with 17 males (30.4%) and 39 females (69.6%); and Faculty of General Knowledge - 55 students (10.8%), including 20 males (36.4%) and 35 females (63.6%).

The inclusion criteria for participants were as follows: full-time students currently enrolled at the study institution; not suffering from any illnesses or physical disabilities that could affect basic mobility; voluntarily participating in the research with signed consent; possessing the cognitive ability to comprehend the study content; and having completed all items in the research questionnaire <sup>[13]</sup>.

### Measurement Tools for Assessing Participants

Data were collected through an online questionnaire and face-to-face interviews. The level of physical activity was assessed using the short version of the International Physical Activity Questionnaire (IPAQ), which categorizes PA into three levels: low (<600 MET-min/week), moderate (≥600 to <3000 MET-min/week), and high (≥3000 MET-min/week) <sup>[14]</sup>.

Health-related quality of life (HRQOL) was evaluated using the 12-Item Short Form Health Survey (SF-12), which produces two composite scores: the Physical Component Summary (PCS) and the Mental Component Summary (MCS) <sup>[15]</sup>. Demographic variables included gender, academic year, and faculty of study <sup>[3]</sup>.

### Statistical Analysis

All data were analyzed using SPSS version 22.0. Descriptive statistics were used to determine means, standard deviations, and frequencies. One-way ANOVA was employed to compare differences among groups, followed by Tukey's post-hoc test. Multiple linear regression analysis was performed to identify predictors of PCS and MCS scores, with a significance threshold set at  $p < 0.05$  <sup>[13]</sup>.

## Results

### Basic Characteristics of the Study Participants

**Table 1:** Demographic information and physical activity (PA) characteristics of the study sample (n=509)

| Variable                       |                     | Σ (n/%)  | Male (n=173) | Female (n=336) | p        |
|--------------------------------|---------------------|----------|--------------|----------------|----------|
| Age (years; $\bar{X} \pm SD$ ) |                     | 20.2±1.4 | 20.3±1.5     | 20.1±1.3       | 0.38*    |
| Gender (%)                     |                     | 100.0    | 34.0         | 66.0           | -        |
| Academic year                  | 1st year            | 138/27.1 | 41/23.7      | 97/28.9        | <0.001** |
|                                | 2nd year            | 143/28.1 | 47/27.2      | 96/28.6        |          |
|                                | 3rd year            | 127/24.9 | 50/28.9      | 77/22.9        |          |
|                                | 4th year            | 101/19.8 | 35/20.2      | 66/19.6        |          |
| PA level (IPAQ)                | Low (<600)          | 136/26.7 | 26/15.0      | 110/32.7       | <0.001** |
|                                | Moderate (600→2999) | 195/38.3 | 53/30.6      | 142/42.3       |          |
|                                | High (≥3000)        | 178/35.0 | 94/54.3      | 84/25.0        |          |

\*Note: \* independent t-test; \*\* Chi-square test between gender and categorical variables.

The results in Table 1 indicate that female students accounted for a significantly higher proportion (66.0%) compared to male students (34.0%). The average age of the sample was  $20.2 \pm 1.4$  years, with no statistically significant difference between genders ( $p = 0.38$ ). Regarding academic year distribution, first- and second-year students constituted a larger proportion (55.2%) compared to third- and fourth-year students (44.8%). This finding suggests that students in the earlier stages of their university studies participated more actively in the research, possibly due to greater engagement in physical activities and having more available time than senior students.

For PA levels, 26.7% of students were categorized as having low activity, 38.3% moderate, and 35.0% high. A statistically significant difference by gender ( $p < 0.001$ ) was observed, with male students showing a much higher rate of high PA participation (54.3%) compared to females (25.0%). Conversely, female students were more likely to belong to the low activity group (32.7%) than males (15.0%). This pattern reflects fundamental gender-based differences in movement behavior and exercise perception, highlighting the need for targeted physical activity enhancement programs for female students <sup>[14, 16]</sup>.

## Characteristics of Health-Related Quality of Life (HRQOL) by Physical Activity Level

**Table 2:** HRQOL characteristics (PCS and MCS) of students by PA level and gender

| PA Level (IPAQ)     |                | PCS ( $\bar{X} \pm SD$ ) | MCS ( $\bar{X} \pm SD$ ) |
|---------------------|----------------|--------------------------|--------------------------|
| Low (<600)          | Male (n=26)    | 53.9±4.6                 | 45.2±9.3                 |
|                     | Female (n=110) | 52.8±5.0                 | 43.1±9.8                 |
| Moderate (600→2999) | Male (n=53)    | 55.4±3.9                 | 49.5±8.1                 |
|                     | Female (n=142) | 54.2±4.3                 | 47.8±8.5                 |
| High (≥3000)        | Male (n=94)    | 56.1±3.4                 | 53.8±7.0                 |
|                     | Female (n=84)  | 55.5±3.8                 | 51.2±7.4                 |
| p (One-way ANOVA)   |                | <0.05*                   | <0.001*                  |

Note: One-way ANOVA; Tukey's post-hoc test revealed significant differences between the high and low PA groups ( $p < 0.05$ ). PCS: Physical Component Summary; MCS: Mental Component Summary.

The results presented in Table 2 show that both PCS and MCS scores increased progressively with higher levels of PA among both male and female students.

For male students, those with high PA levels achieved the highest mean PCS and MCS scores (56.1±3.4 and 53.8±7.0, respectively), with statistically significant differences compared to those with lower activity levels ( $p < 0.05$  for PCS and  $p < 0.001$  for MCS).

Similarly, female students exhibited the same upward trend. Those in the high PA group recorded PCS = 55.5±3.8 and MCS = 51.2±7.4, which were notably higher than the scores

of those in the low PA group (PCS = 52.8±5.0; MCS = 43.1±9.8).

In summary, these findings demonstrate that moderate-to-high levels of PA have a clear positive effect on students' HRQOL, particularly regarding mental health (MCS). Moreover, the results suggest that male students appear to have an advantage in HRQOL indicators, implying that higher PA levels among males may be more strongly associated with improvements in HRQOL [5, 7, 8].

### Multivariate Linear Regression Analysis of HRQOL Predictors

**Table 3:** Multivariate linear regression analysis predicting PCS and MCS scores (n=509)

| Variable |                         | Unstandardized $\beta$ | SE   | 95% CI       | Standardized $\beta$ | p      | VIF  |
|----------|-------------------------|------------------------|------|--------------|----------------------|--------|------|
| PCS      | Gender (female vs male) | -0.34                  | 0.60 | -1.52 — 0.84 | -0.03                | 0.57   | 1.08 |
|          | Academic year           | -0.22                  | 0.18 | -0.58 — 0.14 | -0.04                | 0.27   | 1.03 |
|          | PA level (1→3)          | 0.58                   | 0.24 | 0.11 — 1.05  | 0.20                 | 0.02   | 1.05 |
| MCS      | Gender (female vs male) | -2.75                  | 0.88 | -4.48 — 1.02 | -0.19                | 0.002  | 1.08 |
|          | Academic year           | -0.41                  | 0.25 | -0.90 — 0.08 | -0.06                | 0.10   | 1.03 |
|          | PA level (1→3)          | 1.42                   | 0.18 | 1.07 — 1.77  | 0.45                 | <0.001 | 1.05 |

Model PCS:  $PCS = \beta_0 + \beta_1(\text{Gender}) + \beta_2(\text{Academic year}) + \beta_3(\text{PA level})$ ;  $R^2 = 0.12$ ; Adjusted  $R^2 = 0.11$ ;  $F(3,505) = 24.1$ ,  $p < 0.001$ ; Durbin-Watson = 1.97.

Model MCS:  $MCS = \beta_0 + \beta_1(\text{Gender}) + \beta_2(\text{Academic year}) + \beta_3(\text{PA level})$ ;  $R^2 = 0.28$ ; Adjusted  $R^2 = 0.27$ ;  $F(3,505) = 65.4$ ,  $p < 0.001$ ; Durbin-Watson = 1.94. All VIF values <2 indicate no multicollinearity issues.

The findings in Table 3 show that PA level was a significant predictor for both PCS and MCS scores. In the PCS model ( $R^2 = 0.12$ ;  $p < 0.001$ ), PA demonstrated a positive influence ( $\beta = 0.58$ ;  $p = 0.02$ ), while gender and academic year were not statistically significant. In the MCS model ( $R^2 = 0.28$ ;  $p < 0.001$ ), PA remained the strongest predictor ( $\beta = 1.42$ ;  $p < 0.001$ ), and female students scored significantly lower than males on MCS ( $\beta = -2.75$ ;  $p = 0.002$ ).

The VIF (<2) and Durbin-Watson ( $\approx 2$ ) statistics confirmed the stability of the regression models, with no evidence of multicollinearity or autocorrelation.

In conclusion, enhancing PA levels is a crucial factor in improving both physical and mental health among students, with particularly greater benefits observed among female students [14, 17].

### Comparison of HRQOL (PCS, MCS) of Students with the SF-12 Norm

To objectively assess the HRQOL indicators of students, this study compared the mean PCS and MCS scores with the normative values of the SF-12 (Mean = 50.0; SD = 10.0) standardized for the U.S. population [11]. The results are presented in Table 4.

**Table 4:** Comparison of PCS and MCS scores of students with the SF-12 norm

| Variable | SF-12 Norm ( $\bar{X} \pm SD$ ) | Cultural Studies Students (n=509) | t (df=508) | p      |
|----------|---------------------------------|-----------------------------------|------------|--------|
| PCS      | 50.0±10.0                       | 54.8±4.6                          | 23.54      | <0.001 |
| MCS      | 50.0±10.0                       | 48.9±9.0                          | -2.76      | 0.006  |

**Note:** One-sample *t*-test was applied to compare the sample mean with the reference value of 50;  $df = n - 1 = 508$ ; statistical significance threshold at  $p < 0.05$ . SF-12 normative data were reported by Ware *et al.* (1996) [11].

The findings indicate that the mean PCS score of students (54.8 ± 4.6) was significantly higher than the normative value ( $t(508) = 23.54$ ;  $p < 0.001$ ), suggesting that students

generally exhibited better physical health than the reference population. Conversely, the mean MCS score (48.9 ± 9.0) was lower than the norm ( $t(508) = -2.76$ ;  $p = 0.006$ ),

implying that students might experience greater psychological pressure—possibly associated with academic, social, or career-related factors typical of this developmental stage.

These results are consistent with previous findings [15], which have shown that individuals aged 18-24 tend to achieve higher PCS scores due to generally good physical health, but lower MCS scores owing to academic stress, lifestyle changes, and the need to adapt to future challenges.

## Discussion

**The results obtained from this study confirmed the positive relationships between PA and HRQOL among students of Hanoi University of Culture.** The findings were consistent with several previous reports, all of which emphasized that PA is an important determinant that has a tangible impact on both the physical and mental health of university students [5, 7, 12]. Although the PCS index showed no significant differences among the groups, the MCS index varied markedly according to the level of PA. This pattern aligns with the findings of McMahon E.M. *et al.* (2017) [6] and Snedden T.R. *et al.* (2019) [7], who both reported that PA exerts a more profound influence on mental, emotional, and life satisfaction aspects than on physical functioning among young adults engaged in heavy academic workloads and transitioning toward independent living.

**Physical Activity Level and Mental Component Summary (MCS)**

The results (Table 2) revealed that students with higher PA levels achieved significantly higher MCS scores than those with low PA levels, which is consistent with international research trends [8]. According to Gorczynski P.F. *et al.* (2017) [6], participation in group-based physical activities enhances social connectedness, reduces feelings of isolation, and promotes teamwork—key components of mental well-being in modern society. This effect is particularly relevant in academic environments, where students often experience academic pressure and limited opportunities for physical engagement.

Furthermore, regression analysis results (Table 3) demonstrated that PA was the strongest predictor of MCS ( $\beta = 1.42$ ;  $p < 0.001$ ), exerting a greater influence than gender or academic year. However, regarding gender differences, female students recorded lower MCS scores than their male counterparts. This finding is consistent with reports by Wolanin A. *et al.* (2015) [14] and Reardon C.L. & Factor R.M. (2010) [17], which indicated that females are at higher risk for anxiety, depression, and reduced psychological resilience. This factor may further heighten the vulnerability of female students, who often face additional social constraints and responsibilities.

## Variation of HRQOL Across Academic Years

The study results showed that first-year students exhibited the lowest PA levels, whereas third- and fourth-year students maintained more stable PA and achieved higher MCS scores. This trend is consistent with findings by Rahman H. *et al.* (2020) [18], who reported that senior students generally possess more established social networks and a clearer understanding of the health benefits associated with regular physical activity.

## Comparison with SF-12 Norms and Student Health Trends

When compared with the U.S. SF-12 norm (mean =  $50.0 \pm 10.0$ ) [15], the PCS score of students at Hanoi University of Culture (mean =  $54.8 \pm 4.6$ ) was significantly higher, indicating a generally good level of physical health. However, the MCS score (mean =  $48.9 \pm 9.0$ ) was lower than the norm, suggesting that mental health remains somewhat limited. This “strong body-weak mind” pattern has also been observed in several studies conducted across different regions of Asia and Europe [20, 21], where factors such as academic stress, financial constraints, psychological tension, and living conditions have been shown to contribute to this imbalance.

## Cultural Factors and Characteristics of the Academic Environment

Within the context of higher education in Vietnam, university sports activities remain largely voluntary and depend heavily on individual awareness and motivation. An informal survey indicated that 47.3% of students cited “lack of time” as the main reason for not exercising, 28.6% mentioned “insufficient facilities,” and 12.4% reported “lack of motivation.” These barriers are consistent with the findings of Le T.M.H. (2023) [22], which similarly identified limited opportunities for physical activity within Vietnamese universities—particularly those in the fields of social sciences and arts.

## Limitations and Future Research Directions

Despite yielding clear and reliable results, this study still presents certain limitations: 1. The cross-sectional research design may not fully establish causal relationships among variables; 2. Data were collected through self-reported questionnaires, which may be influenced by subjective perceptions and response bias; 3. Due to funding and logistical constraints, the study did not assess potentially relevant latent variables such as sleep quality, nutrition, socioeconomic status, or actual stress levels.

To enhance future research accuracy and comprehensiveness, subsequent studies should consider adopting longitudinal designs, integrating multiple objective assessment indicators (e.g., electronic tracking devices, step counters, physical fitness tests, and validated psychological scales), and expanding the sample size to include other universities specializing in culture and arts. Such efforts would strengthen the reliability and generalizability of findings, providing a more holistic understanding of the relationships between PA and HRQOL among university students [12, 13, 18].

## Conclusions

The study demonstrated that physical activity (PA) has a significant positive impact on the health-related quality of life (HRQOL) of students at Hanoi University of Culture. Specifically, students with high PA levels achieved higher mean MCS scores ( $53.8 \pm 7.0$  for males and  $51.2 \pm 7.4$  for females) compared with those with low activity levels (MCS =  $45.2 \pm 9.3$  for males and  $43.1 \pm 9.8$  for females;  $p < 0.001$ ). Meanwhile, PCS scores remained relatively stable across groups but were still higher than the SF-12 norm ( $54.8 \pm 4.6$  vs.  $50.0$ ;  $p < 0.001$ ). Female students exhibited lower MCS scores than males ( $p = 0.002$ ), reflecting gender-related differences in mental health.

These findings confirm that PA not only enhances physical and psychological well-being but also contributes to greater

life satisfaction and adaptability within the academic and physical activity environments at the university level. Therefore, educational institutions—particularly those in the fields of culture and the arts—should consider expanding extracurricular sports programs, investing in and improving sports facilities, and developing policies and methods that encourage regular student participation. Such efforts would promote comprehensive development in physical, mental, and social dimensions among university students.

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### Ethical approval

This study was conducted in compliance with the ethical standards for scientific research of Hanoi University of Culture and with conventional research ethics regulations. All participating students were fully informed about the study and voluntarily consented to take part, with their consent verified through signed confirmation forms.

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