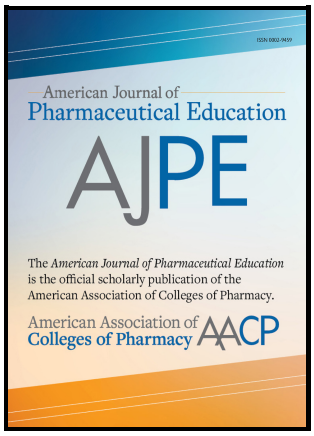
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Assessment of Academic Resilience and its associated factors among Pharmacy Students in Twelve Countries

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Assessment of Academic Resilience and its associated factors among Pharmacy Students in Twelve Countries

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Abstract

Objective: Academic resilience, a critical determinant of academic achievement, is affected by various factors. There is a paucity of large-scale international assessments of academic resilience among pharmacy students. Therefore, this study aimed to assess academic resilience among pharmacy students in twelve countries and to evaluate factors associated with their academic resilience levels.

Methods: A cross-sectional online survey-based study was conducted among randomly selected pharmacy students in twelve countries: Egypt, Türkiye, Indonesia, Pakistan, Bangladesh, Iraq, Jordan, Nigeria, Malaysia, Saudi Arabia, Sudan, and the United Arab Emirates. After pilot testing, the validated 30-item academic resilience scale (ARS) was used for the assessment. The data was collected between November 1, 2022, and April 15, 2023. Descriptive and inferential statistics were performed as appropriate.

Results: A total of 3950 were received from the twelve participating countries. The mean age was 21.68 ± 2.62 years. About two-thirds of the responses were from female participants and those studying for Bachelor of Pharmacy degrees. Overall, the findings show moderate academic resilience, which varied across countries. The median (IQR) of total ARS-30 was 114 [103-124]. Females exhibited lower negative affective and emotional response subscale levels than males ($p = 0.003$). There were significant cross-country variations in the ARS-30 and all subscales. The highest overall levels were reported for Sudan, Pakistan, and Nigeria, and the lowest were reported for Indonesia and Türkiye. Students in private universities tended to have higher overall ARS levels than public university students ($p = 0.035$).

Higher academic performance was significantly associated with ARS levels, whereas those with excellent performance exhibited the highest ARS levels ($p < 0.001$). Students with exercise routines had higher ARS levels ($p<0.001$) than those with no exercise. Finally, students who were engaged in extracurricular activities had higher ARS levels compared to those who did not participate in these activities ($p<0.001$).

Conclusion: The study offers insights into the factors affecting academic resilience in pharmacy students across several countries. The findings could guide interventions and support activities to improve resilience and academic outcomes.

Keywords: academic resilience, pharmacy, students, education, Asia, Middle East, European

1. Introduction

Undergraduate pharmacy programs, similar to other health professional education programs, involve an integrated mix of multiple didactic courses, practical and laboratory sessions, numerous projects, and several months of virtual and on-site training before graduation. Such extensive educational programs have been shown in previous studies to be associated with stress, burnout, and negative impacts on mental health. [1,2] To succeed academically, the ability to respond to difficulties and overcome challenges, setbacks, and adversity during the academic program (such as low grades, difficult assignments, meeting deadlines, and exam pressure) defines academic resilience. [3] Academic resilience is a positive indicator of mental well-being and personal growth. [4]

Previous studies have utilized different methods to evaluate academic resilience among undergraduate pharmacy students. However, the most common method is the Academic Resilience Scale (ARS), a self-reported measure that assesses four dimensions of academic resilience. [5] These include negative affect and emotional response (how students manage stress and negative emotions), adaptive help-seeking (how well students reflect on their experiences and seek help when needed), adaptive thought processes (how well students maintain a positive attitude and focus on their goals), and perseverance (how well students persist in the face of academic challenges). [5]

Academic resilience is a complex construct influenced by various factors, including personality, coping skills, social support, and life experiences. [1,3] Previous studies found that factors such as younger age, higher grade point average, self-directed learning capacity, social support from family or friends,

having time for fun, and engaging in mindfulness-based stress reduction therapy were associated with academic resilience. [6–10] Among pharmacy students, academic resilience declined as the students advanced in the program, which was also associated with negative academic performance and a higher attrition rate [1]. Another study found that academic resilience positively correlated with academic achievement and success, as it acts as a way to cope with academic burnout. [11] Therefore, achieving and maintaining academic resilience among pharmacy students is crucial to ensure successful academic outcomes. [12] Moreover, recent research on resilience among early career pharmacists has identified the beneficial role of activities and interventions that help build resilience during undergraduate studies.[13]

Few studies have evaluated academic resilience among undergraduate pharmacy students, given the unique structure of pharmacy programs and training compared with other health professional education programs, such as medicine and nursing. Therefore, this study aimed to assess academic resilience levels among undergraduate pharmacy students in twelve countries and to evaluate factors associated with their academic resilience levels (including their coping strategies and social support).

2. METHODS

2.1 Study design

A cross-sectional online survey-based study was conducted among pharmacy students in 12 countries with relatively large pharmacy student populations in Asia, the Middle East, Africa, and Europe: Egypt, Türkiye, Indonesia, Pakistan, Bangladesh, Iraq, Jordan, Nigeria, Malaysia, Saudi Arabia, Sudan and the United Arab Emirates. The study used a validated, self-administered survey prepared in English, Turkish, and Arabic on *Google Forms*. The study co-investigators in each country disseminated all forms via private social media and other educational platforms, such as Microsoft Teams. Participants selected the language of the form and responded to only one version to avoid duplicate responses. The form settings were adjusted to limit only one response per participant. The data was collected between November 1, 2022, and April 15, 2023.

2.2 Inclusion and exclusion criteria

The study involved undergraduate pharmacy students who studied for at least one full semester at an accredited university in one participating country. Students from different pharmacy programs across all years of the study and training were eligible to participate in the study. All received responses were checked for completeness, and incomplete forms were excluded from the final data analysis.

2.3 Sample size

This study was directed toward cross-country comparisons. As there were considerable variations among countries regarding the number of pharmacy schools, target student population, and accessible sampling frames, the target sample varied across countries. Using the Raosoft sample size calculator, assuming an estimated proportion of 50% and a 95% confidence interval and confirming that at least one principal pharmacy school will be participating in each country, the minimum required sample size was estimated to be 180 students at least in every setting. All countries met this successfully, with larger sample frames exceeding these minimum requirements. The data collection duration was extended in some countries compared to others to satisfy the sample size requirement.

2.4 Instrument structure and translation

The survey consisted of 3 sections: demographic data, items on common coping strategies and social support, and the validated Academic Resilience Scale (ARS-30). Following the consent form in the first section, questions on gender, age, country of residence, ethnicity, living arrangement, type of pharmacy program, type of institution, average exercise, sleep frequency, engaging in extracurricular activities (such as arts, sports, personal skills, debate competitions, and community services), and cumulative grade point average (CGPA) were asked. The second section asked about coping strategies (including exercising and seeking religious advice) and social support (including their family, classmates, and institution). The third section required participants to answer the ARS-30. Formal permission to use the ARS's original and translated forms was given before the study initiation.[14,15]

2.5 Validity and pilot testing

A panel of seven academicians who are pharmacy practice experts evaluated the content validity for the first two sections, which are the demographic part and questions regarding students' perception of coping strategies and social support. The questionnaire content validity was analyzed by estimating the content validity index (I-CVI) for each item involving a minimum of three experts with at least a 0.78 I-CVI score.[16] The items that were <0.78 for clarity were improved for better clarity according to the experts' suggestions, and no items were deleted. For the Turkish form, an expert panel (n=3) for translation, cultural adaption, and pilot testing for face validity among pharmacy students were performed.

The third section, ARS-30, was developed by Simon Cassidy and designated to evaluate students' reactions (cognitive-affective and behavioral) toward academic challenges [5]. On a 5-point Likert scale, participants answered the questions based on their perception of a scenario or vignette, as they will be asked to visualize themselves encountering an academic situation. The items were constructed using positive and negative wordings to perceive the reaction to distress. A five-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree) resides on each item. The overall score will be calculated by summation where the theoretical range is 30-150, reflecting the level of academic resilience [5]. The items represented three factors: (1) perseverance, (2) reflecting and adaptive help-seeking, and (3) interpreted negative affect and emotional response. Perseverance is the first factor that highlights the perception of hardship as a chance to confront challenges and make improvements, strive, hold onto goals, embrace and utilize feedback, and creative problem-solving. The second factor is reflecting and the adaptive-help-seeking attribute to assessing strengths and weaknesses, adjusting the study method and looking for support, help, and inspiration. The third factor is interpreted as the negative affect and emotional response that comprises anxiety, overthinking, optimism, vulnerability, and suppressing emotion. Previous research emphasized the role of these factors in shaping academic resilience and predicting academic achievement. [17,18] All the reverse coding was done as per the developer's guide. Finally, the total ARS scores and individual factor scores were calculated for each participant.

2.6 Data collection

The final survey was distributed to potential participants through the study con-investigators via private social media and educational platforms (e.g., WhatsApp and Microsoft Teams). In addition, a weekly reminder was sent throughout the period allocated for data collection until the target sample size was reached.

2.7 Statistical analysis

The current study employed IBM SPSS Statistics for Windows, Version 28.0 (IBM Corp. Released 2021. IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp) to analyze the data. The responses were subjected to descriptive statistics in terms of frequencies and percentages. Initially, the total ARS scores and individual factors' scores were computed. Internal consistency was measured by calculating Cronbach's alpha. Subsequently, the Mann-Whitney was used to assess the significance of the differences in these scores across two-group variables of participants' demographics, academic-related information, and coping and support strategies, given that normal distribution assumptions were not met. Similarly, Kruskal–Wallis test was used to examine score differences between variables with more than two groups. We adjusted the p-values for multiple comparisons using the Bonferroni adjustment. The resulting adjusted p-values were reported for each pairwise comparison. A p-value of <0.05 was considered statistically significant for all other comparisons.

2.8 Ethical approval

Ethical approval for this study was initially provided by the IIUM Research Ethics Committee (IREC 2022-081). Further ethical approval and administrative agreements were obtained from co-investigator institutions when required (Marmara University Faculty of Medicine Clinical Trials Ethical Committee- 06.01.2023/09.2023.109). The introductory page of the online form included the participation information sheet and informed consent that required approval before accessing the main survey. By approving the consent form, the participants were deemed to have consented to participate in this research. They were also free to withdraw their consent during the study.

3. Results

3.1. Overall characteristics of the study participants

A total of 4013 responses were initially received. Sixty-three forms were not complete and were excluded from the final analysis. So, 3950 responses from the twelve participating countries were finally considered for formal analysis. The mean age was 21.68 ± 2.62 years. About two-thirds of the responses were from female participants and those studying for Bachelor of Pharmacy degrees. Approximately 60% belong to public universities. More than 50% of the students were in years 4 and 5 of their studies. One-third of the sample did not report exercise routines, and about 40% did not participate in extracurricular activities. Table 1 shows the overall participants' characteristics.

3.2. Coping and support strategies among the study participants

The participants were asked how they had been supported or tried to cope with their academic-related demands. The highest agreements were for family support and help started with choosing the pharmacy program. Approximately 80% reported agreement with the role of exercise and activities in helping them overcome tough times. About 90% agreed with the positive impact of religious and spiritual support on their ability to handle problems. Table 2 shows an overview of study participants' responses concerning key coping and support strategies.

3.3. Academic resilience scales and subscales reliability analysis and assessment findings

Reliability analysis of the total scale and sub-scales was conducted to confirm the internal consistency of using the ASR-30 among our study participants. In this study, the results indicated that the ARS-30 has good internal consistency with α=.874 for the overall scale, α=.786 for the perseverance subscale, α=.876 for the reflecting and adaptive help-seeking subscale, and α=.743 for the negative affect and emotional response subscale. Overall, the findings show moderate academic resilience, which varied across countries. The median (IQR) of total ARS-30 was 114 [103-124]. The perseverance subscale was 56 [51-61], while the reflecting and adaptive help-seeking subscale was 36 [33-41]. Finally, the negative

affective and emotional response subscale was 22 [17-26]. Table 3 presents the median and interquartile ranges of the overall ARS-30 and its three subscales.

3.4. Cross-tabulation of mean ranks of ARS-30 and its three subscales across various participants' characteristics

Overall, the ARS-30 and subscales exhibited variations across different characteristics of participants. Females had lower levels in the third negative affective and emotional response subscale than males (P = 0.003). There were significant cross-country variations in the ARS-30 and all subscales. The highest overall levels were reported for Sudan, Pakistan, and Nigeria, and the lowest were reported for Indonesia and Türkiye. Students in private universities tended to have higher overall ARS levels than public university students (p = 0.035). Higher academic performance was significantly associated with ARS levels, whereas those with excellent performance exhibited the highest ARS levels (p < 0.001). Students with exercise routines had higher ARS levels (<0.001) than those with no exercise. Finally, students who were engaged in extracurricular activities had higher ARS levels compared to those who did not participate in these activities (<0.001). Table 4 presents the cross-tabulation of the overall ARS and subscales against participants' characteristics.

4. Discussion

To our knowledge, the present study possibly reports the largest-scale academic resilience assessment in pharmacy education. We reported moderate levels of academic resilience that varied considerably across countries. The findings also reported variations in academic resilience levels and subscales based on gender, institution, year of study, academic performance, and participation in extracurricular activities. The study also described the status of coping and support strategies among participants, where exercise, religion, and family appeared to have a significant role in shaping how students cope with tough times throughout their studies. These findings provide valuable insights into the factors that influence academic resilience among pharmacy students and can be used to develop interventions to support students and improve their outcomes.

Our findings showed significant variations in overall academic resilience across countries, with the highest levels recorded in Sudan, Pakistan, and Nigeria. In contrast, relatively lower levels were reported in Indonesia and Türkiye. Other countries, such as Malaysia, Jordan, Saudi Arabia, and the United Arab Emirates, tended to have relatively moderate levels. This variation was anticipated in the context of differences across countries and institutions in the offered framework of student integration into the academic system and the range of support activities, contributing directly to students' level of wellbeing and academic resilience [19,20]. This was further amplified by the unique demands of pharmacy programs concerning practical and experiential learning activities that exhibited significant differences across countries in the design, demands, and institutional support reported in two recent reports in Arab and Asia-Pacific countries. [21,22]

Although previous large-scale studies highlighted differences in overall academic resilience based on gender [1], the current study found only gender-based differences in the third subscale 3 of negative affective and emotional responses but not in the overall academic resilience measures. This might suggest a more refined impact of gender on academic resilience and a guide for providing additional support. Similar to previous studies, our study found a significant difference in academic resilience across years of study, where first-year students tended to have higher academic resilience than other years. Unsurprisingly, our findings support that academic resilience directly correlates with academic performance, whereas students with higher academic resilience levels have higher academic grades. This is consistent with a previous Malaysian study that showed a positive correlation between academic resilience and cumulative grade points. [12]

Earlier large-scale assessments of mental wellbeing and grit, essential traits for academic achievement, identified an impact of institution type on the overall assessment [20,23]. This impact was also evident in our findings, as students from private universities had higher academic resilience levels than their counterparts from public universities. This, again, can be attributed initially to student support activities that might be more likely to be available in a well-structured format in private schools. One of these support modalities might be linked to sports engagement, as exercise seems to be associated with students' resilience, possibly through the positive link between exercise routine and mental wellbeing among pharmacy students. [20]

On the other hand, our findings did not show any significant difference in academic resilience levels based on living arrangements, such as staying alone, sharing a hostel, or living with family. However, an earlier study in Thailand reported significantly higher resilience levels among those with friends and family surrounding them during their studies. [24]

The implications of this study hold significant weight in the realm of pharmacy education. Initially, the findings indicate the necessity of cultivating and implementing interventions designed to uphold academic resilience amongst pharmacy students. These interventions may center around the cultivation of coping mechanisms, the provision of accessible support services, and the creation of an environment that fosters support. [2] Moreover, the findings propose that pharmacy programs should be customized to cater to the unique needs of individual students. For instance, programs may need to extend additional support to female students, those from certain ethnic backgrounds, penultimate and final-year students, and those encountering academic challenges. [25] Finally, the findings suggest that pharmacy programs should actively encourage student participation in extracurricular activities. Such activities are linked to academic achievement, character, social development, and community involvement. [26] All these elements collectively contribute to an enhanced state of academic resilience.

The main strengths of the current study were its large sample and that it is a multinational survey involving representative samples of pharmacy students from twelve countries representing varied geographical regions extending from Asia, the Middle East, Africa, and Europe. Another strength was the use of a validated 30-item academic resilience scale.

There are some limitations of this study. There is a risk of selection bias; pharmacy students with higher academic resilience might be willing to participate in this online survey. Also, the self-reported nature of the survey may limit the overall assessment accuracy among participants. In addition, points related to family obligations and detailed program requirements in every country might have benefited from a thorough, detailed assessment to ascertain its impact on academic resilience.

5. Conclusion

The present study provides valuable insights into the factors that could impact the academic resilience of pharmacy students. These findings could inform the development of interventions and structured support activities to boost academic resilience and enhance overall academic outcomes. Pharmacy

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colleges should activate academic advising services to support students' mental wellbeing and academic resilience. Given its multifaceted nature, it is imperative to conduct further research to gain in-depth insights into the specific traits or characteristics associated with academic resilience.

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Conflict of Interest:

The authors declare there is no conflict of interest associated with this work.

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Table 1. General information of study participants (N =3950)

Characteristics	Frequency	Percent
Gender		
Female	2600	65.8
Male	1350	34.2
Country of Residence		
Egypt	681	17.2
Pakistan	469	11.9
Nigeria	411	10.4
Indonesia	378	9.6
Bangladesh	355	9.0

Türkiye	293	7.4
Saudi Arabia	251	6.4
Sudan	249	6.3
Iraq	242	6.1
Malaysia	233	5.9
Jordan	221	5.6
United Arab Emirates	167	4.2
Race		
African (non-Arab)	424	10.7
Arab	1779	45.0
Asian (non-Arab)	1469	37.2
Caucasian	278	7.0
Living arrangement		
On campus (sharing hostel)	777	19.7
Living alone	317	8.0
Living with family	2362	59.8
Living with friend(s) outside campus	494	12.5
Type of institution		
Private (not funded by government)	1593	40.3
Public (funded by the government)	2357	59.7
Pharmacy program		
Bachelor's degree (BS. Pharm)/with honors	2604	65.9
Pharm D (Doctor of Pharmacy)	1346	34.1
Year of Study		
Year 1	670	17.0
Year 2	517	13.1
Year 3	649	16.4
Year 4	1308	33.1
Year 5	712	18.0
Year 6	94	2.4
Academic Performance up to the previous semester/annual exam		
Excellent	899	22.8
Very good	1420	35.9
Good	1056	26.7
Average	362	9.2
Below average	164	4.2
Poor	49	1.2
Exercise status		
No	1428	36.2
Yes. Irregular exercise	2170	54.9

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Yes. Regular exercise	352	8.9
Participation in extracurricular activities (arts, sports, personal skills, debate competitions, and community service)		
Maybe (participate occasionally in some activities).	1790	45.3
No.	1550	39.2
Yes (regularly participate in almost all activities).	610	15.4
The average number of hours sleep a day		
4 to 6 hours/day.	1990	50.4
7 to 10 hours/day.	1864	47.2
More than 10 hours/day.	96	2.4
Total	3950	100.0

Table 2. Assessment of coping strategies and social support (n =3950)

Coping strategy/ social support	1 (Strongly agree)	2 (Agree)	3 (Neutral)	4 (Disagree)	5 (Strongly disagree)
Coping strategy					
Doing activities such as exercise or recreational activities helps you in dealing with problems or tough times.	1468 (37.2%)	1637 (41.4%)	645 (16.3%)	142 (3.6%)	58 (1.5%)
Spiritual or religious support helps you to get through the problems or tough time.	2351 (59.5%)	1157 (29.3%)	321 (8.1%)	69 (1.7%)	52 (1.3%)
Acting like nothing has happened helps you go through the problems	675 (17.1%)	1103 (27.9%)	1087 (27.5%)	723 (18.3%)	362 (9.2%)
Social support					
Your family supported you when you chose the pharmacy course	2279 (57.7%)	1119 (28.3%)	392 (9.9%)	96 (2.4%)	64 (1.6%)
You get the help and support you need from your family	2139 (54.2%)	1167 (29.5%)	460 (11.6%)	104 (2.6%)	80 (2%)
You get the help and support you need from your classmates	967 (24.5%)	1753 (44.4%)	894 (22.6%)	227 (5.7%)	109 (2.8%)
You get the help and support you need from your institution	710 (18%)	1250 (31.6%)	1159 (29.3%)	502 (12.7%)	329 (8.3%)

Table 3. Median and interquartile range of total academic resilience (ARS-30) scale and subscales. (N =3950)

	Median	IQR	Max and Min theoretical values
Total ARS score	114	103-124	30-150

Sub-scale 1 (Perseverance)	56	51-61	14-70
Sub-scale 2 (Reflecting and adaptive help-seeking):	36	33-41	9-45
Sub-scale 3 (Negative affective and emotional response)	22	17-26	7-35

Table 4. Associations with the total academic Resilience (ARS-30) scale and subscales expressed in mean rank. (N =3950)

Characteristic	ARS-30 score	Sub-scale 1 (Perseverance)	Sub-scale 2 (Reflecting and adaptive help-seeking):	Sub-scale 3 (Negative affective and emotional response)
Gender				
Female (N=2600)	1971.16	1988.46	1977	1936.36
Male (N=1350)	1983.86	1950.53	1972.60	2050.87
P-value*	0.740	0.321	0.908	0.003
Country of Residence				
Egypt (N=**681)**	1969.04	1996.09	1940.95	1932.37
Pakistan (N=**469)**	2205.78	2043.88	2237.76	2239.35
Nigeria (N=**411)**	2339.85	2419.38	2135.85	2163.56
Indonesia (N=**378)**	1544.78	1373.99	1752.42	1943.67
Bangladesh (N=**355)**	1968.50	1841.18	2175.31	1970.83
Türkiye (N=**293)**	1382.90	1569.67	1407.79	1438.80
Saudi Arabia (N=**251)**	1826.81	2030.08	1805.22	1670.58
Sudan (N=**249)**	2501.92	2450.40	2339.80	2408.06
Iraq (N=**242)**	1917.14	1964.35	1747.81	2039.71
Malaysia (N=**233)**	1954.74	2023.97	1928.62	1891.04
Jordan (N=**221)**	1982.63	2045.41	2024.72	1877.47
United Arab Emirates (N=167)	2030.62	2032.05	2104.42	1939.04
P-value **	<0.001	<0.001	<0.001	<0.001
Race				
African (non-Arab) (N=**424)**	2330.43	2406.03	2136.72	2155.70
Arab (N=**1779)**	2021.67	2064.34	1976.56	1972.61
Asian (non-Arab) (N=**1469)**	1930.05	1819	2038.93	2028.28
Caucasian (N=**278)**	1378.84	1577.33	1387.63	1440.30
P-value**	<0.001	<0.001	<0.001	<0.001
Living arrangement				

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On campus (sharing hostel) (N=**777)**	1996.56	2030.02	1994.90	1923.95
Living alone (N=**317)**	1881.41	1867.64	1886.18	1985.82
Living with family (N=**2362)**	1991.08	1990.35	1980.32	1990.31
Living with friend(s) outside campus (N=**494)**	1928.27	1887.94	1979.27	1979.16
P-value**	0.294	0.047	0.527	0.568
Type of institution				
Private (not funded by government) (N=**1593)**	2021.99	1944.66	2097.33	2049.53
Public (funded by the government) (N=**2357)**	1944.08	1996.34	1893.16	1925.47
P-value*	0.035	0.162	<0.001	<0.001
Pharmacy program				
Bachelor's degree (BS. Pharm)/with honors (N=**2604)**	1967.73	1965.50	1965.98	1975.26
Pharm D (Doctor of Pharmacy) (N=**1346)**	1990.53	1994.84	1993.91	1975.97
P-value *	0.551	0.443	0.465	0.985
Year of Study				
Year 1 (N=670)	2132.95	2040.95	2146.71	2188.57
Year 2 (N=**517)**	1962.21	1977.67	1962.05	1953.68
Year 3 (N=**649)**	1912.22	1972.96	1923.30	1839.35
Year 4 (N=**1308)**	1940.40	1938.21	1957.08	1946.57
Year 5 (N=**712)**	1981.67	1983.29	1928.99	1999.74
Year 6 (N=**94)**	1804.86	1974.48	1798.06	1735.77
P-value**	0.003	0.601	0.001	<0.001
Academic Performance up to the previous semester/annual exam				
Excellent (N=**899)**	2202.70	2207.50	2153	2096.65
Very good (N=**1420)**	1973.76	1971.03	1969.81	1981.95
Good (N=**1056)**	1904.26	1884.23	1926.57	1951.95
Average (N=**362)**	1895.27	1900.76	1879.30	1963.81
Below average (N=**164)**	1572.16	1619.30	1726.27	1670.05
Poor (N=**49)**	1335.53	1559.76	1483.29	1182.23
P-value **	<0.001	<0.001	<0.001	<0.001
Exercise status				
No (N=**1428)**	1859.95	1909.21	1872.45	1841.08
Yes. Irregular exercise (N =**2170)**	2039.77	2020.60	2031.62	2032.07

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Yes. Regular exercise (N = **352)**	2048.09	1966.37	2047.56	2172.08
P-value **	<0.001	0.016	<0.001	<0.001
Participation in extracurricular activities (arts, sports, personal skills, debate competitions, and community service)				
Maybe (participate occasionally in some activities). (N =**1790)**	2044.69	2055.92	1983.25	2036.60
No. (N=**1550)**	1888.47	1903.42	1883.87	1914.34
Yes (regularly participate in almost all activities). **(N = 610)**	1993.60	1922.66	2185.60	1951.63
P-value**	<0.001	0.016	<0.001	0.007
The average number of hours sleep a day				
4 to 6 hours/day. (N =**1990)**	2033.27	2028.87	2036.23	2005.04
7 to 10 hours/day. (N =**1864)**	1925.81	1933.13	1916.15	1949.81
More than 10 hours/day. (N = **96)**	1742.88	1962	1869.12	1861.86
P-value**	0.002	0.002	0.003	0.198

The significance level is 0.050.
*Mann–Whitney U test
**Kruskal–Wallis test

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Declaration of Competing Interest

☒ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

☐ The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

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