ORIGINAL RESEARCH

Academic Difficulties Among Medical Students at Jazan University: A Case–Control Study

Sarah Salih [1]
Maram Fageehi [2]
Safiah Hakami [2]
Ebtisam Ateya [2]
Manal Hakami [2]
Hajar Hakami [2]
Bashaer Ghazwani [2]
Yaqeen Alabdalali [2]
Mai Mustafa [3]

[1]Family and Community Medicine Department, Faculty of Medicine, Jazan University, Jazan, Kingdom of Saudi Arabia; [2]Faculty of Medicine, Jazan University, Jazan, Kingdom of Saudi Arabia; [3]Pediatric Department, Faculty of Medicine, Jazan University, Jazan, Kingdom of Saudi Arabia

Video abstract

Point your SmartPhone at the code above. If you have a QR code reader the video abstract will appear. Or use: https://youtu.be/EE9U7YuDfB0

Correspondence: Sarah Salih
Family and Community Medicine Department, Faculty of Medicine, Jazan University, Jazan, Kingdom of Saudi Arabia
Email ssalih@jazanu.edu.sa

Purpose: Identification of potential causes of academic difficulties and unsatisfactory student performance is essential for any educational institution. This study has been undertaken to identify risk factors that are associated with academic difficulties among medical students by exploring lifestyle and social factors, health problems, study and exam habits and psychological status of students at the faculty of medicine in Jazan University, Saudi Arabia.

Materials and Methods: This observational analytical case–control study was performed at the Faculty of Medicine at Jazan University to highlight the factors that influence the academic performance of medical students. We studied 40 students with academic difficulties (cases) and 40 controls based on their grade point average. Cases were matched to controls according to sex, age, and medical year.

Results: Several factors seem to negatively affect the students' academic performance; students with academic difficulties are older, require more time to reach the college, their perceived English proficiency is less than their counterparts, and they spend less time socializing. On the other hand, having a strong family support system, socializing with friends, access to the internet, and engagement in extracurricular activities seems to positively affect the students' performance. No difference was observed in study habits or sleep quality. The prevalence of anxiety, stress, and depression were all low for both cases and controls.

Conclusion: We have identified many factors, most of which are related to the student's lifestyle and social habits, that positively and negatively affect academic performance.

Keywords: academic, difficulties, medical, students, GPA, Jazan University

Introduction

One challenge in the field of medical education is to identify factors that can lead to good academic performance. Improved student achievement has always been one of the main concerns of education. Medical education stakeholders are concerned about the students' performances since they reflect various interests for institutions and stakeholders.

Identification of potential causes of academic difficulties and unsatisfactory student performance is essential for any educational institution to ensure production of safe medical practitioners[1] and for the wellbeing and future prospects of the students themselves.

A student's academic average may serve as an indicator of progress in his or her studies. However, academic performance is affected by many factors like psychological, social, personal, and environmental factors.[1,2] While these factors strongly influence the performance of the students, they are very different across nations and

individuals. Some factors associated with poor academic performance are inadequate learning skills, difficulty in managing study load and socioeconomic difficulties.[1–3] Psychological problems such as stress, depression, and anxiety are also linked to poor academic performance,[1,2,4] as well as sleep disturbances.[5,6] Often these factors are non-academic in nature,[7] although inconsistencies exist between different studies.[3]

Research conducted in Saudi Arabia has reported insufficient time for self-study, subject overload, inadequate proficiency in the English language, insufficient sleeping time, anxiety and stress, teaching methodology, and health problems[7] were all associated with poor academic performance.

A majority of medical students considered peer competition to be their greatest challenge followed by English language skills. The subject difficulty was ranked third followed by a lack of informational resources and a large amount of academic work. A lack of time for social activities and stress related to courses was the lowest-ranked items.[9]

Studies on medical students in Saudi Arabia also found that English language proficiency is related to avoidance of textbook reading as well as poor academic performance.[9,10] The availability of Internet facilities at the individual level also has a significant effect on student achievement.[10]

Although many studies have been performed in different parts of Saudi Arabia, no reported studies have been performed in the Jazan area. This study has been undertaken to identify risk factors that are associated with academic difficulties among medical students by exploring lifestyle and social factors, health problems, study and exam habits, and psychological status of students at the faculty of medicine at Jazan University, Saudi Arabia.

Materials and Methods

This is an observational analytical case–control study conducted at the Faculty of Medicine at Jazan University. Jazan University is located in the Jazan province in the southwestern part of Saudi Arabia just north of the Yemeni border.

The Faculty of Medicine at Jazan University was established in 2006. The program consists of six academic years and requires students to complete 209 credit hours consisting of three components:

1. Core and introductory modules (188 credit hours);

2. Elective courses (6 credit hours); and
3. Required university courses (15 credit hours).

The program is arranged in three phases. During the first phase (the first year), students learn basic concepts in chemistry, physics, biology, and more of the English and Arabic languages. During the second phase (the second and third years), students study the organ systems which integrate structure and function. The third phase (during years 4–6) forms the clinical clerkships in hospitals and community health settings where students practice skills, attitudes, and behaviors specific to each discipline as well as those common to the practice of medicine.

A total of 812 students (389 males and 423 females) were enrolled in the academic year 2018–2019 from the second to the sixth year. The first-year medical students study at the preparatory college, so they were excluded from the study. The study was performed over a period of 6 months. The calculated sample size for this study was 40 cases and 40 controls with 1:1 cases to control and male to female ratios. The total number of students with academic difficulties at the time of the study was 180 students.

Cases and controls were recruited according to their grade point average (GPA). Students with a GPA of less than 2.5 at the time of the study were considered to have academic difficulties according to faculty standards (case group). Any student with a GPA of 2.5 or more was considered in the control group. Cases were matched to controls according to sex, age, and medical year.

Table 1 shows the proportionate allocation of cases and controls according to their study year.

The sample was identified with the help of the students' academic advisors. The research team was blinded to whether the selected student was a case or a control. Data were collected using an electronic self-administered questionnaire that consists of five parts: demographic information of the students, social activities, and lifestyle influence, students' study habits, and exam preparation habits. The fifth part was to test the psychological status of the students using the Mental Health Inventory 5 items (MHI-5) tool in Arabic. This tool has been field-tested in extensive populations. The score is calculated by adding up the points of each question, which ranges from 1 to 6 and then transforming the raw scores to a 0 to 100-point scale.[11]

The questionnaire was tested and pre-validated by a pilot study. The results of the pilot study are not included in the final results.

Table 1 Proportionate Allocation of Cases and Controls According to Their Study Year

Case	Female		Male		Total	
Student Year	Total No.	Sample Size	Total No.	Sample Size	Total Population	Total Sample Size
2nd Year	132	6	155	8	287	14
3rd Year	92	4	79	4	171	8
4th Year	76	4	62	3	138	7
5th Year	77	4	48	3	125	7
6th Year	46	2	45	2	91	4
Total	423	20	389	20	812	40

Data were entered and analyzed using the Statistical Package for the Social Sciences version 22. Descriptive statistics were used to analyze study variables like frequency and odds ratio. Independent student *t*-test was done to compare between the two groups and logistic regression was performed to identify significant factors. Appropriate significance tests (such as chi-square) were applied and $P < 0.05$ was considered statistically significant.

Ethical clearance was obtained from the Institutional Review Board (IRB) of Jazan University with the reference number: REC39/8-S022. Informed written consent was obtained from all participants. Data privacy and confidentiality were maintained at all phases of the research.

Results

A total of 80 students from the second to the sixth year participated in the study. Of those, 50% were male students and 50% were female students. About 50% of participants had a GPA greater than 2.5; this group represents the "control group." Those with a lower GPA (<2.5) comprised 50% of the total participants; this group represents the "cases group."

There was a significant age difference between the case and control groups [*P*= 0.002; odds ratio (OR) = 4.2, adjusted odds ratio (AOR) =1.603]. Most of the students with lower GPA are older; 47.5% of them are between 22 and 24 years of age and 30% were older than 25 years of age. The students with a high GPA were mostly younger; 55% of these students were between 19 and 21 years old and only 5% of were older than 25 years of age. There was no significant difference between sexes in terms of academic performance (*P* = 1; OR =1). The students residing in rural areas had lower GPA as compared to those living in the city (OR= 3, AOR= 3.424); however, this result was not statistically significant (*P*= 0.056). Demographic data are summarized in Table 2.

Table 2 Demographic Data of Participants

Profile of Participants	High GPA Students N=40 (50%)	Low GPA Students N=40 (50%)	Total N=80 (100%)	P-value
Sex				1.00
Male	20(25%)	20(25%)	40(50%)	
Female	20(25%)	20(25%)	40(50%)	
Age				0.002
19–21	22 (55%)	9(22.5%)	31(38.75%)	
22–24	16(40%)	19(47.5%)	35(43.75%)	
25–27	2(5%)	12(30%)	14(17.5%)	
Level of study				0.999
2nd year	15(30%)	14(35%)	29(36.25%)	
3rd year	8(20%)	8(20%)	16(20%)	
4th year	7(17.5%)	7(17.5%)	14(17.5%)	
5th year	6(15%)	7(17.5%)	13(16.25%)	
6th year	4(10%)	4(10%)	8(10%)	
Social status				0.112
Single	36(90%)	31(77.5%)	67(83.75%)	
Married	3(7.5%)	9(22.5%)	12(15%)	
Widowed	1(2.5%)	0 (0%)	1(1.25%)	
Residence				0.056
City	35(87.5%)	28(70%)	63(78.75%)	
Village	5(12.5%)	12(30%)	17(21.25%)	

The time required to reach the college shows a statistically significant inverse relationship with GPA (P=0.032, OR= 1.6, AOR= 2.484).

No statistically significant relationship was found between students' performance and their family size (P = 0.466) or whether they were living with their families (P= 1). There were no significant differences in the educational levels of both parents or the monthly income of the family between cases and controls.

The proportion of students who spent time with friends was significantly different between cases and controls. Controls seem to spend more time socializing with friends compared to cases (P= 0.003; OR = 0.29, AOR= 2.81).

Controls participate more in extracurricular activities either inside or outside the college compared to the cases, and the results are highly statistically significant (P 0.009, OR= 0.24, AOR= 0.276).

The following factors did not show any significant difference between cases and controls: the mode of transportation to the college (P= 0.078); the time spent outside the house (P=0.110); drinking caffeinated beverages (P=0.121) and having enough money to buy their college supplies (P= 0.193). Forty-seven percent of cases spend more than 4 h a day watching television or on social media compared to only 10.5% of controls. However, this result was not statistically significant (P= 0.152).

Also, no significant difference was observed regarding the quality of sleep (P=0.961).

Most cases and controls had entered medical college through their own will, with no statistically significant difference between the two groups (P= 0.176).

Regarding student perception of family and community support, cases were much less satisfied by their family support compared to controls (25% vs 52%), the results are statistically significant (P= 0.022; OR = 0.4652, AOR= 0.415). Meanwhile, 12.5% of cases were satisfied by their level of community support compared to 27.5% of controls. However, these results are not statistically significant.

When it came to self-perceived English proficiency, there was a significant difference in the level of English proficiency between cases and controls, with controls having better self-perceived English proficiency (P= 0.007, OR=0.354, AOR= 0.399). As expected, cases were more likely to have had previous difficulty with a subject compared to controls (P= 0.029).

Regarding 24-h internet access, high GPA students had better internet access and results were statistically significant (P= 0.041, OR= 0.248, AOR= 2.48). Most cases and controls own a personal laptop (82.5% and 85%) and results were not statistically significant (P= 0.762).

Regarding study habits of the students, most control students (82.5%) prefer to study alone compared to 65% of cases. However, studying in groups was the least-preferred method of study for cases (12%) and controls (5%). The results were statistically insignificant (P= 0.080, OR= 0.3939, AOR=1.612)

Regarding studying hours during the week, cases study less compared to controls (P = 0.600; OR = 0.6923, AOR= 0.700) but the results were not statistically significant.

There was no statistically significant difference between the proportion of cases and controls that asked for help from other colleagues (P = 1) or when preparing for an upcoming course (P = 0.504).

There were no differences in study techniques between cases and controls. Both prefer reading loudly (86.25%) followed by taking notes (50%), silent reading (45%), and summarizing (33%). The least-preferred technique among both groups was mapping (15%).

No significant difference existed between the two groups regarding the quantity amount of time used to prepare for examinations and academic performance (P = 0.504).

We examined the prevalence of chronic diseases (diabetes mellitus and hypertension), anemia, respiratory diseases (asthma), and other diseases among the two groups. None of these conditions had a significant association with academic performance between the two groups of students (P = 0.447).

The psychological status of the two groups of students was assessed using the Mental Health Inventory five-item tool. Differences between mean values of total MHI-5 were assessed using Student's *t*-test. The mean score of cases was 33% compared to 36.4% for controls; these results were not statistically significant (P=0.44). The results indicate low psychological stress among the two groups because the two groups scored below 50%. These results were consistent for the subscales as well; the students' psychological statuses in terms of anxiety, stress, and depression were all less than 50% for both cases and controls.

Further analysis of results with logistic regression has shown a significant association between academic performance and the following factors: students with academic difficulties are older, require more time to reach college, their perceived English proficiency is less than their counterparts, and they spend less time socializing and participating in extracurricular activities. They are also less satisfied with their family support. Table 3 summarizes the results of logistic regression for some factors.

Discussion

The results of this study show that cases (students with low GPA) are significantly older than controls (students with high GPA). The results on the effect of age on academic

Table 3 Logistic Regression Analysis for Factors Associated with Academic Difficulties

Variables in the Equation		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Student Age	0.437	0.169	6.689	1	0.010	1.548
	Residence	1.231	0.852	2.089	1	0.148	3.424
	Time required to reach college	1.205	0.564	4.563	1	0.033	3.335
	Own a Laptop	0.135	0.919	0.022	1	0.883	1.145
	Have 24 hours Internet access	0.386	0.503	0.589	1	0.443	1.471
	Perceived English proficiency	−0.898	0.525	2.932	1	0.087	0.407
	Have enough money for university supplies	0.206	0.485	0.180	1	0.671	1.228
	Study habits (Prefer to study alone)	0.478	0.548	0.759	1	0.384	1.612
	Study hours (More than 4 hours per day)	−0.356	0.307	1.347	1	0.246	0.700
	Participate in extracurricular activities	1.679	0.693	5.871	1	0.0111	0.2763
	Socialize with friends	1.033	0.465	4.936	1	0.026	2.810
	Satisfaction with family support	−0.032	0.219	0.021	1	0.885	0.969
	Constant	−16.117	4.801	11.268	1	0.001	0.000

Notes: [a]Variable(s) entered on step 1: Q1, Q10, Q11, Q25, Q26, Q29, Q32, Q33, Q34, Q41, Q42, Q63. Q1= Student Age. Q10= Residence. Q11=Time required to reach college. Q25= Own a Laptop. Q26= Have 24 hours Internet access. Q29= Perceived English proficiency. Q32= Have enough money for university supplies. Q33= Study habits (Prefer to study alone). Q34= Study hours (More than 4 hours per day). Q41= Participate in extracurricular activities. Q42= Socialize with friends. Q63= Satisfaction with family support.

performance are varied.[12] A likely explanation is that these students due to their academic difficulties spend longer time at the college rather than entering at an older age. This is because students in Saudi Arabia enter the faculty of medicine directly from high school. So, there is no delay in entering the college and most students enter by the age of 18 years.

Some studies showed that females tend to perform better than males;[8,13] however, in this study there was no significant difference between male or female academic performance.

This study found that students residing in rural areas tend to have a lower GPA than those living in the city, although the results were not statistically significant. However, the time required to reach college showed a statistically significant inverse relationship with GPA. It is well recognized that living in remote places and a long daily trip to reach the college contributes to performance difficulties faced by some students.[1,14]

Previous studies showed that family influences, such as family education, affect the academic performance of students.[15] However, family-related factors that were included in our study such as family size, the student living with their families, the educational levels of both parents, and the monthly income of the family were all not significantly associated with academic performance. These results are consistent with other studies conducted in Saudi Arabia and other countries.[14,16,17]

Financial factors, such as family income and insufficient money for the student fees or to buy their college supplies, are recognized contributing factors to academic difficulties.[1,7,18] However, many studies in Saudi Arabia including this study found no significant relationship between these financial factors and academic performance.[14] This may be explained by the fact that Saudi Arabia is a rich country, University studies are free of charge and all students in Saudi government universities receive a monthly allowance from the government. Also, it is the norm in Saudi Arabian culture for students to remain under the care of their families until their graduation.

This study has found that controls seem to spend more time socializing with friends and participate more in extracurricular activities either inside or outside college compared to cases. This is consistent with many other studies that find successful students are more social and active participants in curricular and extracurricular activities.[1,4,19] However, a study in King Abdulaziz University found no statistically significant difference regarding social activities among medical students with a high GPA and low GPA.[14]

This study found that cases spend more time than controls (more than 4 h a day) watching television or on social media. This result is similar to findings of other studies done in Saudi Arabia where students were found to spend most of their spare time on social media[10] and that students with low GPA were reported to spend more time on social networks.[14]

Regarding sleeping habits of the students, many studies have reported that lack of proper sleep quality or quantity can affect student performance and their GPA,[5,6,8,20] however, this study found no significant difference between cases and controls regarding sleeping habits and their academic performance. Similar results were obtained from studies in Saudi Arabia.[14]

Also, similar to the findings of other studies in Saudi Arabia, the mode of transportation to college, drinking caffeinated beverages, and time spent outside the house were all not significantly associated with student GPA.[14]

An important difference between our cases and controls is that cases were much less satisfied by their family support. The effects of family functioning or family problems are known to be associated with academic difficulties and causes of this failure are usually not purely academic.[1,7] The association between family support and student performance was also observed in other studies in Saudi Arabia.[14]

An important finding of this study is that self-perceived English proficiency is significantly different between cases and controls, with controls having better self-perceived English proficiency. This result is consistent with many other studies done in Saudi Arabia and other countries where English is a second language for medical students.[8,9,14,17] This language barrier was also pointed as a reason for avoiding studying from textbooks,[10] a further contributing factor to performance difficulties.

The study also found that cases were more likely to have had previously failed a subject than controls. This is an expected finding since academic failure is usually a repeated cycle although any student might be subjected to failure at any point in their studies.[1]

A significant difference in relation to learning resources is that high GPA students are found to have better internet access compared to cases. However, most of both groups own a personal laptop. The importance of learning resources for student performance is documented in many studies.[10,13]

Regarding study habits of the students, no significant differences were detected between cases and controls. However, results are similar to other previous studies done in Saudi Arabia. High GPA students prefer to study alone and they study more than cases.[14] No differences were observed regarding asking other colleagues for help or when preparing for an upcoming course. There were no differences in study techniques. No significant difference existed between the two regarding the amount of time used to prepare for examinations.

These findings point to the importance of non-academic factors as influencers of academic struggle rather than academic and study factors per se.[1–3,7]

Student health issues were explored like chronic diseases (diabetes, hypertension, and asthma), anemia, and other conditions. No significant differences were observed between cases and controls or a relation with academic performance. Coping with health issues and difficulties can affect academic performance,[19] however, probably due to the low prevalence of these conditions among students, no associations were observed.

Regarding the psychological health of the students, results indicate low psychological stress among the two groups in terms of anxiety, stress, and depression. Previous studies have demonstrated the influence of stress, anxiety, and mental health problems on student performance.[1,2,8,21,22] However, these conditions are known to increase around stressful times like examinations, for example. Also, detailed psychological assessment might show differences between the two groups that are more apparent.

Limitations

This study has some limitations: factors assessed here were of possible association and do not demonstrate causation. The whole analysis was based on bivariate comparison (high versus low GPA) and some individual variation does exist between people.

Also, careful exploration of some factors like those related to social and family functioning was not performed.

The results of the study cannot be generalized to other medical students than those of Jazan University.

Conclusion

Several factors seem to negatively affect the students' academic performance; students with academic difficulties are older, require more time to reach the college, their perceived English proficiency is less than their counterparts, and they spend less time socializing. On the other hand, having a strong family support system, socializing with friends, access to the internet, and engagement in extracurricular activities seems to positively affect the students' performance. Other factors were found to be insignificant including family size, financial factors, and mode of transportation used. Finally, neither time spent watching TV nor on social networks or studying habits was significantly associated with difference in student GPA. No difference in psychological health or sleep quality was observed in the two groups.

Further large-scale descriptive studies are needed as well as interventional studies to understand further the factors influencing the academic performance of medical students and perhaps try some remedial actions like tailored tutoring programs or social and psychological support systems for students facing difficulties.

Acknowledgments

Disclosure

References

1. Bellodi PL, Dolhnikoff M, et al; Academic Tutoring Group F. Medical students with performance difficulties need wide support: initial results of an academic tutoring program. *Clinics*. 2021;76:e2495. doi:10.6061/clinics/2021/e2495
2. Sherina MS, Rampal L, Kaneson N. Psychological stress among undergraduate medical students. *Med J Malaysia*. 2004;59(2):207–211.
3. Malau-Aduli BS, O'Connor T, Ray RA, et al. Risk factors associated with academic difficulty in an Australian regionally located medical school. *BMC Med Educ*. 2017;17(1):266. doi:10.1186/s12909-017-1095-9
4. Soliman M. Perception of stress and coping strategies by medical students at King Saud University, Riyadh, Saudi Arabia. *J Taibah Univ Med Sci*. 2014;9(1):30–35. doi:10.1016/j.jtumed.2013.09.006
5. Abdulghani HM, Alrowais NA, Bin-Saad NS, Al-Subaie NM, Haji AM, Alhaqwi AI. Sleep disorder among medical students: relationship to their academic performance. *Med Teach*. 2012;34(Suppl 1):S37–S41. doi:10.3109/0142159X.2012.656749
6. Khatun M, Khatun F, Akter M. Factor's related to academic performance among undergraduate nursing students in Bangladesh. *IOSR J Nurs Health Sci*. 2020;9(1):14–23. doi:10.9790/1959-0901131423
7. Sayer M, Chaput De Saintonge M, Evans D, Wood D. Support for students with academic difficulties. *Med Educ*. 2002;36(7):643–650. doi:10.1046/j.1365-2923.2002.01259.x
8. Shathele S, Oommen A. Factors influencing the academic performance of the female medical students in pre clinical and clinical years. 2015. Available from:https://nanopdf.com/download/5b1cde32eaa46_pdf. Accessed June 17, 2021.
9. Almoallim H, Aldahlawi S, Alqahtani E, Alqurashi S, Munshi A. Difficulties facing first-year medical students at Umm Alqura University in Saudi Arabia. *East Mediterr Health J*. 2012;16(12):1272–1277. doi:10.26719/2010.16.12.1272
10. Jameel T, Gazzaz ZJ, Baig M, et al. Medical students' preferences towards learning resources and their study habits at King Abdulaziz University, Jeddah, Saudi Arabia. *BMC Res Notes*. 2019;12(1):30. doi:10.1186/s13104-019-4052-3
11. Mental health inventory (MHI). National multiple sclerosis society. Available from:http://www.nationalmssociety.org/For-Professionals/Researchers/Resources-for-Researchers/Clinical-Study-Measures/Me. Accessed June 17, 2021.
12. Mills C, Heyworth J, Rosenwax L, Carr S, Rosenberg M. Factors associated with the academic success of first year health science students. *Adv Health Sci Educ Theory Pract*. 2009;14(2):205–217. doi:10.1007/s10459-008-9103-9
13. Salem RO, Al-Mously N, Nabil NM, Al-Zalabani AH, Al-Dhawi AF, Al-Hamdan N. Academic and socio-demographic factors influencing students' performance in a new Saudi medical school. *Med Teach*. 2013;35(Suppl 1):S83–S89. doi:10.3109/0142159X.2013.765551
14. Al Shawwa L, Abulaban AA, Abulaban AA, et al. Factors potentially influencing academic performance among medical students. *Adv Med Educ Pract*. 2015;6:65–75. doi:10.2147/AMEP.S69304
15. Alfayez SF, Strand DA, Carline JD. Academic, social and cultural factors influencing medical school grade performance. *Med Educ*. 1990;24(3):230–238. doi:10.1111/j.1365-2923.1990.tb00006.x
16. Musa RM, Haque M. Academic performance of pre-clinical and clinical medical students' of East Coast Malaysian Peninsula: a cross-sectional and descriptive study that stimulates their life. *J Appl Pharm Sci*. 2017;7(6):169–175.
17. Mushtaq I, Nawaz Khan S. Factors affecting students' academic performance. *Global J Manag Bus Res*. 2012;12(9).
18. Hashem MH, Khawaja A, Edhah SO, Hashmi UI, Hareth A, Akill S. How do academic issues affect college students' performance? 2014:3–9. Available from:http://www.asee.org/documents/zones/zone1/2014/Student/PDFs/167.pdf. Accessed June 17, 2021.
19. Todres M, Tsimtsiou Z, Sidhu K, Stephenson A, Jones R. Medical students' perceptions of the factors influencing their academic performance: an exploratory interview study with high-achieving and re-sitting medical students. *Med Teach*. 2012;34(5):e325–e331. doi:10.3109/0142159X.2012.668626
20. Pilcher JJ, Ginter DR, Sadowsky B. Sleep quality versus sleep quantity: relationships between sleep and measures of health, well-being and sleepiness in college students. *J Psychosom Res*. 1997;42(6):583–596. doi:10.1016/s0022-3999(97)00004-4
21. Yiu V. Supporting the well-being of medical students. *CMAJ*. 2005;172(7):889–890. doi:10.1503/cmaj.050126
22. Bramness JG, Fixdal TC, Vaglum P. Effect of medical school stress on the mental health of medical students in early and late clinical curriculum. *Acta Psychiatr Scand*. 1991;84(4):340–345. doi:10.1111/j.1600-0447.1991.tb03157.x