Original Article

Relationship between study habits and academic success among students at Arak university of medical sciences during the COVID-19 pandemic

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Article Info

Article history:
Received 28 Nov. 2022
Accepted 26 Mar. 2023
Published 15 Aug. 2023

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How to cite this article:
Kohansal B, Poorsaadat L, Almasi Hashiani A, Habibi M. Relationship between study habits and academic success among students at Arak university of medical sciences during the COVID-19 pandemic. J Med Edu Dev. 2023; 16(51): 49-56.

Abstract

Background & Objective: The COVID-19 pandemic has changed the pattern of medical education. This study aimed to investigate the study habits of students at Arak University of Medical Sciences, Arak, its relationship with academic success, and the related factors.

Materials & Methods: This cross-sectional descriptive study was conducted by random sampling method on 340 students of Arak University of Medical Sciences during the COVID-19 pandemic in 2022. The required data for this study were collected through a demographic form and Palsani and Sharma's Study Habits Inventory. Data analysis was conducted in Stata software using independent t-tests, one-way analysis of variance, and Pearson correlation.

Results: A total of 229 female and 111 male students participated in this study, and the results showed that the majority of the students (84.19%) had relatively favorable study habits. The mean score of the students' study habits was obtained at 50.70±8.86, and the highest scores were related to the subscales of taking tests and reading ability. A positive correlation was observed between the overall score of study habits and the grade point average (r=0.19, P≤0.001) and the number of siblings (r=0.12, P≤0.001). The score of study habits showed a significant relationship between study hours and English language level (P≤0.001).

Conclusion: The status of students' study habits was reported to be relatively favorable and related to academic success. It is recommended to improve the training level of students in virtual education, enhance their English language level, and create more interaction to strengthen motivation to study and learn in the self-learning process.

Keywords: Academic Performance, Corona Virus, Education, Questionnaire

Introduction

Studying is a complex process with cognitive, emotional, and behavioral mechanisms. Study habits are defined as skills and habits that increase motivation to study and learn in a person. These habits and individual skills play a great role in transferring data to the mind and improving knowledge (1, 2). Learning and study skills have been mentioned as one of the most important factors of academic success that can be the cause of lower productivity and success than expected in students having wrong study habits (3). Effective and successful study occurs when a person is both interested in the material and can use study techniques and skills masterfully (4).

Improving study habits, in addition to leading to the progress and academic success of learners, plays an important role in the transformation processes and the scientific promotion of educational institutions. The epidemic of COVID-19 in 2020 and the closure or suspension of educational institutions, including universities, and educational classes affected all students at all levels of medical education, from theoretical courses to clinical internships, and this crisis became a huge challenge for educational systems all over the world (5). This exceptional situation in the history of education provided a unique opportunity to abandon the traditional model of teaching and start a new era of digital

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[DOI: 10.32592/jmed.2023.16.51.49]

transformation in teaching, which required adaptive approaches to education (6, 7). At the same time, the pandemic changed the model of education and social life of remote learners (8).

Access to online platforms, the Internet, and devices, such as computers, tablets, or smartphones, became a necessary prerequisite for learners to learn, and the compulsion to share devices, slow Internet connection, lack of equipment in disadvantaged urban and non-urban areas, and as a result, the lack of complete and correct learning lessons led to the dissatisfaction of the learners (9). Meanwhile, virtual education through offline or online platforms in universities of medical sciences caused more challenges for students due to the unfamiliar educational model (1). This problem demonstrated the absence of necessary digital preparation in the educational system (9).

Social distancing and quarantine made students stay at home, study and sleep in the same space. In addition, students were under increasing social and economic pressures at home, and some even had to take care of children or supported elderly family members at home. Previous literature indicated that medical students experienced symptoms of anxiety immediately after the quarantine of COVID-19 (1, 6). Perhaps this anxiety had been caused by the lack of study skills to effectively manage time, organize tasks, and succeed in fulfilling academic responsibilities. Some good study habits are described as studying in a completely suitable place without any distracting devices (e.g., television and mobile phones), studying on a daily basis, having adequate and regular rest, listening to relaxing music, taking notes of important material, and prioritizing difficult material based on individual learning style, while procrastination, studying in inappropriate conditions with loud music or television are mentioned as some of the worst study habits (10).

Therefore, since learning is referred to as a complex cognitive-behavioral mechanism (11, 12), facing potential intellectual problems, such as depression, anxiety, worry, and stress, caused by this epidemic can also affect study habits. The 45-item Palsani and Sharma's Study Habits Inventory (PSSHI) with 8 subscales have been proposed as one of the most common tools in assessing learning and study habits (13). Various studies conducted before the COVID-19 pandemic have reported that the level of study habits among medical science students (including medicine, dentistry, pharmacy, nursing, and paramedicine) was generally poor to desirable (3, 10, 14-16) and mostly moderate (4, 15).

The studies conducted in this field have mostly focused on examining the study habits of students of medical sciences before the COVID-19 pandemic. Alzahrani et al. (2018) investigated the relationship between study habits, non-academic factors affecting learning, including gender, and their relationship with academic performance results. This study found that study habits varied among genders and had a significant impact on learners' performance outcomes. Considering that the academic success of students is an important outcome for medical schools, the results of this research demand that they be put into practice to enhance curricular adjustments and enhance learning outcomes (17).

In the same vein, Walck-Shannon et al. (2021) investigated the study habits of students and the relationship between their study habits and performance in exams, and concluded that because of the significance of study habits on students' performance, this issue should be given a top priority by professors and officials (18). Abdulrahman et al. (2021) in examining the most common study habits of highly successful medical students and their relationship with their academic progress reported the general study methods that led to success in learning (19). Andersen et al. (2022), compared the academic performance and study habits of fresh medical students during the COVID-19 pandemic with those of their counterparts before the pandemic of COVID-19. In their research, they found significant differences in first-semester students' experience and performance during and before the pandemic (20).

However, little research has been conducted on the study habits and factors affecting the academic performance of students of medical sciences in Iran during the COVID-19 pandemic. Due to the significant differences in the study habits and academic performance of first-semester students during the pandemic compared to the pre-pandemic periods, Tobar et al. (2021) and Andersen et al. (2022) recommended that studies be carried out to investigate study habits and its relationship with the academic performance of medical students. The results of such research can potentially inform university officials to invest in the interventions of structured study skills to help students develop time management and goal-setting skills and increase academic performance. This is because investing time and resources to strengthen students' study skills can potentially affect academic performance and ensure resilience in

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[DOI: 10.32592/jmed.2023.16.51.49]

unexpected situations, such as the COVID-19 pandemic (20, 21).

The importance of monitoring teaching and early detection of students in need of support in all dimensions becomes clear when taking into account the need for a long-term perspective of responsive education and the possibility that students may require academic support due to factors like ineffective teaching strategies, low motivation, insufficient proficiency with electronic devices, or unfavorable communication skills. This means that in line with ensuring the health of students, it is necessary to maintain the normal performance of education and improve its quality. Therefore, the purpose of the present study was to investigate the study habits of students during the COVID-19 pandemic and its relationship with academic success and some other related factors.

Materials & Methods

Design and setting(s)

The current cross-sectional study was conducted using the PSSHI questionnaire on students studying at Arak University of Medical Sciences, Arak, Iran, in 2021-2022. This research aimed at examining study habits and their relationship with demographic characteristics and academic performance during the COVID-19 epidemic.

Participants and sampling

The sample size was estimated at 337 cases based on the results of a study by Ali Mohammadi et al. (3) who estimated the mean and standard deviation of the learning habits score in students at 45 and 9.37, respectively, as well as considering an alpha value of 5%, and ±1 score/grade accuracy, and the following formula:

$$n=\frac{\left(Z_{1-\frac{a^2}{2}}\right)\times \sigma^2}{d^2}$$

However, finally, 340 students were included in this study from different medical fields (medicine, dentistry, pharmacy, nursing, and rehabilitation) at Arak University of Medical Sciences studying during the outbreak of COVID-19 in 2022.

The samples were selected from qualified students of all faculties by simple random sampling method and using the student number. The inclusion criteria were being 18 years old and older and having completed at least one academic semester during the pandemic in virtual or blended form. On the other hand, postgraduate students and medical students in higher semesters than basic sciences were not included in the study due to having different learning styles. The questionnaire was developed on the electronic platform of Porsline, and after obtaining the informed consent form, the subjects were asked to fill it out anonymously. Out of 365 completed questionnaires, 25 were excluded from the study due to incomplete completion.

Tools/Instruments

The study tool was a questionnaire consisting of two parts. The first part was a demographic form enquiring information about age, gender, semester, teaching method, socio-economic status, and history of COVID-19 development, while the second part included the PSSHI. The students' academic performance was evaluated based on their grade point average (GPA) for the academic semester. According to a study by Bakui et al., a GPA of ≥ 17 demonstrates good performance, a GPA of 14-17 average performance, and a GPA of ≤ 14 poor performance (22). The availability and level of familiarity with electronic learning tools and techniques, English language proficiency, and average study hours before and during COVID-19 were investigated.

The PSSHI is a standard instrument designed by Palsane and Sharma in India. This 45-item questionnaire measures study habits in 8 subscales, namely time management (5 items), physical conditions (6 items), learning motivation (6 items), reading ability (8 items), note-taking (3 items), memory (4 items), taking tests (10 items) and health of study (3 items). The replies are rated on a 3-point Likert scale of 0=rarely or never, 1=sometimes, and 2=always or most of the time.

Items 6, 9, 13, 15, 24, 26, 34, 36, 37, 41, and 42 are scored in reverse. The total score of the questionnaire ranges between 0 and 90, and that for the subscales is obtained at 0-10 for time management, 0-12 for physical conditions, 0-12 for learning motivation, 0-16 for reading ability, 0-6 for note-taking, 0-8 for memory, 0-20 for taking tests, and 0-6 for the health of study (23). A higher total score indicates better study habits, while a score of <30 is regarded as unfavorable study habits, 30-61 as relatively favorable study habits, and >61 as favorable study habits. The validity and reliability of the original version of this questionnaire have been confirmed in previous studies. Siahi and Mayo reported the reliability coefficient of this tool as 0.88 (2). In general, the content validity score of the Persian version of this tool and its reliability coefficient for all subscales were reported as 0.86-0.96 and 0.86, respectively, which were acceptable in terms of measurement (24).

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Data collection methods

After uploading the questionnaire to the online platform, students were given 3 days to complete the questionnaire. To ensure the completion of the questionnaire, the students were repeatedly reminded by the professors and education officers of the departments. The information obtained from the completed questionnaires was received from the site as an Excel file and entered into Stata statistical software version 13 for analysis.

Data analysis

The Shapiro-Wilk test was used to check the normality of the data, the results of which indicated the normal distribution of the investigated variables; therefore, parametric tests were done to analyze the data. Stata software was used to analyze the data, and the significance level was considered 0.05. One-way analysis of variance (one-way ANOVA) was used to compare different aspects of study habits with dependent variables (overall score of PSSHI questionnaire and each of its subscales), study hours before and during COVID-19, the level of access to technology and the Internet, and English language proficiency. An independent t-test was employed to compare the average of the results of evaluations between two genders, GPA, marital status, and infection with COVID-19; and Pearson correlation to check the correlation of the components of study habits with demographic indicators in each group.

Results

The research sample (n=340) included 229 and 111 female and male students of Arak University of Medical Sciences with average ages of 22.08±2.09 and 22.40±3.23 years, respectively. Of the 340 participating students, 19.1% were in the age range of 21 years, 90.3% were single, and 35.29% were studying in the third academic semester. The demographic indicators of the students participating in this research are presented in Table 1. The mean total score of the students' study habits was estimated at 50.70±8.86. Female students obtained a higher mean score (51.17±8.57) than the male ones (49.69±9.40) from the questionnaire. The independent t-test showed no significant statistical difference between the mean scores between the two genders (t=1.41, P=0.15).

The majority of students (63.2%) studied less than 4 hours per day during the COVID-19 pandemic. According to the results of the PSSHI questionnaire, the learning habits of 4 (1.22%) students were in a favorable condition, that of 277 (84.19%) students in a relatively favorable condition, and that of 48 (14.09%) students in an unfavorable condition (Table 2).

According to Table 3, Pearson correlation results showed a significant correlation between age and the motivation dimension (r=-0.09, P=0.08); academic semester and the note-taking (r=-0.09, P=0.06), health of study (r=-0.09, P=0.06), and motivation (r=-0.12, P=0.01) dimensions; GPA and the time management (r=-0.17, P=0.001), note-taking (r=0.09, P=0.08), motivation (r=0.23, P=0.000), memory (r=0.13, P=0.01), and taking tests (r=0.14, P=0.009) dimensions, and the PSSHI total score (r=0.19, P=0.000); and the number of siblings and the motivation (r=0.10, P=0.06) and health of study (r=0.13, P=0.01) dimension, and the PSSHI total score (r=0.12, P=0.02). Statistically, the results of one-way ANOVA showed a significant difference between the study hours before and during the COVID-19 epidemic (P≤0.001). The PSSHI total score revealed no significant relationship with English language proficiency, the type of teaching method, access to technology and the Internet, COVID-19 infection, family income, and parents' occupation and education (P≥0.05).

Table 1. Distribution of students' demographic characteristics and their relationship with study habits

variables		Freq(%)	M(SD)	P-value
Gender	female	229(67.35)	51.17(0.57)	P=0.15*
	male	111(32.65)	49.69(0.91)	
Academic semester	2-4	122(35.88)	51.71(8.79)	P=0.22*
	4-6	115(33.82)	50.56(8.94)	
	6-8	103(30.29)	49.65(/818)	
Marital status	Single	307(90.29)	50.47(0.51)	P=0.15*
	Married	33(71/9)	52.81(1.48)	
Getting infected with Covid-19	Yes	183(53.82)	50.33(0.70)	P=0.42*
	No	157(46.18)	51.12(0.67)	
Teaching method	Offline	58(17.06)	49.4(8.59)	P=0.10**
	Online	56(16.47)	52.83(9.99)	
	Mixed	226(66.47)	50.50(8.58)	
English language level	Weak	22(6.47)	45.55(9.83)	P≤0.001**
	Lower intermediate	32(9.41)	51.09(9.11)	
	Intermediate	180(52.94)	50.84(8.45)	

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[DOI: 10.32592/jmed.2023.16.51.49]

	Good	85(25.00)	50.65(9.18)	
	Excellent	21(6.18)	54.20(8.14)	
Technology Access	Weak	26(7.65)	48.50(9.68)	P=0.21**
	Lower intermediate	30(8.82)	48.25(7.74)	
	Intermediate	154(45.29)	51.27(8.86)	
	Good	92(27.06)	50.45(8.81)	
	Excellent	38(11.18)	52.43(8.93)	
Internet Access	Weak	4(1.18)	45.25(18.89)	P=0.19**
	Good	37(10.88)	48.91(9.55)	
	Excellent	299(87.94)	51(8.58)	
Study hours per day before Corona era	Less than 4 hours	164(48.24)	48.99(8.23)	P≤0.001**
	4-8 hours	147(43.24)	52(9.12)	
	More than 4 hours	29(8.53)	53.60(9.29)	
Study hours per day during the Corona era	Less than 4 hours	215(63.24)	49.14(8.55)	P≤0.001**
	4-8 hours	108(31.76)	53.22(8.89)	
	More than 4 hours	17(5.00)	53.93(8.34)	
GPA	More than 17	75(22.06)	48.07(6.98)	P≤0.001*
	14-17	252(74.12)	50.28(8.85)	
	Less than 14	13(3.82)	52.60(8.98)	

*T test **ANOVA, the significance level was considered to be 0.05

Table 2. Students' mean scores for the subscales of the PSSHI questionnaire

Domains of study habits	Managing time	Physical status	Reading ability	Note taking	Motivation	Memory	Exams	Well being	Total
M	5.80	6.94	8.30	3.24	7.79	4.79	9.89	2.93	50.70
(SD)	(1.96)	(1.95)	(2.20)	(1.58)	(2.13)	(1.15)	(1.92)	(1.32)	(8.86)

Table 3. Correlation between demographic characteristics and the subscales of the PSSHI questionnaire

Variables \ Domain		Physical status	motivation	Well being	Note taking	memory	exam	PSSHI Total Score
Age	**P**	0.710	0.087*	0.619	0.536	0.403	0.577	0.161
	R	-0.02	-0.09	0.02	-0.03	-0.04	-0.03	-0.07
Academic semester	**P**	0.257	0.017*	0.067*	0.066*	0.200	0.353	0.112
	R	-0.06	-0.12	-0.09	-0.09	0.07	-0.05	-0.08
GPA	**P**	0.000*	0.000*	0.435	0.086	0.014*	0.009*	0.000*
	R	0.17	0.23	-0.04	0.09	0.13	0.14	0.19
Siblings	**P**	0.179	0.060*	0.015*	0.115	0.639	0.450	0.021*
	R	0.07	0.10	0.13	0.08	0.02	0.04	0/12

Discussion

In this research, the study habits and skills of students at Arak University of Medical Sciences and their relationship with academic performance and some related variables were investigated. Based on the authors' review, this was the first study that examined the study habits of medical students during the COVID-19 pandemic in Iran. The total score of the PSSHI questionnaire was relatively favorable for the majority of students, and the mean total score was obtained higher in female students than in male ones. The total score of the questionnaire was similar to that estimated in a study conducted by Tarshizi on the students of Birjand University of Medical Sciences, Birjand, showing no significant difference between the two genders (4).

The mean score of students' study habits obtained in this study was similar to those reported in studies conducted in other universities during the pre-COVID-19 period; the results of these studies also showed that just a few students had good academic performance (4, 15). The reason for this issue can be attributed to the lack of familiarity with virtual teaching methods and/or the new methods of study. This research showed a significant positive correlation between individuals' study habits and their academic GPA. This positive correlation was also observed in the findings of similar studies conducted by Tarshizi, Illahi Bha, and Dey Chandana Dey, in which students with better study skills had better academic performance (4, 25, 26). It was also revealed that female students had better study habits and spent more time studying than their male peers. In this research, similar to the previous studies, no significant difference was observed between the two genders in the total score of study habits (4, 15, 27). It seems that gender has no effect on the type and method of studying, and both genders have shown the same performance in most universities in the country (4, 15).

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In the present study, students had the most problems in the areas of health of study, note-taking, and time management in descending order, while the least problem was reported for taking tests. These results were almost similar to those of studies by Alamdar and Alimohammadi, who reported the highest scores in the areas of taking tests and learning motivation, and the lowest scores in the areas of note-taking- and general health of study (3, 15). Unlike the present study, in another study, the major problems of students were in the fields of note-taking, time management, and scheduling (4). It seems that the score in different areas depends more on student characteristics, such as the hours allocated to study, knowledge level and other concerns of life, and effective care on study habits rather than on the type of university and its policies towards students; as in various studies, most researchers have attributed the reasons to the difference between students (28).

An interesting finding in this study was the significant difference between the hours of study before and during the COVID-19 period. In relation to the age of the students, the results of the present study were similar to the findings of the studies by Alamdar, Yamin Firouz, and Dehghani in none of these studies, a significant statistical relationship was observed between age and study habits (15, 29, 30). In this study, similar to Tarshizi's study, due to the small number of married people, no significant difference was found between study habits and marital status (4). It is suggested to include a larger group with an equal number of married and single individuals in the sample size for more accurate comparison and more comprehensive planning in future studies.

In this study, no significant relationship was observed between parents' education and PSSHI scores. Contrary to the present study, in the study by Alamdar et al., students whose parents had a university education had a more favorable academic status (15). Tarshizi et al. also found that students whose fathers had a diploma degree had a higher average study score in the area of taking tests, compared to those whose fathers had a middle school degree or lower (4). It seems that it is necessary to pay serious attention to study habits (especially virtual methods), more familiarity with the English language, and provision of a solution to create and strengthen motivation with the aim of improving these habits.

One of the limitations of this study was the self-report of the impact of students' mental state on the results of the research, as well as the small number of married students participating in the study. It is suggested that an equal number of married and single students be compared with each other. It is also recommended that the delay in the graduation of students due to inappropriate study habits be investigated in future studies.

Conclusion

The findings of the present study showed that although there might have been some changes in study habits and study hours during the COVID-19 pandemic, the status of students' study habits during the COVID-19 pandemic was relatively favorable and in line with their academic success. Students have apparently employed appropriate methods for learning in the virtual course, and education and awareness of appropriate and correct study skills have played an effective role in improving their academic performance. Factors that influenced study habits during COVID-19 included mastery of the English language and the number of study hours before and during the COVID-19 epidemic. Obtaining a relatively favorable average score among students indicated that although changing from face-to-face learning to online or virtual learning could be a possible solution in times of need, reaching maximum productivity was not easily possible, and there was a need for guidance and providing solutions related to strengthening self-study habits and motivation.

Ethical considerations

This article was the result of a research project titled "Relationship between study habits and academic performance among Students of Arak University of Medical Sciences". This research was reviewed at the National Center for Strategic Research in Medical Education and approved by the Code of Ethics IRI.ARAKMU.REC.1400.177. To conduct this research, written consent was obtained from the participants and the ethical protocol was followed to keep the information of the participants confidential based on the relevant regulations.

Acknowledgment

The authors would like to appreciate the respected officials of the faculties of Arak University of Medical Sciences, the Vice Chancellor for Research of Arak University of Medical Sciences, and all the students who participated in this study.

Conflict of interest

The authors declare that there is no conflict of interest.

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[DOI: 10.32592/jmed.2023.16.51.49]

Author contributions

B.K.: Designing the study and supervising all stages of the study implementation. L.P.: Collecting data and reviewing the article. M.H.: Analyzing and writing the article. A.A.: Analyzing the results of the study and reviewing the article. All authors read and approved the final version of the manuscript.

Data availability statement

The data sets used and analyzed in the present study are available from the corresponding author upon reasonable request.

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