



# The Association of Self-efficacy with Self-care Behaviors, Anxiety, and Academic Motivation in Iranian Medical Sciences Students

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## Abstract:

**Background and Objective:** Medical students are most susceptible to contracting stressful clinical phenomena and experiencing subsequent psychological consequences. The study aimed to investigate the association between self-efficacy, self-care, and anxiety with academic motivation among students enrolled at Shahroud University of Medical Sciences.

**Materials and Methods:** This cross-sectional study, conducted in 2022 immediately after the university opening during the COVID-19 pandemic, to investigate anxiety and self-care behaviors related to COVID-19, academic self-efficacy, and motivation among 339 students from diverse medical science disciplines. A multi-stage random sampling technique was employed to choose the participants. The data underwent analysis using one-way ANOVA, Chi-square test, and linear regression model. The significance level for all tests was 0.05.

**Results:** The mean score of students' self-care behavior was  $56.5 \pm 13.7$ , the mean academic self-efficacy was  $106.5 \pm 17.6$ , and the mean academic motivation score was  $98.5 \pm 13.0$ . The mean score of students' anxiety about COVID-19 was  $6.9 \pm 6.9$ , suggesting a low level of anxiety. A total of 70 participants (20.6%) demonstrated good self-care behaviors against COVID-19, 316 (93.2%) reported reduced anxiety related to COVID-19, and 154 (45.4%) reported high levels of academic motivation. Only the self-care behaviors and academic motivation variables in the faculty and COVID-19 setting were shown to be substantially correlated with the sense of academic self-efficacy in the final model.

**Conclusion:** Medical students have been found to have significantly lower motivation and academic self-efficacy than students in other fields of study, so the need for identification of causes and implementation of intervention measures has been deemed necessary.

**Keywords:** Self-care behavior, Academic motivation, Academic self-efficacy, Anxiety, Medical students, Psychological consequences, COVID-19.

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## 1. INTRODUCTION

Within educational settings that prioritize advancement, such as medical science colleges, self-efficacy pertains to an individual's conviction in their capacity to effectively navigate a given circumstance and attain specific objectives [1, 2]. According to Bandura, self-efficacy refers to an individual's confidence to effectively plan and execute various tasks required to navigate various circumstances and environments [3]. Individuals' cognition, motivation, affect, and conduct vary between situations where they possess confidence in their capabilities and when they experience insecurity or a lack of competence [4]. Self-efficacy is a cognitive process that facilitates the efficient organization of an individual's cognitive, social, emotional, and behavioral abilities in order to attain desired objectives. It enables individuals to effectively utilize their capabilities to achieve high levels of performance [5]. The individual's perception of self-efficacy has a significant impact on cognitive processes, motivation, task performance, and emotional arousal, ultimately influencing an individual's behavior and overall performance [4].

Motivation, regarded as a fundamental element in the process of learning, is influenced by both an individual's personality traits and the extrinsic factors present in their environment [6-8]. The academic performance of medical science students is influenced by their level of motivation, which is crucial due to the demanding nature of their programs [9, 10]. Motivation is an intrinsic cognitive process that plays a significant role in stimulating, sustaining, and guiding human action [11]. Motivation encompasses various subscales, namely intrinsic motivation, extrinsic motivation, and lack of motivation. According to research, intrinsic motivation is the best motivation for enhancing learning, academic achievement, and professional progression [12-14]. According to Robbins [15], individuals with accomplishment motivation are strongly inclined to perform their job tasks effectively and self-assess their performance. Research indicates a correlation between academic motivation and a range of educational outcomes, including but not limited to curiosity, perseverance, academic advancement, self-efficacy, improved performance in school, and increased likelihood of success in future employment opportunities [16].

The COVID-19 outbreak has been deemed a serious threat to both physical and mental health by the World Health Organization (WHO). The disease's quick spread has changed people's daily routines and put their lives in peril [17, 18]. This epidemic is a huge public and physical health concern since it has been linked to an increase in stress, anxiety, depression, and post-traumatic stress disorder (PTSD) [19, 20].

One population at risk is students; in addition to the physical dangers, COVID-19 can have negative psychological effects on a person's ability to function in social and academic settings. Hence, it is crucial to consider the impact of COVID-19-induced anxiety and self-

care practices on the prevention of COVID-19 infection among student populations. The implementation of quarantine measures and the adoption of self-care practices have been identified as significant variables in mitigating the adverse psychological, physical, and social consequences associated with the condition [21]. Self-care behavior refers to a collection of self-initiated behaviors through which an individual endeavors to uphold and enhance their health on both personal and societal levels [22]. The findings of several studies suggest that engaging in self-care behaviors can effectively manage anxiety related to COVID-19. Additionally, these studies reveal a noteworthy gender disparity in the level of dread experienced due to COVID-19 when it comes to adhering to social distancing measures [23, 24]. Additionally, individuals who experienced higher levels of fear had a greater adherence to social distancing measures and quarantine protocols [25]. The findings of several studies indicate a notable disparity in adherence to behaviors such as hand hygiene across individuals of different genders. Moreover, individuals who exhibited higher levels of fear of contracting diseases showed an increased tendency for regular hand washing and frequent utilization of disinfectants in comparison to their counterparts [23, 26].

The global response to the COVID-19 pandemic has involved implementing traffic restrictions and temporarily closing in-person educational institutions at universities. These actions, coupled with the widespread fear of the disease and its consequences, have had a significant impact on students' motivation and academic progress. Consequently, these factors have contributed to a decrease in students' academic self-efficacy [27-29]. The transition from traditional face-to-face educational models to virtual classrooms and distant learning has imposed significant challenges on professors, students, and parents [30, 31].

One demographic particularly vulnerable to the effects of COVID-19 is the student population. The psychological repercussions of this pandemic have the potential to significantly impact not only their physical well-being but also their academic achievements and social interactions. The primary objective of this study was to assess the prevalence of self-care behaviors and anxiety related to COVID-19 among students, as well as their association with academic motivation and self-efficacy. The study focused on students enrolled at Shahroud University of Medical Sciences in 2022, during the post-reopening period of universities.

## 2. METHOD

This is a cross-sectional study that was conducted on medical students at Shahroud University of Medical Sciences. Based on previous study, which reported a compliance rate of 30.2% for self-care behaviors related to COVID-19 [32], and with a statistical power of 80%, a type I error rate of 5%, and an estimating accuracy of 7%, the estimated sample size was 358 students. The present study was carried out in 2022, immediately after the

university opening during the COVID-19 pandemic, encompassing a sample of 339 students from various disciplines within the realm of medical sciences. The participants were recruited using a multistage random selection technique, yielding a response rate of 94.69%. Initially, the distribution of students across each faculty was determined to ascertain the proportion of each faculty within the overall sample. In the subsequent phase, an inventory was conducted to ascertain the active courses offered by each faculty, encompassing the respective discipline and academic term and the registered students for each discipline. Based on the sample size and the mean number of students per class, 20 classes as clusters were selected through a random process. Subsequently, the students within each selected class were requested to provide informed consent prior to completing the study questionnaires. Three well-trained researchers were employed to conduct the study. The completion of questionnaires was done in convenient environment after explanations about the goals and structure of items.

## 2.1. Measurement

The research employed a set of instruments comprising questionnaires that assessed self-care behaviors about COVID-19, anxiety levels induced by the COVID-19 disease, self-efficacy, and academic motivation among students. These sections encompassed a total of 19 questions that covered various aspects such as age, gender, academic field and level of study, current academic semester, marital status, nativity, place of residence, family's economic status, economic activities during studies, parents' place of residence, family size, father's occupation, personal and family history of COVID-19 infection, as well as personal history of COVID-19 vaccination, among others.

### 2.1.1. Self-care Behaviors related to COVID-19 Scale

The Persian version of this questionnaire was developed and validated within the context of Iran. The primary objective of this assessment is to evaluate individuals' adherence to self-care behaviors during the COVID-19 pandemic. The assessment comprises a total of 20 questions. The questionnaire is scored using a 5-point Likert scale, with each option assigned a numerical value ranging from 1 (very low) to 5 (very high). The final score encompasses a range from 20 to 100, with scores below 33.3 indicating low or absent self-care practices in response to COVID-19. Scores between 33.4 and 66.6 denote average self-care practices against COVID-19, while scores over 66.6 signify comprehensive adherence to self-care measures in the context of COVID-19. Pouyanfarid *et al.* confirmed the validity and reliability of this scale. The scale's reliability was assessed using Cronbach's alpha coefficient, which yielded a value of 0.87 [33]. Also, the scale's reliability coefficient, or Cronbach's alpha, was determined to be 0.91 in the current study.

### 2.1.2. COVID-19-related Anxiety Scale

The development and validation of the Persian version of this questionnaire were conducted in the specific setting

of Iran to assess the levels of anxiety induced by the COVID-19 pandemic. The final version of this tool comprises a total of 18 items, which are further classified into two distinct components. The first nine items of the assessment instrument pertain to the measurement of psychological symptoms, whereas the subsequent nine items focus on the measurement of physical symptoms. The scoring of this instrument is based on a 4-point Likert scale, where the response options range from "never" with a score of 0 to "sometimes" with a score of 1, "most of the time" with a score of 2, and "always" with a score of 3. The ultimate score spans from 0 to 54. Elevated scores on the questionnaire are indicative of heightened levels of anxiety. Alipour *et al.* have confirmed the validity and reliability of the Persian version of this questionnaire. Cronbach's alpha was used to calculate the reliability of this instrument; the results showed a value of 0.879 for the psychological component, 0.861 for the physical component, and 0.919 for the full questionnaire items [34]. Using Cronbach's alpha coefficient, the instrument's reliability was determined to be 0.915 in the present study.

### 2.1.3. Students' Academic Motivation Scale

The academic motivation questionnaire comprises a total of 33 items [35], each of which is assessed using a Likert scale ranging from 1 (never) to 5 (almost usually). The total scores exhibit a range spanning from 33 to 165. Scores falling within the range of 33 to 66 are indicative of low academic motivation. Scores ranging from 66 to 99 suggest average academic motivation. Finally, scores over 99 are associated with good academic motivation. The Persian version of this questionnaire has been assessed for reliability in Iran, with a reported Cronbach's alpha coefficient of 0.92 [36]. The present study assessed the tool's reliability by estimating Cronbach's alpha coefficient, yielding a value of 0.83.

### 2.1.4. College Academic Self-efficacy Scale

Owen and Froman developed this questionnaire in 1988 to gauge students' perceptions of their academic efficacy [37]. There are 32 items on this scale, each rated on a five-point Likert scale from very low to very high. The scores for each option are as follows: very low = 1, low = 2, average = 3, high = 4 and very high = 5. The total score ranges from 32 to 160. Students with scores between 32 and 53 have low academic self-efficacy, those between 53 and 106 have moderate academic self-efficacy, and those with scores of 107 and above have strong academic self-efficacy. The Persian version of this questionnaire has been shown to have a reliability coefficient of 0.84 [38, 39]. The questionnaire's Cronbach's alpha coefficient in the current study was determined to be 0.91.

In this study, trained interviewers distributed questionnaires to each class's students after explaining the research's objectives and then collected them once completed. The protocol of this study was reviewed and approved by the Ethics Council of Shahrood University of Medical Sciences with the ethics code IR.SHMU.REC.1401.139. For confidentiality reasons, questionnaires were anonymous, and participation in the study was voluntary.

## 2.2. Data Analysis

The data were entered into SPSS 16 and analyzed with ANOVA, Chi-square, Pearson's correlation coefficient, and multivariable regression models. In all tests, the significance level was at 0.05.

## 3. RESULTS

This study included 339 students with a mean age of 21.4 years and a standard deviation of 2.4 years. Regarding gender, 232 (68.4%) were females. The majority of them 314 (92.6%) were unmarried. Regarding academic level, 190 (56%) were in their fourth semester or lower. In terms of the discipline of study, there were 85 (25.1%) students in the School of Public Health, 137 (40.4%) in the school of Paramedicine, 55 (16.2%) in the School of Nursing and Midwifery, and 62 (18.3%) in the School of Medicine. Regarding residence, 321 (or 94.7%) students resided in the dormitory. The fathers of 158 (46.6%) students were government employees. Additionally, 327 students (96.5%) had living with their parents. The family monthly income of 73 students (21.5%) was less than \$300, while 266 students (78.5%) had more than \$300. Regarding COVID-19 vaccination, 135 students (39.8%) were not entirely immunized, while 204 (60.2%) received all 3 doses of vaccination. In addition, 20 (5.9%) of the students lacked self-care related to COVID-19, while 249 (73.5%) demonstrated moderate self-care and 70 (20.6%) demonstrated good self-care. Additionally, 316 (93.2%) experienced only mild anxiety due to COVID-19, 21 (6.2%) experienced strong anxiety, and two (0.6%) experienced severe anxiety. The academic motivation score level of four students (1.2%) was inadequate, 181 (52.4%) was average, and 154 (45.4%) was good. Academic self-efficacy was poor in two (0.6%), moderate in 162 (47.8%), and high in 175 (51.6%) students. Table 1 provides the average scores for the self-efficacy, anxiety, academic motivation, and self-care questionnaires.

**Table 1. Average scores of the self-efficacy, anxiety, academic motivation, and self-care behavior of the students.**

Variables	Mean±SD	Minimum	Maximum
Self-care behavior related to corona	56.5±13.7	20	100
Feeling of academic self-efficacy	106.6±17.7	32	160
Academic motivation	98.5±13.0	50	165
Anxiety	6.9±6.9	0	47
Mental anxiety	5.4±4.4	0	21
Physical anxiety	1.5±3.5	0	27

Table 2 compares COVID-19-related mean anxiety scores based on demographic characteristics. The findings indicated that there was no relationship between COVID-19-related anxiety and the following variables: gender, academic semester, marital status, current residence of the student, history of COVID-19 infection in the student, history of COVID-19 infection in the student's family members, history of COVID-19-related death in the student's relatives, vaccination status of the student, father's job, level of education, type of faculty, and academic motivation. The

COVID-19 anxiety score, however, varied significantly depending on the student's COVID-19 vaccination status ( $P = 0.002$ ) and the family's economic standing ( $P = 0.04$ ); the students whose monthly income was less than \$300 had higher anxiety. Students who had received the full COVID-19 immunization also scored higher on the anxiety scale overall.

The findings presented in Table 2 indicate that there were no statistically significant differences ( $p > 0.05$ ) in the average scores of self-care behaviors related to COVID-19 across various variables, including academic semester, marital status, student's current residence, history of the student's infection with COVID-19, history of the student's family member's infection with COVID-19, history of death of the student's relatives due to COVID-19, vaccination status of the student, father's occupation, educational level, and family's economic income. A notable disparity was found in the average scores of self-care behaviors related to COVID-19 based on various factors, including gender ( $p=0.02$ ), field of study ( $p=0.02$ ), the student's anti-COVID-19 vaccination status ( $p=0.009$ ), the level of anxiety induced by COVID-19 ( $p=0.001$ ), and the levels of academic motivation ( $p=0.001$ ). Thus, the average score for COVID-19 self-care behaviors was higher for women than men and students whose vaccinations were complete. Furthermore, it was observed that nursing and midwifery students exhibited a comparatively lower mean score in terms of engaging in self-care activities when compared to their counterparts in the field of health and medicine. Students with stronger academic motivation also had a higher COVID-19 self-care behavior score.

Based on the findings presented in Table 3, there were no statistically significant differences observed in the average score of academic motivation across various factors, including gender, academic semester, marital status, student's current residence, student's history of COVID-19 infection, student's family members' history of COVID-19 infection, student's relatives' death history due to COVID-19, father's occupation, family's economic status, field of study, student's COVID-19 vaccination status, and the level of anxiety caused by COVID-19 ( $p>0.05$ ). However, there is a significant variation in the average academic motivation score according to education level ( $p=0.005$ ). Therefore, compared to medical and bachelor's students, master's students and above had a higher average score for academic motivation.

According to the findings presented in Table 2, there was no statistically significant difference observed in the academic self-efficacy score across various variables, including academic semester, marital status, current residence of the student, history of the student's infection with COVID-19, history of the student's family members' infection with COVID-19, history of the death of the student's relatives due to COVID-19, father's occupation, student's COVID-19 vaccination status, family's economic status, and anxiety caused by COVID-19 ( $p>0.05$ ). However, a statistically significant difference was found in the mean score of academic self-efficacy across factors, including gender ( $p=0.05$ ), field of study ( $p=0.02$ ), academic level ( $p=0.01$ ), and academic motivation ( $p=0.01$ ).

**Table 2. Comparison of means of COVID-19-related anxiety scores, self-care behaviors, academic motivation and self-efficacy based on demographic characteristics.**

Variable	COVID-19-related Mean Anxiety	Self-care Behaviors	Academic Motivation	Educational Self-efficacy
Gender				
Female	7.42±7.18	57.68±13.91	98.63±12.87	107.76±16.99
Male	5.89±6.23	53.82±12.78	98.11±13.14	103.80±18.68
t(P.V)	1.90(0.06)	2.44(0.02)	0.34(0.73)	1.93(0.05)
Semester				
≤4	7.14±6.95	56.74±13.62	99.51±12.84	106.93±18.76
≥5	6.67±6.90	56.11±13.75	97.13±13.02	105.99±16.09
t(P.V)	0.62 (0.54)	0.42 (0.67)	1.68 (0.09)	0.49 (0.63)
Marital status				
Single	6.83±6.61	56.24±13.71	98.25±12.91	106.61±17.36
Married	8.24±10.16	59.24±12.94	101.20±13.48	105.32±20.88
t(P.V)	-0.98 (0.50)	-1.06 (0.29)	-1.10 (0.27)	0.35 (0.73)
Father's job				
Non-governmental	6.76±6.37	55.26±13.88	98.24±13.63	107.04±18.4
Governmental	7.14±7.52	57.84±13.31	98.73±12.16	105.90±16.7
t(P.V)	-0.51 (0.61)	-1.74 (0.08)	-0.35 (0.73)	0.59 (0.55)
Income(dollar)				
≤300	8.36±7.92	55.62±12.76	98.95±12.13	107.78±16.60
≥300	6.55±6.59	56.59±13.91	98.33±13.19	106.16±17.89
t(P.V)	1.99 (0.04)	-0.60 (0.55)	0.36 (0.72)	-0.69 (0.49)
Current residency				
Dormitory	6.89±6.71	56.13±13.72	98.22±12.91	106.17±17.12
Non - dormitory	7.72±10.25	62.44±11.25	102.78±13.26	112.56±24.74
t (P.V)	-0.50 (0.62)	-1.92 (0.06)	-1.45 (0.15)	1.50 (0.14)
COVID-19 immunization				
Partially vaccinated	5.46±5.38	54.20±14.43	98.95±14.93	106.65±19.39
Fully vaccinated	7.80±7.41	58.13±12.75	98.14±11.57	106.48±16.42
t (P.V)	9.86 (0.002)	6.89 (0.009)	0.313 (0.58)	0.08 (0.93)
Faculty				
School of public health	7.34±6.49	59.21±13.72	100.74±14.72	110.94±19.71
school of paramedicine	7.09±7.34	55.99±14.57	97.94±13.56	106.39±15.70
School of nursing and midwifery	6.09±7.01	52.16±12.38	98.03±11.23	104.75±17.65
School of medicines	6.79±6.55	57.56±11.70	96.89±10.55	102.27±17.63
t(P.V)	0.40 (0.75)	3.22 (0.02)	1.28 (0.28)	3.24 (0.02)
Level of education				
Bachelor	6.98±6.80	56.07±13.83	98.36±13.35	107.11±17.38
Medicine	6.71±6.40	57.06±11.49	96.97±10.31	102.22±17.98
Master and above	7.30±12.55	62.90±20.73	111.10±11.86	118.80±14.75
t (P.V)	0.05 (0.95)	1.28 (0.28)	5.33 (0.005)	4.61 (0.01)
Academic motivation				
High	7.21±7.53	60.53±14.28	-	112.67±16.37
Medium and low	6.70±6.39	53.08±12.16	-	101.38±17.0
t (P.V)	0.27 (0.50)	1.75 (0.001)	-	-6.2 (0.001)
COVID-19-related anxiety				
Medium and high	-	65.57±13.89	99.17±13.13	107.56±18.93
Low	-	55.80±13.43	98.41±12.96	106.43±17.50
t (P.V)	-	5.18 (0.001)	0.007 (0.79)	-0.29 (0.76)

The final multiple regression model examined the association between factors and self-efficacy. In this model, a range of variables were included as predictors, such as age, gender, student's current residence, academic semester, college, education level, marital status, student's parents' residence, family economic

status, parents' status, father's occupation, student's experience of contracting COVID-19, experience of contracting COVID-19 in the family, the history of death due to COVID-19 in the family and relatives, vaccination status against COVID-19, academic motivation score, self-care behavior score, and anxiety score due to COVID-19.

**Table 3. The association between feeling of academic self-efficacy and predictor factors using a multiple regression model.**

Variables	Coefficient	SE	t- test	p- value	95% CI	
Academic motivation	0.39	0.07	5.48	<0.001	0.25	0.53
COVID19-related Anxiety	-0.17	0.12	-1.38	0.167	-0.42	0.073
Self-care behaviors	0.39	0.07	5.68	<0.001	0.26	0.53
Age	-0.21	0.35	-0.59	0.558	-0.90	0.49
Gender	-0.38	2.07	-0.18	0.856	-4.46	3.71
Faculty	-1.92	0.93	-2.08	0.039	-3.74	-0.10
Constant	56.75	9.97	5.69	<0.001	37.13	76.38

**Note:** SE; standard error, CI: confidence interval.

Variables that were not related to academic self-efficacy were excluded from the model. In the ultimate model, the variables of academic motivation, COVID-19 self-care behaviors, and faculty exhibited a significant association with the perception of academic self-efficacy (Table 3).

#### 4. DISCUSSION

The findings of this study revealed that the mean score of students' self-care behavior was  $56.5 \pm 13.7$ , thereby reflecting the average level of students' behavioral response to the COVID-19 pandemic. In a separate study conducted in Iran, it was found that the level of adherence to COVID-19 self-care practices was reported to be moderate [32], which aligns with the findings of our study. A notable correlation was identified between self-care practices and gender, indicating that women exhibited a higher mean score than men. The findings of research conducted at universities in Arak, Iran, indicated a disparity in self-care behaviors between men and women, with men exhibiting higher levels of self-care than women [32]. However, these results are inconsistent with our results. The observed variations in health and illness outcomes between genders can be attributed to several factors, including physiological disparities between men and women, the heightened significance placed on health by female students, variations in the timing of research studies, and variations in the types of questionnaires employed.

The mean COVID-19 anxiety score among the student participants was  $6.9 \pm 6.9$ , suggesting a low level of anxiety. In contrast, previous studies conducted in Iran showed average COVID-19 anxiety scores of  $26.89 \pm 18.6$  [40] and  $14.31 \pm 10.13$  [41], which exceed the findings of the present study. The medium and high prevalence of COVID-19 anxiety was observed in 6.8% of the student population. Nevertheless, alternative research has documented higher rates of anxiety attributed to COVID-19, with reported prevalence rates of 38% [39] and 95.8% [42], surpassing the findings of the current study. According to a study conducted in Turkey, the reported prevalence of anxiety induced by COVID-19 was 23.2%, a finding that does not align with our results [43].

Furthermore, a separate study conducted in Iran has found a moderate prevalence of anxiety induced by COVID-19, which contradicts the findings of the present

study [32]. A further investigation conducted in Iran documented the mean anxiety score associated with COVID-19 as  $9.7 \pm 8.4$ , suggesting a low level of anxiety among students. This finding closely aligns with the outcomes of our study [41]. A major contributing factor to the outcome variations may be the time the studies were conducted. Given that our survey was done in 2022 at the late phase of the epidemic and after the university opening, it is evident that the enhanced understanding of preventive measures and treatment modalities about the disease, together with the widespread availability of effective vaccines, has resulted in a significant decrease in anxiety levels among students.

The mean academic self-efficacy score was  $106.5 \pm 17.6$ , suggesting a moderate level of self-efficacy among the student population. In previous research, the mean academic self-efficacy scores were documented as  $58.5 \pm 6.4$  [44],  $69.5 \pm 10.4$  [45],  $68.13$  [46],  $81.48$  [47], and  $60.71 \pm 8.61$  [48], indicating a lower level compared to the findings of the current study. The mean academic self-efficacy observed in this study is comparatively lower than that reported in previous studies conducted in Iran [49, 50]. Previous studies have found higher levels of academic self-efficacy than the average, as indicated by research conducted by many scholars [49-52]. However, our findings do not align with these results. The disparity in outcomes might be attributed to variations in the research community and the specific conditions of the universities under investigation.

The mean score of academic motivation was  $98.5 \pm 13.0$ , indicating the average level of motivation across students. The findings about the level of academic motivation observed in our study align with the outcomes reported in several previous studies [53-58]. Furthermore, a separate study [51] indicated that academic motivation was shown to be at a significantly greater level compared to the findings of our investigation. A possible explanation for the discrepancy between the outcomes of Afra *et al.*'s study [51] and those of other studies could be that the former focused exclusively on a single field of study. At the same time, the latter examined various fields.

There was a strong relationship between the factors of academic motivation, self-care practices in the context of COVID-19, and the kind of faculty concerning the feeling of academic self-efficacy. In previous research, a

correlation has been observed between academic motivation and self-efficacy, aligning with the findings of our study [50, 51]. However, Shahmohammadipour's study [45] reports a contradictory relationship between self-efficacy and academic motivation, which does not align with our findings. Furthermore, a separate study has also acknowledged the presence of a correlation between self-efficacy and faculty, aligning with the findings of our study [49]. Since medical school of students have performed better on university entrance exams than students in other fields and have a more promising career future, it is important to understand the pathology and underlying causes of this group of students' lack of motivation. Using machine learning approaches and complex data for predicting future conditions and related factors of the health status of students is recommended [59, 60].

## 5. LIMITATIONS OF THE RESEARCH

The reverse causality error may influence the results due to the study's cross-sectional design and lack of research conducted before the COVID-19 outbreak on the association between self-care behaviors and anxiety caused by the virus and medical students' academic motivation and sense of academic self-efficacy. Due to the limited scope of the study and the sample is only composed of medical students from a single region, it is not easy to generalize the findings to the entire student population. This study's strengths include a well-designed study, the inclusion of students from all areas of medical sciences, an adequate sample size, and the use of standardized questionnaires.

## CONCLUSION

Based on the assessment of self-care behaviors, academic motivation, and average academic self-efficacy among students, as well as the observed positive correlation between these factors, implementing effective interventions to enhance these variables may lead to an improvement in the overall academic condition. However, it is crucial to investigate the reasons behind the comparatively lower academic drive and confidence exhibited by medical students compared to other disciplines. Furthermore, it is imperative to implement measures to enhance their confidence, sense of purpose, and motivation within the educational setting. Employing sophisticated approaches like machine learning can effectively identify at-risk students and detect predictors.

## AUTHORS' CONTRIBUTION

It is hereby acknowledged that all authors have accepted responsibility for the manuscript's content and consented to its submission. They have meticulously reviewed all results and unanimously approved the final version of the manuscript.

## LIST OF ABBREVIATIONS

WHO	=	World Health Organization
PTSD	=	Post-traumatic Stress Disorder
CDAS	=	Corona Disease Anxiety Scale

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The protocol of this study was reviewed and approved by the Ethical Review Board of Shahroud University of Medical Sciences, Iran with the code IR.SHMU.REC.1401.139.

## HUMAN AND ANIMAL RIGHTS

All procedures performed in studies involving human participants were in accordance with the ethical standards of institutional and/or research committees and with the 1975 Declaration of Helsinki, as revised in 2013.

## CONSENT FOR PUBLICATION

Informed consent was obtained from them.

## STANDARDS OF REPORTING

STROBE guidelines were followed.

## AVAILABILITY OF DATA AND MATERIALS

The data of current study are available from author, [A.K], on a reasonable request.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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