



## Research Paper: COVID-19 Anxiety, Academic Burnout and Academic Achievement Among Medical Stagers and Interns at Guilan University of Medical Sciences, in 2020



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### ABSTRACT

**Background:** Medical students, as part of the healthcare team, are directly exposed to challenging conditions during the COVID-19 epidemic. This study investigated COVID-19 anxiety, burnout, and academic achievement in stagers and interns of Guilan University of Medical Sciences.

**Materials & Methods:** The present analytical cross-sectional study was conducted on medical students and interns studying at Guilan University of Medical Sciences in the 2020-2021 academic year. Of whom, 150 students participated in this study. Corona Disease Anxiety Scale (CDAS) and Maslach Burnout Inventory-Student Survey (MBI-SS) were used to measure anxiety and academic burnout of the students, respectively. Measuring students' academic achievement was based on Grade Point Average (GPA). Data analysis was performed using chi-square, Mann-Whitney U test, and partial Spearman correlation Coefficient.

**Results:** The participation rate in this study was 92%. The results showed that 6.5% of students had high anxiety, 18.8% reported high academic burnout, and 79% reported the average level of burnout score. Also, the participants' GPA was  $16.76 \pm 1.30$ . The academic burnout score was significantly higher in male students than female ones ( $t = -2.01$ ;  $P = 0.04$ ). The GPA was significantly higher in students under 24 years old than in older students ( $t = 4.71$ ;  $P = 0.01$ ). The partial correlation coefficient adjusted for sex showed a positive and significant correlation between CDAS and MBI-SS ( $r = 0.346$ ;  $P < 0.001$ ).

**Conclusion:** The present study results showed that medical stagers and intern students had high academic burnout during the COVID-19 epidemic, and there was a weak and direct correlation between academic burnout and COVID-19 anxiety. Accordingly, to reduce the consequences of the COVID-19 epidemic, appropriate therapeutic and educational interventions should be provided to empower stagers and intern students.

**Keywords:** COVID-19, Anxiety, Academic burnout, Academic achievement, Medical students

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## 1. Introduction

The Coronavirus Disease 2019 (COVID-19) first broke out in Wuhan City, China, on December 17, 2019, and was declared a worldwide epidemic on March 11, 2020, according to the World Health Organization [1]. COVID-19 as an epidemic can cause emotions such as anxiety, fear, and stress in individuals [2]. The negative impact of epidemics is not limited to physical health problems and can have unpleasant consequences such as anxiety and stress in individuals [3]. Previous studies show that anxiety is a significant response to epidemic diseases and these negative emotions are much more pronounced in the early period [4].

COVID-19 has specific characteristics that cause distorted perceptions, interpretations, and understandings in individuals [5, 6]. Meanwhile, health care providers who directly deal with the pandemic may experience different psychological reactions [7]. Being in a COVID-19 contaminated environment creates widespread psychological disorders in medical professionals and medical students [8].

During the epidemic, academic and work pressures on medical students will significantly increase, which might play a significant role in their academic burnout [9]. Burnout is a three-dimensional syndrome (exhaustion, cynicism, and reduced efficacy) [10, 11]. The burnout variable in educational situations and contexts, called academic burnout [12]. Academic burnout among students refers to a feeling of tiredness due to the demands and requirements of education (fatigue), having a pessimistic feeling without interest in homework (apathy), and feeling unworthy as a low-performing student [13].

During the COVID-19 epidemic, medical students who had to work in person and practice were forced to complete their practical courses virtually. In this condition, many medical students experience high levels of burnout. Academic burnout and high anxiety during the COVID-19 epidemic had various effects on the performance and academic achievement of many medical students and interns [14]. Students have different characteristics that affect their progress. Progress is the achievement of a goal that people set for themselves [15].

In contrast to academic achievement, academic failure refers to the failure of education, dropout, repetition of courses, poor quality of education, and discrepancies between lessons learned and the ultimate educational objectives. Academic achievement is the most important

consequence of any educational system that can play an influential role in achieving the educational and professional goals of any society [16-18]. With a comprehensive approach, the factors affecting academic achievement or lack of achievement can be considered and examined in two categories of individual and environmental factors. Components such as gender, marital status, educational background, self-esteem, anxiety, depression, and intelligence are classified as individual factors [19, 20].

Environmental factors, family, social, and environmental conditions affect the progress or lack of academic achievement of students, which can be referred to the socio-economic status, housing status, employment, and welfare facilities. These factors and variables are so intertwined and interact that it is not easy to determine the magnitude of their contribution, but educational and individual factors with cognitive and social nature have the greatest impact on student's academic achievement [21]. During the COVID-19 epidemic and social distancing, many medical students suffered severe psychological damage that affected their academic achievement [22].

Given that a year has passed since the COVID-19 epidemic and the deadly virus is still mutating, no definite date can be predicted for the post-corona era. Also, the mental health of medical students has undergone many changes during the COVID-19 epidemic that need to be investigated [23]. Therefore, the present study investigated COVID-19 anxiety, academic burnout, and achievement in students and interns of Guilan University of Medical Sciences.

## 2. Materials and Methods

### Study type and population

The present research was an analytical cross-sectional study, and the study population consisted of medical students and interns studying at Guilan University of Medical Sciences in the academic year of 2020-2021 that was approximately 450 individuals (260 students and 240 interns). According to the formula by Chow et al. [24] and previous estimate of  $38.57 \pm 8.34$  for the mean value of academic burnout [25], considering margin of error as 1.5, the significance level of 0.05 and 30% non-response rate, a total of 150 individuals was calculated for sample size.

Willingness to participate in the study, studying in the academic year 2020-2021, and lack of COVID-19 infection at the time of the study were considered criteria for entering the study. Also, leaving 10% of the ques-

tionnaire questions unanswered was considered as an exclusion criterion.

The samples were randomly selected from the staggers and intern students. The students were first divided into two general categories: staggers and interns. Then from each group, according to the year of study commencement, the sample was recruited from the list of students available in the university education using a simple random sampling method. In this study, the principles of ethics in research, such as obtaining informed consent, maintaining confidentiality, and privacy, were observed. This study with the ethical code IR.GUMS.REC.1399.464 was approved by the Ethics Committee of Guilan University of Medical Sciences.

### Data collection

Data collection was performed by presenting a letter of introduction from the Vice-Chancellor for Research and Technology of Guilan University of Medical Sciences and education officials' permission. The questionnaires were delivered to the students if they were present. In case of absence of the students, a web-based questionnaire was designed and the link of access was sent to them via SMS, and they were asked to complete the questionnaires within 24 hours. All questionnaires had an informed consent form on the first page that was approved as consent to participate in the study. Students had the authority to participate in the study, all information about them remained confidential, and a code was used to record the information. Individuals were also allowed to refuse to complete the questionnaire while completing it.

### Study variables and instruments

Demographic variables of students, including age, gender, marital status, place of residence, and course of study (stagger or intern) were measured using a general list. The students' academic achievement was measured using Grade Point Average (GPA).

### Corona disease anxiety scale

Alipour et al. designed the Corona Disease Anxiety Scale (CDAS) in 2019 to measure the anxiety of COVID-19 and can be performed in people over 18 years old. This scale contains 18 items scored based on a 4-point Likert-type scale (never=0 to always=3) and two subscales of psychological symptoms (items 1 to 9) and physical symptoms (items 10 to 18) measures anxiety; the range of scores that can be achieved on this scale

is between 0 and 54, and higher scores indicate more anxiety. Also, on this scale, scores of 0-16, 17-29, and 30-54 show mild, moderate, and severe anxiety levels, respectively. Using exploratory factor analysis, Alipour et al. identified two factors of psychological and physical symptoms that explain a total of 61% of the total variance of the scale. The reliability of this scale was calculated by the Cronbach  $\alpha$  method for psychological factor as 0.87, for physical factor 0.86, and the whole scale 0.91 [26]. In the present study, the reliability of this instrument was calculated to be 0.88 by the internal consistency calculated with Cronbach  $\alpha$  value.

### Maslach Burnout Inventory-Student Survey (MBI-SS)

In 2002, Schaufeli et al. designed Maslach Burnout Inventory-Student Survey (MBI-SS) to measure burnout. This scale contains 15 items based on a 7-point Likert-type scale from never=0 to always=6. The range of scores to be achieved was between 0 and 90. This questionnaire has three subscales of exhaustion (items: 1-6), cynicism (items: 7-10), and reduced efficacy (items: 11-15). High scores on these three subscales indicate academic burnout. In other words, scores from 0 to 27, 28 to 54, and 55 to 90 indicate low, medium, and severe levels of academic burnout, respectively. Using exploratory factor analysis, Schaufeli et al. identified three components of exhaustion, cynicism, and reduced efficacy, which together explain 58% of the variance of the questionnaire, and the internal consistency coefficients by the Cronbach  $\alpha$  values were 0.74 for exhaustion, 0.79 for cynicism, and 0.76 for reduced efficacy [27]. This questionnaire was translated into Persian in Iran by Hashemi Sheikh Shabani and associates, and its psychometric properties were examined. The confirmatory factor analysis results showed that the three components of exhaustion, cynicism, and reduced efficacy were confirmed in the Iranian sample, and the Cronbach  $\alpha$  coefficients were obtained for the subscales of exhaustion as 0.78, cynicism 0.82, and reduced efficacy 0.68. these values indicate the proper reliability of this tool [25]. In the present study, the tool reliability was obtained by calculating the internal consistency with the Cronbach  $\alpha$  values of 0.88 for the exhaustion, 0.90 for the cynicism, and 0.84 for the reduced efficacy.

### Statistical analysis

The obtained data were analyzed using SPSS version 19. According to the type of the variables, frequency, percentage, mean, standard deviation, and median indices were used to describe data. The Kolmogorov-

Smirnov test was performed to evaluate the normal distribution of the main variables CDAS, MBI-SS, and GPA. The Mann-Whitney U test was used to compare CDAS scores based on demographic information, and the independent t-test was used to compare MBI-SS and GPA. The partial Spearman correlation coefficient was used to examine the correlation among variables. The Chi-square test was also used to evaluate the relationship between the levels of CDAS and MBI-SS levels. A P value less than 0.05 was considered significant.

### 3. Results

Out of 150 participants, 138 returned the questionnaires, (73 staggers and 65 interns). The participation rate of this study was 92%. The Mean±SD age of participants was 24.44±1.84 years. Of the total respondents, 53.6% (74 individuals) were interns, and 68.1% (94 individuals) were female; 89.1% (123 individuals) were single; 89.9% (124 individuals) lived in a private house, and the rest of the participants lived in a dormitory. The Mean±SD GPA of the participants was 16.76±1.30. [Table 1](#) presents the mean anxiety, academic burnout, and GPA score according to the study variables.

According to [Table 2](#), academic burnout was significantly higher in male students than in female students ( $t=-2.01$ ,  $P=0.04$ ). The GPA was significantly higher in students under 24 years old ( $t=4.71$ ,  $P=0.01$ ). Of total, 26 students (18.8%) had high academic burnout.

The results of the partial correlation coefficient, according to [Table 3](#), showed a direct and weak correlation between CDAS and MBI-SS adjusted for sex ( $r=0.346$ ;  $P=0.001$ ). But GPA was not significantly correlated with CDAS ( $r=-0.042$ ;  $P=0.623$ ) and MBI-SS ( $r=-0.078$ ;  $P=0.365$ ) ([Table 1](#)). The percentage of high academic burnout in those with high anxiety was 33% compared to 18% among individuals with moderate and low anxiety levels.

Though, the association was not significant ( $\chi^2=2.636$ ;  $P=0.621$ ).

### 4. Discussion

This study aimed to investigate COVID-19 anxiety, burnout, and academic achievement in staggers and interns of Guilan University of Medical Sciences. The results showed that 19% of students had high academic burnout. Also, the burnout score in male students was significantly higher than in female ones. On the other hand, there was a positive correlation between burnout and COVID-19 anxiety. These results were consistent with the studies of Wang et al. [13], Jiang et al. [14], and Moreno-Fernandez et al. [15].

COVID-19 pandemic has created significant stress and anxiety in medical students, which affected their academic performance [16]. In other words, it can be stated that academic burnout can lead to non-participation and reduce the energy needed to carry out activities. Thus, students who feel academic burnout do not have an incentive to participate in educational activities, impairing their academic performance [9]. Dilapidated students often lack interest, and the monotony of educational activities is tedious for them. They usually have symptoms such as apathy towards the curriculum, a sense of meaninglessness, and inability to learn the curriculum. Finally, they experience decreased academic performance [9]. Over the past year, the COVID-19 epidemic has had far-reaching consequences at the academic and educational levels. In this regard, many studies have been conducted on the effects of the COVID-19 epidemic on students' academic performance. Most of them reported decreased academic performance and increased academic burnout in many students [28, 29]. In this regard, Wang et al., in a study, showed that 39.29% of students had burnout [13]. In another study, Jiang et al. found that students who used social media were significantly more likely to have anxiety levels.

**Table 1.** CDAS, MBI-SS, and GPA scores and partial correlations (n=138)

Item	Mean±SD	Range	Median	Z (P)	r (p)	
					CDAS	MBI-SS
CDAS	10.97±9.53	1-54	8	1.968 (0.001)	1	
MBI-SS	44.23±10.95	22-90	43	0.780 (0.577)	0.346 (0.001)	1
GPA	16.76±1.30	14-19	17	1.120 (0.162)	-0.042 (0.623)	-0.078 (0.365)



Z: Kolmogorov-Smirnov test; P: significance level; r: partial Spearman correlation; GPA: Grade Point Average; MBI-SS: Maslach Burnout Inventory-Student Survey; CDAS: Corona Disease Anxiety Scale

**Table 2.** The scores of anxiety, academic burnout and academic achievement according to the study variables

Items	No.(%)	CDAS		MBI-SS		GPA		
		Mean±SD	U (P)	Mean±SD	t (P)	Mean±SD	t (P)	
Age (y)	≤24	74(53.6)	10.47±8.22	-0.08 (0.93)	42.63±10.68	-1.87 (0.06)	17.21±1.25	4.71 (0.01)
	≥25	64(46.4)	11.56±10.89		46.07±11.06		16.24±1.16	
Educational Status	Stager	73(52.9)	10.84±8.19	-0.90 (0.36)	44.64±9.89	0.46 (0.64)	16.85±1.36	0.87 (0.38)
	Interns	65(47.1)	11.12±10.91		43.76±12.12		16.66±1.24	
Sex	Female	94(68.1)	11.22±9.66	-0.50 (0.61)	42.95±10.53	-2.01 (0.04)	16.77±1.32	0.16 (0.86)
	Male	44(31.9)	10.45±9.34		46.95±11.46		16.73±1.28	
Marital Status	Single	123(89.1)	11.03±9.66	-0.14 (0.88)	44.26±10.99	0.11 (0.91)	16.80±1.32	1.00 (0.31)
	Married	15(10.9)	10.53±8.70		43.93±11.05		16.44±1.11	
Location	Home	124(89.9)	10.87±9.53	-0.88 (0.37)	44.10±11.34	-0.40 (0.68)	16.80±1.30	1.18 (0.23)
	Dormitory	14(10.1)	11.92±9.87		45.35±6.87		16.37±1.33	



GPA: Grade Point Average; MBI-SS: Maslach Burnout Inventory-Student Survey; CDAS: Corona Disease Anxiety Scale; U: Mann-Whitney U test; P: significance level; t: independent samples test

ety and burnout. In contrast, students with higher psychological capital were found to experience less burnout and anxiety [14]. Given the impact that hospital activities during the COVID-19 epidemic have had on medical student burnout, studies show that universities, hospitals, and families should provide the necessary social support for medical students to reduce burnout and increase academic achievement in stagers intern students studying [30].

On the other hand, in relation to academic achievement, it was found that the GPA of students under 24 years old was higher than other students. This result indicates the better academic performance of lower semester students. These results are consistent with the findings of studies by Jan SU et al. [21], Fawaz et al. [22], and Lasheras et al. [23].

Students' academic achievement is one of the most critical indicators in the evaluation of higher education, and all system efforts should be invested in this area [18]. Academic achievement is usually measured in various ways, including the degree of achievement in each training course separately, the achievement of the set of training courses, or the annual GPA. Identifying the factors affecting students' academic achievement creates an appropriate approach to plan and develop educational programs to achieve the best possible results for students [20]. Because of the COVID-19 pandemic, many medical students have not received in-person clinical training in practical classes, and their academic performance has dropped significantly. Accordingly, high-quality virtual and e-learning should be provided for the students. DePietro et al. examined the experiences of a radiology vid-

**Table 3.** The Chi-square test result for the relationships between CDAS and MBI-SS levels

CDAS	MBI-SS, No.(%)			Total	χ <sup>2</sup> (P)
	High, ≥55	Moderate, 28-54	Low, ≤27		
High, ≥30	3 (33)	6 (67)	0	9	2.636 (0.621)
Moderate, 17-29	3 (18)	13 (76)	1 (6)	17	
Low, ≤16	20 (18)	90 (80)	2 (2)	112	



CDAS: Corona Disease Anxiety Scale; MBI-SS: Maslach Burnout Inventory-Student Survey; χ<sup>2</sup>: the Chi-square value; P: significance level

eo training course during the COVID-19 epidemic [31]. Their finding showed that video classes were suitable for teaching purposes. So, it is necessary to accommodate the medical education system with the emerging situation and making the best of virtual classes [32].

The present study had some limitations to address. The statistical population of this study was medical stagers and interns studying at Guilan University of Medical Sciences in the academic year 2020-2021. Therefore, caution should be exercised in generalizing the results to other groups and regions. Another major limitation of this study is the cross-sectional nature of the study that obscures any temporal association between study variables. Besides, the students' grade point average was obtained before the COVID-19 epidemic, so we are uncertain that COVID-19 anxiety is related to academic achievement and has been affected by pandemic conditions.

Given that it is unclear when the COVID-19 epidemic will end, the Ministry of Health, university officials, and experts must ensure that stagers and intern medical students study at the appropriate level in terms of academic achievement and practice. They should also prepare intensive classes to bring the scientific and educational level of students to the desired level. To reduce academic burnout and anxiety, it is also necessary to hold workshops and training to increase resilience and psychological flexibility in stagers and interns studying.

## 5. Conclusion

The present study results showed that stagers and intern medical students had high academic burnout during the COVID-19 epidemic, and there was a weak and direct association between academic burnout and COVID-19 anxiety. The study results can be used to plan educational programs to empower medical students during the COVID-19 epidemic and beyond.

## Ethical Considerations

### Compliance with ethical guidelines

This research was registered with the ID of IR.GUMS.REC.1399.464 in the Research Ethics Committee of Guilan University of Medical Sciences.

### Funding

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## Authors' contributions

Conceptualization and supervision: Alia Saberi, Sajjad Saadat; Methodology: Sajjad Saadat, Ali Ashraf, Hamidreza Hatamian; Data collection: Tina Nabatchi Ahmadi; writing– review & editing: Sajjad Saadat, Farzin Bagheri Sheykhgafshe; Writing – original draft and funding acquisition, resources: Alia Saberi, Sajjad Saadat, Marjan Entezari.

## Conflict of interest

The authors declared no conflict of interest.

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