



Academic Stress as a Predictor of Research Self-Efficacy Mediated by Research Spirit in Medical Students



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ABSTRACT

Aims Research capacity building and self-efficacy are essential skills for medical students that greatly help them to participate in research. The present study aimed to investigate the relationship between academic stress and research self-efficacy in medical students through the mediating role of research spirit.

Materials & Methods This descriptive-correlational study used path analysis to examine the relationships between the variables. The statistical population was all postgraduate medical students in Ilam in the academic year 2022-2023, of whom 301 students were selected using convenience sampling. They completed the Research Self-Efficacy Scale, the Academic Stress Scale, and the Research Spirit Questionnaire. Evaluation of the proposed model was done using path analysis.

Findings There was a negative correlation between academic stress and research spirit ($p < 0.001$). There was a significant positive correlation between research spirit and research self-efficacy ($p < 0.001$), whereas there was no significant correlation between the direct path of academic stress to research self-efficacy. Al

so, there was a significant correlation between the indirect path connecting academic stress and research self-efficacy through research spirit ($p < 0.01$).

Conclusion Based on the results, the proposed model shows a good fit and is a major step toward identifying factors influencing research self-efficacy among medical students.susceptibility.

Keywords Research; Stress Disorders, Traumatic, Acute; Medical; Students

CITATION LINKS

[1] Platforms and institutions in the post-pandemic university: A case study of social media and the impact ... [2] A mixed-methods study of a poster presentation activity, students' science identity, and science communication self-efficacy under ... [3] Predictors of research self efficacy in first-year osteopathic medical ... [4] Career decision making self efficacy and its implications on guidance and counseling programs: A study of high school ... [5] Research self-efficacy ... [6] The development and use of a research self-efficacy scale ... [7] Research self-efficacy and its relationship with academic performance in postgraduate students ... [8] Mediating role of safety policy on contact care in the stress of exposure to sharps injuries in ... [9] The impact of stress on body function ... [10] Anxiety and depression in adolescents with ADHD and autism spectrum disorders ... [11] Academic stress and mental well-being in college students: Correlations, affected groups ... [12] Family and academic stress and their impact on students' depression level and academic ... [13] Building self-efficacy without letting stress knock it down ... [14] Academic stress, academic self-efficacy, and psychological distress: A moderated ... [15] The spirit of ... [16] Presenting a causal model of the effect of motivational ... [17] Validation of research self-efficacy scale for postgraduate students of Ferdowsi university ... [18] Educational stress scale for adolescents: development, validity ... [19] The relationship between educational stress and educational ... [20] Construction and validation of the scale of research ... [21] Impacting caregiver self-efficacy and stress during the COVID-19 ... [22] Online and academic procrastination in students with learning ... [23] Academic stress and self-regulation among university ... [24] The influence of college students' academic stressors on mental ... [25] The association between academic stress and test anxiety in ... [26] Perceived academic stress, causes, and coping strategies ... [27] Academic stress and prevalence of stress-related self-medication among ... [28] The representation of research experience model and its relationship with researcher ... [29] The effects of scientific self-efficacy and cognitive ... [30] Self-esteem and self-efficacy in the status attainment ... [31] Self-esteem and academic engagement among adolescents ...

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Introduction

Universities are the main platform for reflection and examination of social issues. All countries are trying to pay attention to the role of universities in national development and the improvement of knowledge and technology from two dimensions: education and training of specialized human resources and research to move the boundaries of science and technology [1]. Research-based education and different approaches to its implementation are currently some of the most important subjects in higher education. The gap between education and research can be narrowed by bringing research into higher education, especially concerning educational activities [2]. Therefore, research capacity building and self-efficacy are essential skills for students that greatly help them to participate in research [3].

Paying attention to the concept of self-efficacy refers to a person's belief in his abilities with an emphasis on motivational and cognitive resources for the successful implementation of tasks [4, 5]. Research self-efficacy is related to a researcher's belief in doing research and the judgment of individuals regarding their abilities for organizing and carrying out research activities [6]. In other words, research self-efficacy indicates the adaptation of the concept of cognitive-social self-efficacy to academic research. This adaptation is one of the best predictors of successful research activities [7].

In this regard, research self-efficacy is influenced by various factors, including academic stress. Although necessary to a certain extent, stress becomes problematic if people cannot predict the future or their behavior, find themselves engaged in fruitless efforts, or believe that they have no control over events [8]. Long-term stress causes tension, anxiety, and bad mood in people [9]. Thus, failure to address or cope with a problem raises stress and makes efforts inflexible so that other solutions to the problem are neglected [10]. Students face academic stress in educational and academic settings due to the overabundance of information that occupies their mind and prevent them from processing and assimilating new information [1, 12]. Various studies have confirmed the relationship between academic stress and research self-efficacy [13, 14].

Research spirit is another factor that affects research self-efficacy in post-graduate students. Creating and improving research spirit in students is a primary goal and educational concern of universities and higher education institutions. All countries have to deal with low research spirit and a lack of sufficient interest in proper learning in higher education. The most important function of higher education in human societies is to produce knowledge and carry out research. Countries find it worthwhile to accelerate the education of researchers and graduates by establishing an efficient research-oriented educational system. However, the lack of

scientific spirit among researchers currently is one of the important factors of disinterest in research [15]. Students with greater levels of research spirit typically take on tasks and responsibilities more readily [16]. Livinți *et al.* [5] consider being interested in research and having a scientific spirit as predictors of research self-efficacy.

Although previous studies have somehow confirmed that there are correlations between the research variables, they have failed to consider the structural relationship. Moreover, there has been less interest in the spirit of research and the statistical population of postgraduate medical students has not been used frequently in domestic research. Because medical students are essential to the development and health of society and they face various problems in educational and work environments, it is necessary to make plans for addressing the educational and research problems they face. Based on the mentioned background, the present study aimed to investigate the relationship between academic stress and research self-efficacy in medical students through the mediating role of research spirit.

Materials and Methods

This descriptive-correlational study examined the relationships between the variables using the path analysis framework. The statistical population was all post-graduate medical students in Ilam in the academic year 2022-2023, of whom 301 cases filled out the questionnaires completely and were included in the research. The relationships between the variables were examined using Pearson's correlation coefficient and path analysis. The inclusion criteria were consent for research, physical and mental health, and completion of at least one semester, whereas the exclusion criteria were revoking consent, incurable diseases (in the participants or their families), or any other event negatively affecting routine life, behavior, and performance, failure to complete the questionnaire or a history of taking sedatives or neuropsychiatric drugs.

Research Tools

Research Self-Efficacy Questionnaire: This scale was designed by Salehi [17] with 55 items and seven factors, namely statistical and analytical self-efficacy, conceptualization self-efficacy, method and implementation self-efficacy, qualitative research self-efficacy, reporting self-efficacy, and self-efficacy in skills, competence, and ethics. The questionnaire is scored on a 5-point Likert scale (from 1: very low to 5: very high) with respective minimum and maximum scores of 55 and 275. The reliability of this scale was reported to be 0.76 using Cronbach's alpha [17].

Academic Stress Questionnaire: This questionnaire was designed by Sun *et al.* [18] with 16 items and is scored on a 5-point Likert scale (1: completely disagree to 5: completely agree). Scores

range from 16 to 80 with higher scores representing higher levels of academic stress. In Iran, AramFar and Zeynali^[19] reported a Cronbach's alpha of 0.73 for the whole questionnaire.

Research Spirit Questionnaire: This questionnaire was developed by Shirzad *et al.*^[20] and includes 30 items in four subscales, namely diligence, managing impulses, curiosity, and teamwork scored on a 4-point Likert scale (very low, low, high, and very high). The respective maximum and minimum scores for this questionnaire are 120 and 30. The reliability of this questionnaire was reported as 0.81 using Cronbach's alpha^[20].

Data Analysis

The proposed model was examined using path analysis by SPSS 27 and AMOS 25, and indirect

correlations were tested using the Bootstrap test.

Findings

The mean age of students was 26.16 ± 2.51 years. Among the participants, 250 students (83.06%) were single and 51 students (16.94%) were married, 164 cases (54.49%) were female, and 137 cases (45.51%) were male.

Table 1 presents the means, standard deviations (SD), and Pearson's correlation coefficients of the research variables. Pearson's correlation coefficients showed significant correlations between all research variables ($p < 0.001$). Figure 1 shows the preliminary model for explaining research self-efficacy based on academic stress and research spirit.

Table 1) Mean, standard deviation (SD), and correlation between the variables

Parameter	Mean±SD	3	2	1
1- Research self-efficacy	103.83±23.01	0.52*	-0.22*	1
2- Academic stress	46.31±6.95	-0.36*	1	
3- Research spirit	65.48±8.08	1		

** $p < 0.01$

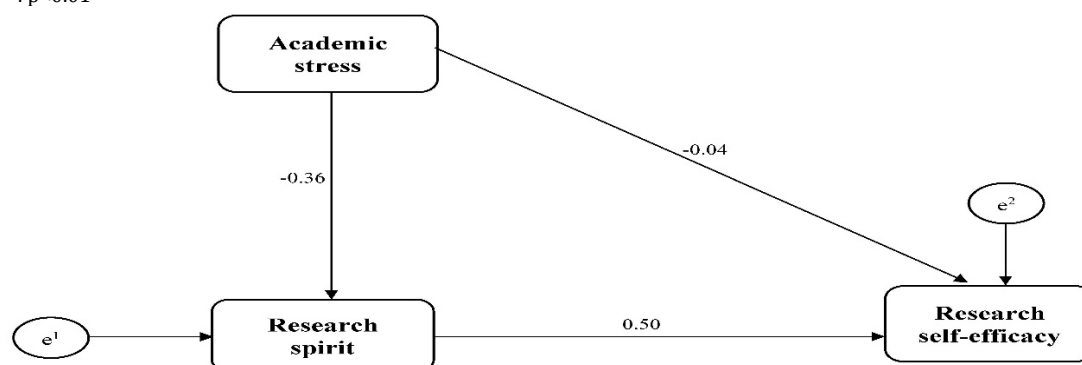


Figure 1) The initial model of the mediating role of research spirit in the relationship between academic stress and research self-efficacy

The root-mean-square error (RMSEA) of 0.385 indicated that the initial model required modifications (Table 2). As the initial model was saturated (i.e., all the possible paths were drawn), the Chi-square and other indices could not be calculated.

After removing one path (academic stress to research self-efficacy), the model was no longer saturated and the software could compute these indices. Figure 2 shows the final model. According to the RMSEA of 0.001, the final model showed a good fit.

Table 2) Initial and final models fit indicators

Fit indicators	Chi-square (χ^2)	Degree of freedom (df)	(χ^2)/df	Incremental Fit Index (IFI)	Relative fit index (RFI)	Tucker Lewis index (TLI)	Comparative fit index (CFI)	Normed fit index (NFI)	Root-mean-square error (RMSEA)
Initial model	-	-	-	-	-	-	0.90	0.84	0.385
Final model	0.56	1	0.56	0.99	0.98	0.99	0.99	0.99	0.001

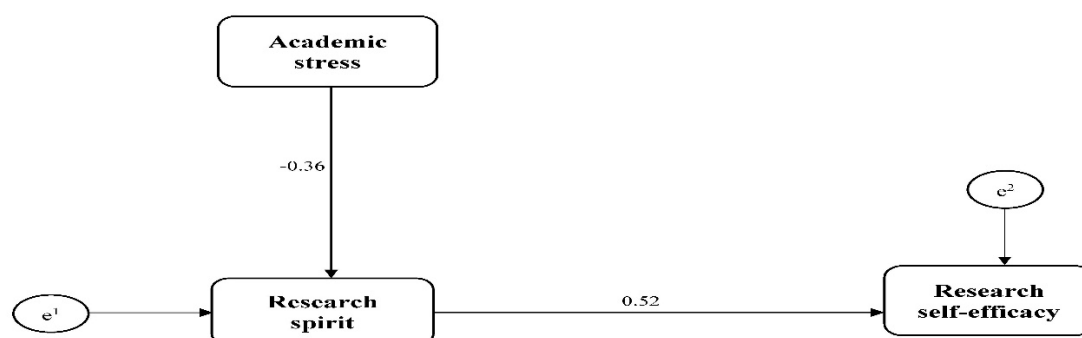


Figure 2) The final model of the mediating role of research spirit in the relationship between academic stress and research self-efficacy

Table 3 presents the findings related to the estimation of path coefficients to examine the direct and indirect paths. There was a negative and significant relationship between academic stress and research spirit ($\beta=-0.36$; $p=0.001$). Moreover, there was a positive relationship between research spirit and research self-efficacy ($\beta=0.52$; $p=0.001$). There was no significant relationship between academic stress and research self-efficacy. The confidence intervals shown in Table 3 suggested that the indirect path of academic stress to research self-efficacy was significant when mediated by research spirit ($\beta=-0.62$; $p=0.010$).

Table 3) Path coefficients of the direct and indirect relationship between the research variables

Paths	Initial model		Final model	
	β	p-value	β	p-value
Academic stress→Research self-efficacy	-0.04	0.454	-	-
Academic stress→Research spirit	-0.36	0.001	-0.36	0.001
Research spirit→Research self-efficacy	0.50	0.001	0.52	0.001
Academic stress→Research self-efficacy through research spirit	-0.60	0.010	-0.62	0.010

Discussion

This study aimed to investigate the relationship between academic stress and research self-efficacy in medical students through the mediating role of research spirit. The first finding was no significant correlation between academic stress and research self-efficacy, which is consistent with that reported by Garavand and Pakmehr [16] who showed that academic stressors did not directly influence research spirit and self-efficacy. However, this result is inconsistent with those reported by Perdomo *et al.* [21] and Niazov *et al.* [22], who employed Pearson's correlation coefficient and found a significant correlation between the variables. However, in this study, academic stress had a greater effect through the mediation of research spirit, and as a result, it reduced research self-efficacy. To explain this finding, it can be said that the medical students started with clinical discussions, performed rotations in hospitals, and encountered patients from the very beginning. The resulting stress affected their academic performance and research self-efficacy. Thus, higher levels of stress reduced research self-efficacy. Empirical evidence shows that students with academic stress typically have low levels of research self-efficacy. After failure, adaptive attribution further exposes them to risks of negative emotional experiences, and they tend to employ certain behavioral patterns, such as negative self-evaluations and negative self-talk [16].

Attention to academic stress is one of the important aspects of mental health in students. Stress is an inseparable part of life, and may lead to illness depending on the level of psychological pressure and

the quality of the person's adaptation to it [23]. Long and continuous stress in the study and work environment can cause depression and lead to issues, such as frequent absences and reduced academic and work performance. Considering that the healthcare environment that deals with human life is known as a stressful environment and its employees are prone to face severe stress, the stress caused by this type of work can affect the academic performance of students [24]. It is believed that stress is one of the disruptive factors in academic performance. Stress is considered a factor affecting the success and academic progress of students. Therefore, it negatively affects and disrupts educational achievement [25]. The results of the present study and the results of previous studies indicated that stress is one of the variables that affect the level of self-efficacy beliefs of students, and the perception of a high level of stress leads to a decrease in self-efficacy beliefs in students. In explaining the results, it can be argued that stress and physiological arousal are effective factors in reducing self-efficacy [26]. Students with high stress rate their study and learning skills lower than their ability and knowledge during their studies. Having skills that help a person be less stressed on the path to success, in addition to increasing mental health, makes him/her more efficient. Also, stress control skills can be effective in a person's mood in educational environments [27].

The results also showed a statistically significant correlation between research spirit and research self-efficacy. In other words, research spirit had a significant positive correlation with research self-efficacy, which is consistent with the results of previous studies [2, 28, 29]. Leone and French [2] reported significant correlations between scientific spirit and identity and the academic self-efficacy of students. Mardani *et al.* [28] reported a positive correlation between research spirit and research self-efficacy in students so that increasing the research spirit leads to an increase in research self-efficacy in students. It can be said that scientific spirit and identity and self-efficacy significantly improved the scientific relationship of students. In addition, the complaints about the virtual presentation of research decreased and also the advantages of this kind of presentation (reduced stress and a more comfortable environment) became more pronounced. Therefore, developing a research spirit is among the most important ways of building a scientific society [16].

Because postgraduate students play an important role in improving educational processes and developing scientific services in society, acquiring research skills is highly important [28]. People with high self-worth have greater self-efficacy and performance, whereas those with low self-worth accept defeat, which leads to a reduction in the level of self-efficacy [30, 31]. In this regard, the behavior and support of professors have significant impacts on students' intellectual development.

The results also indicated that academic stress had a significant correlation with research self-efficacy when mediated by research spirit. We found no similar studies about this finding. The first hypothesis showed that academic stress had no significant correlation with research self-efficacy, whereas the indirect hypothesis revealed that academic stress could reduce research self-efficacy by weakening the students' research spirit. Because the medical students completed clinical courses simultaneously with their other studies, they may not have had the time and motivation to do research, which weakened their research spirit and consequently, research self-efficacy. Therefore, the research spirit effectively mediated the relationship between academic stress and research self-efficacy. Using the self-report instrument may have affected the accuracy of the students' reports due to the social desirability bias in them. In addition, because the research population was limited to postgraduate medical students in Ilam City (Iran), the results should be generalized to other universities, fields, and cities with caution. It is therefore recommended to examine the research variables in other universities and fields to increase the generalizability of the results found in the present study.

Conclusion

The modified conceptual model shows a good fit. Therefore, it can be considered a scientific innovation and discovery in postgraduate education, which will be effective in improving students' research self-efficacy. The results are also an important step toward recognizing the important factors in research self-efficacy in postgraduate students. Planners should consider holding workshops with specialist instructors to develop students' research skills, increase research facilities and spaces, such as instruments and laboratories, and raise the research budget of universities to promote research spirit thereby improving research self-efficacy.

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