Investigation of Correlation Between Research Self-Efficacy and Academic Performance in Iranian Students of Health Sciences

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Abstract

Purpose

One of the most important concepts in educational psychology is self-efficacy. Self-efficacy in the learning and research process can play an important role in the success of students. Therefore, the purpose of this study was to investigate the level of research self-efficacy in students and its correlation with academic performance.

Methods

In this correlation study, 210 Iranian students of health sciences participated. The self-efficacy in research measure (SERM) and grade point average (GPA) was used for data collection. Data analysis was conducted using SPSS version 18.

Results

Most of the students used internet and library resources for more than 3 hours and less than 1 hour per day, respectively. In addition, students mostly used the PubMed database. The mean research self-efficacy score among students was 183.12 ± 46.54 out of 297. There was a significant difference between the mean research self-efficacy score and age group ($F = 2.103$, $P \leq 0.01$). Research self-efficacy had a significant correlation with academic performance ($r = 0.648$, $P \leq 0.01$).

Conclusion

In this study, research self-efficacy of students was at a moderate level. Research self-efficacy showed associations with academic performance. In general, the findings suggest that research self-efficacy is very important in students' educational-research performance. Therefore, educational and psychological interventions are necessary to enhance the research self-efficacy beliefs.

Introduction

One of the key issues in higher education is academic performance (1–3). Improving the level of academic performance in students is one of the important priorities of universities (4). Evidence suggests that there is an association between students' academic performance and psychological, behavioral, and social factors (5, 6). Self-efficacy (SE) is one of the most important psychological factors for improving students' academic performance (7–9). SE in Bandura's social cognitive theory is defined as "individual's belief in their abilities and skills in performing an action" (10). In other words, SE is a feeling of competence and ability to adapt to difficult situations and issues of personal and social (10–12). Self-efficacy beliefs play an important role in promoting the performance of health science students (13). The

results of the study by Klassen and Klassen (2018) indicated that in recent years, research on self-efficacy beliefs in health professions students has increased (13). In this regard, Olivier et al. (2019) showed that SE has a significant correlation with academic achievement (9). Galyon et al. (2012) also reported that SE predicts the level of learners' participation in the learning process and the quality of their performance in exams (14). In addition to academic performance, it is important to improve students' research skills (15–19). Researchers have emphasized that increasing research culture and research-based learning in healthcare students is a vital priority in the healthcare system (20). University students are one of the most important factors in socio-economic development. They play a vital role in the publication of scientific studies and participation in research projects. In this regard, students' belief in their self-efficacy is a key factor in their research performance (21). One of the concepts related to SE is research self-efficacy (RSE). RSE reflects students' beliefs about their abilities to doing scientific research (22). According to social cognitive theory, individuals' beliefs about their abilities have a positive effect on having a better performance (23). Studies show that there is a positive and significant correlation between RSE and research performance and academic performance (24, 25). In addition, RSE has a significant relationship with research intention (26, 27). Researchers believe that students with low RSE are not confident about their research abilities. In addition, their research performance is poor. In contrast, students with a high RSE believe in their abilities. As a result, they are successful in research activities (25, 28–30). Evidence from studies suggests that some health science students are poor in some research skills such as computer skills and quantitative research skills (25). They also do not believe in their ability to do research (22). Thus, it is necessary to assess the level of RSE in students to design training programs and workshops (31). Considering to the few studies have been conducted between SER and academic performance this study was designed (25) The purpose of the present study was to investigate RSE in students and its correlation with academic performance. In this study, we want to answer the following questions:

1. What is the level of RSE in health science's students?
2. Is there any significant difference between the mean RSE score and demographic variables?
3. Is there any significant relationship between RSE and students' academic performance?

Methods

Study design

This correlation study was conducted from October 2019 to January 2020.

Sample and Sampling

The study sample consisted of nursing, medical, and health students who were studying at Kermanshah University of Medical Sciences in 2019-2020 academic years. Sample size was determined based on a correlation coefficient formula ($n= 210$). The participants were selected by stratified random sampling method. The response rate to the questionnaires was 100%. The inclusion criteria in this study were

studying at the second semester of 2019–2020 academic years, consent to participate in the study, studying in one of the fields of nursing, medicine or health and completing the questionnaires fully.

Instruments

Data were collected using a self-designed scale and the self-efficacy in research measure (SERM) (32). A self-designed scale was used to obtain demographic information, including sex, age, and field of study. This scale included other questions about grade point average, hours of using of the internet, hours of using the library, reason or purpose of using the internet, and frequency of use of the scientific database.

The Persian version SERM was used to evaluate RSE. The SERM consists of 33 items and developed by Phillips and Russell (1994). The psychometric properties of this questionnaire have been confirmed in Iranian students (33). In addition, the validity and reliability of this questionnaire in Phillips and Russell (1994) study were confirmed (32). Internal consistency of the scale in this study was 0.960 (Cronbach's $\alpha=0.960$).

SERM consists of four sub-scales practical research skills (eight items), Research design skills (eight items), writing skills (nine items) and quantitative and computer skills (eight items). The method of scoring SERM is that each item is given a score from 0 to 9. A score of 0 indicates no confidence in research ability, and a score of 9 reflects complete confidence in research ability. The total score of the questionnaire was from 0 to 297. We also used indicator GPA to determine students' academic performance. Many studies have used the GPA to assess academic performance (1, 34, 35).

Study Procedures

Initially, the design and implementation permission was obtained from the KUMS's Research Deputy. Then, the researcher attended the schools of KUMS and obtained the list of students. The list was numbered and then students were selected according to the table of random numbers. After selecting the samples, the researcher referred to the students according to the classroom schedule. The purpose of the study was stated to the students. Then, the questionnaire was given to the students who were willing to participate in the study. Finally, questionnaires were collected after completion.

Ethical considerations

The current study has been confirmed by the ethics committee of KUMS with the code of IR.KUMS.REC.1398.212. In order to comply with ethical considerations, written informed consent was obtained from samples. The students were assured about the confidentiality of their demographic and answers.

Data analysis

The statistical package for the social sciences (SPSS for Windows 18.0, SPSS Inc., Chicago, IL) was used to conduct the data analyses. Frequency, percentage, mean and standard deviation were used for

descriptive analysis. Independent sample t-test, one way ANOVA and Pearson's correlation (r) were used for analysis of questions. To compare the mean RSE score in male and female students, the independent sample t-test was used and the one-way ANOVA test was used to compare the mean RSE score according to variables of age and field of study. Pearson's Correlation (r) test was used to investigate the correlation between RSE and academic performance. Significance level was set at less than 0.05 ($P \leq 0.05$).

Results

The demographic characteristics of the students are shown in Table 1. In total, 210 students participated in the study. 51.0% of the students were male ($n = 107$) and 49.0% were female ($n = 103$). The majority of students ($n = 91$, 43.3%) were in the age range of 27–31 years with a mean age of 29.26 ± 4.96 years. Most of the students ($n = 76$, 36.2%) were studying at the health field (Table 1).

Table 1
Comparison of mean research self-efficacy score in term of demographical characteristics students

Variable		N (%)	Mean (SD)	Statistical Test
Sex	Men	107 (51.0)	184.53 ± 45.48	T = 0.446, <i>P</i> = 0.893
	Women	103 (49.0)	181.66 ± 47.80	
Age range	22–26	67 (31.9)	188.22 ± 56.27	F = 2.103, <i>P</i> = 0.005**
	27–31	91 (43.3)	188.19 ± 38.69	
	32–36	33 (15.7)	167.42 ± 50.5	
	37≤	19 (9.0)	168.10 ± 2617	
Field	Nursing	71 (33.8)	181.52 ± 48.61	F = 0.70, <i>P</i> = 0.933
	Medicine	63 (30.0)	184.44 ± 43.40	
	Health	76 (36.2)	183.52 ± 47.43	
* <i>Non-Significant</i> ** <i>P</i> ≤ 0.01				

The majority of students used the internet ($N = 124$, 59.0%) and library resources ($N = 130$, 61.9%) for more than three hours and less than an hour per day, respectively. 46.7% of the students used the internet to "search for scientific sources and information". PubMed ($N = 85$, 40.5%) and Scopus ($N = 15$, 7.1%) were the most and least databases used by students, respectively (Table 2).

Table 2
Frequency of students' use of information resources

Item		N (%)
Hours of using of the internet per day	< 1 hour	16 (7.6)
	1–3 hour	70 (33.3)
	> 3 hour	124 (59.0)
The purpose of using the internet	Search for scientific sources and information	98 (46.7)
	online shopping	52 (24.8)
	Social Network	60 (28.6)
Hours of using of the library per day	< 1 hour	130 (61.9)
	1–3 hour	52 (24.8)
	> 3 hour	28 (13.3)
Frequency of use of the scientific databases	PubMed	85 (40.5)
	Scopus	15 (7.1)
	Web of Science	28 (13.3)
	Science Direct	61 (29.0)
	Clinical Key	21 (10.0)

The results of the first question of the study showed that the mean RSE score was 183.12 ± 46.54 out of 297. Among the subscales of RSE, The highest and lowest scores of students were related to writing skills (54.34 ± 14.56) and quantitative and computer skills (39.91 ± 12.61) respectively (Table 3).

Table 3
Mean (SD) students' research self-efficacy and its sub-scales

Research Self-efficacy	Number of item	Cronbach's alpha	Mean (SD)
Research Design Skills	8	0.864	42.83 ± 11.98
Practical Research Skills	8	0.866	46.04 ± 12.29
Quantitative and Computer Skills	8	0.872	39.91 ± 12.61
Writing Skills	9	0.911	54.34 ± 14.56
Total score	33	0.960	183.12 ± 46.54

The results of the second question of the study indicated that the mean RSE score in male students (184.53 ± 45.48) was higher than female students (181.66 ± 47.80). However, this difference was not statistically significant. The mean RSE score in students of 22–26 years (188.22 ± 56.27) was higher than other students, which showed a statistically significant difference ($F = 2.103$, $P \leq 0.01$). In terms of field of study, the mean RSE score in medical students (184.44 ± 43.40) was higher than nursing and health students. This difference was not statistically significant (Table 1). In relation to the third question of the study results showed that there was a significant positive correlation between RSE and academic performance of students ($r = 0.648$, $P \leq 0.01$). Furthermore, there was a positive and significant correlation between all subscales of RSE with academic performance. This correlation was significant at level $P \leq 0.01$ (Table 4).

Table 4
Correlation coefficients between variables study

Variable	1	2	3	4	5	6
Research Design Skills	1					
Practical Research Skills	0.851**	1				
Quantitative and Computer Skills	0.763**	0.618**	1			
Writing Skills	0.876**	0.870**	0.570**	1		
Research skill self-efficacy	0.963**	0.923**	0.810**	0.923**	1	
Academic Performance (GPA)	0.607**	0.555**	0.626**	0.560**	0.648**	1
** $P \leq 0.01$						

Discussion

In the current study, we investigated the level of RSE and its correlation with academic performance in Iranian students. In addition, the mean RSE score was compared in terms of demographic characteristics. Based on the findings of this study, students showed moderate level of RSE. The findings from some studies suggest that students' belief in their research skills is low (22, 36). Results of another study showed that the RSE of students is at an acceptable level (25). In our opinion, the ability of educators to teach the principles of research and methodology, access to scientific resources on the internet and the library, interest in research and perception of the educational-research environment are among the factors affecting the quality of students' research skills (27, 37).

According to the findings of current study, the score of quantitative and computer skills was lower than other dimensions. Tiyyuri et al. (2018) also showed that students are weak in computer skills and quantitative research (25). In this regard, Odaci (2013) showed that computer self-efficacy is a predictor of RSE (21). Another of our findings showed that the mean RSE score in male students was higher than

female students. However, this mean difference was not statistically significant. In this regard, the results of some studies indicated that there was no significant difference between the score of RSE in male and female students (38–40). Nevertheless, Wright and Holttum (2012) in a study concluded that masculine identity is correlated with higher RSE and more desire to do research (26). In addition, the results of some studies have shown that women in some disciplines, such as medical sciences and social sciences, tend to do research and participate in scientific activities (41). In short, gender is an important factor in psychological studies. Researchers believe that male and female students have different psychological characteristics (42, 43). Therefore, these psychological differences should be considered by educational planners.

The students that were in the age range of 22–26 years had a higher score of RSE compared to other students. This difference was statistically significant. In this regard, Lambie and Vaccaro (2011) have shown that the age variable has a significant effect on students' understanding of the research teaching environment (16). Additionally, Some researchers believe that younger students have more adaptability and skill to use new technologies in research and search (16). Research skills and RSE should be promoted in all of students. One of the important aspects of lifelong learning is information search skills (44). Therefore, the culture of lifelong learning must be developed in universities. The development of a lifelong learning culture plays an important role in enhancing students' willingness to do research. The mean RSE score in medical students was slightly higher than nursing and health students. This mean difference was not statistically significant. This part of our findings was consistent with the findings of Ashrafi-Rizi et al. (2015) (38).

This research determined a significant relationship between RSE and academic performance. This finding was consistent with the findings of other studies (14, 25). Individuals with a high belief in RSE exhibit better performance. Based on the results of one study, SER has a significant effect on increasing interest in research and acquiring research knowledge (37). The results of another study showed that there is a significant correlation between higher RSE and higher interest research (27). Additionally, findings from other studies emphasized that the acquisition of research skills and RSE has a positive role in predicting learner aspirations for research careers (45). We believe that students should have sufficient knowledge and skills in research. They must also have a positive belief in their skills. Empirical studies show that educational interventions have a significant effect on promoting RSE (13, 42). Therefore, educational and psychological interventions should be considered by educational managers and planners in universities.

There are some limitations in this study that should be noted. The present study was conducted in some disciplines of health sciences. Caution should be taken when generalizing the results to other disciplines. It is recommended that this study be conducted at other universities and disciplines. This study assessed only four research skills using the Phillips & Russell scale. Future studies can assess other skills. Researchers can use other scales such as the research self-efficacy scale (46, 47); research attitudes measure (48); research self-efficacy (49); clinical research appraisal inventory (50). The current study had methodological limitation. This study was cross-sectional. Thus, it is not possible to infer causal relationship between the variables.

Conclusion

The RSE of health sciences students was at a moderate level. There was significant difference between the mean RSE score and age groups. The RSE was significantly correlated with academic performance. Students with high level of research skills and positive feelings of RSE can play an effective role in solving the challenges of the global community. Students' belief in their research self-efficacy plays an important role in improving their academic performance. Therefore, in the educational-research environment of universities, students should be encouraged to participate in research projects. Additionally, effective teaching is a vital factor in improving students' research skills. Therefore, it is necessary to provide educational infrastructure in universities. Increasing interaction between students and faculty members, increasing students' engagement in scientific-research projects and psychological interventions are among the strategies to increase students' research self-efficacy. Therefore, it is necessary to focus on these strategies in educational programs.

Declarations

Ethics approval and consent to participate

The study was approved by research ethics committee of KUMS (IR.KUMS.REC.1398.212). According to the Helsinki Declaration, students were informed of the voluntary nature of this study. We received written informed consent from all students.

Consent for publication

Not Applicable.

Availability of data and materials

The data of this study are available upon request due to some ethical limitations. If someone wants to request the data from this study, they can contact Parisa Shiri (p.nurse9797@gmail.com).

Competing interests

The authors declare there are no competing interests.

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Authors' contributions

SMA and AKH wrote the manuscript, Study data were collected by PSH and MJ; SMA conducted the statistical analysis, the manuscript was revised by all authors. All authors approved the final manuscript.

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