

# Research self-efficacy among students of Isfahan University of Medical Sciences

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## ABSTRACT

**Introduction:** Research self-efficacy is the people's judgment of their abilities in order to organize and conduct meaningful research in different formats. The aim of this study is to determine the rate of research self-efficacy among students of Isfahan University of Medical Sciences based on Research Self-efficacy Scale. **Materials and Methods:** The method of this study is an applied survey method. Statistical population is all students of Isfahan University of Medical Sciences and the sample size was calculated to be 361 samples based on Krejcie and Morgan table. Random sampling method was used with equal number of samples from every department. Data collection tool is Salehi *et al.* questionnaire (with 7 dimensions) with Likert scale (5 grades). Its validity and reliability were confirmed by Psychology and Research Method experts and Cronbach's alpha ( $r = 0.84$ ) respectively. Data gathering method was direct visit to each department. The data was then analyzed using *t*-test and one-tailed ANOVA using SPSS 16 software. **Results:** The finding showed that among research self-efficacy dimensions research ethics dimension had the highest and quality research dimension had the lowest means. Furthermore comparing the research self-efficacy scores with demographic characteristics suggests that there is no significant difference between total score of research self-efficacy of different departments, genders or educational degrees ( $P > 0.05$ ). **Conclusion:** Since the score of most of the research self-efficacy dimensions were lower than average, holding periodical workshops, inclusion of necessary courses in the educational plan, forcing student to perform research activity such as writing articles in lower educational levels and improvement of research culture for students with the help of experienced professors are some of practical solutions, which can lead to increasing the motivation of the students for conducting efficient research.

**Key words:** Isfahan University of Medical Sciences, research self-efficacy, Research Self-Efficacy Scale, students

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## INTRODUCTION

Research, learning and teaching are among important processes and skills for students, especially students of higher education and play an important role in the betterment of educational processes and expansion of scientific services in the society.<sup>[1]</sup> One of the most significant factors affecting the research conducted by students is their beliefs concerning their abilities. Those students that are uncertain about their abilities in conducting a research and don't believe that practice and effort can lead to success will usually become nervous and feel especially unworthy when being judged. On the other hand, students that believe in their worth

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can conduct successful researches and are generally more successful.<sup>[2]</sup>

Self-efficacy effects a person's choices and decisions and people tend to like participating in activities they believe themselves to be skillful in. Therefore, self-efficacy can improve people's certainty, perseverance in performing their duty and their decision making by helping the learners understand their potential skills.<sup>[3]</sup> Self-efficacy beliefs are raised from four sources: Personal experiences or achievements, visual experiences, verbal persuasions and biological conditions. The most efficient of these sources is personal experiences because these experiences are based on skills that a person has mastered. One of the important subjects of personal experience is the beliefs and theories of the researcher about his or her research. These research beliefs play a vital role in conducting or refusing a certain study.<sup>[4]</sup> Research self-efficacy is the people's judgment of their abilities in order to organize and conduct meaningful research in different formats, the reasons and basis behind which have been studied in various literature.<sup>[5,6]</sup> Self-efficacy as a motivation source effects the highest learning level, self-adjustment, in a way that the feeling the learners have about their abilities in performing their duties based on their previous successes can affect their performance and can increase their effort and perseverance. This is especially obvious for students at higher educational levels.<sup>[7]</sup> Although various studies have been conducted regarding self-efficacy in many areas, studies on research self-efficacy are rare.<sup>[8-10]</sup> One of the important subjects that have preoccupied most of teachers and university professors is the training of students that can guide their own researches, have high internal control and self-worth while doing researches and are self-motivated in their field of study. The knowledge of teachers and university professors on the research self-efficacy of their students can greatly affect the training of students. There haven't been many studies regarding research self-efficacy in Iran. Dozisorakhabi *et al.* conducted a study titled "Factors Affecting Shahid Beheshti University graduate student research experience". They used Postgraduate Research Experience Questionnaire as data gathering tool with the statistical population being 85 postgraduate students of Shahid Beheshti University who had succeeded in defending their dissertation. The main factors affecting the research experience of these students were supervision, cognitive abilities, operational skills, department atmosphere and the factors used to judge the dissertations. The findings showed that among these 5 factors, atmosphere of the department and operational skills had the lowest and highest average respectively. In total, the students' satisfaction concerning their research experience in Shahid Beheshti University was average. It was suggested that in order to improve the scientific discovery (the results of the studies) multidisciplinary thoughts and the use of research information needs to be effectively thought. Therefore change in the structure of the departments and organic communication between different research activities were said to be among the ways to improve the research experience of students.<sup>[11]</sup>

Behzadi *et al.* conducted a study called "Factors affecting on graduate student research experience Ferdowsi University of Mashhad" whose statistical population was the postgraduate students of Ferdowsi University of Mashhad and used categorical random sampling. The findings showed that there are meaningful relations between all factors affecting the research experience. Furthermore the students' general satisfaction regarding seven factors affecting their research experience (the approval process for preliminary dissertation, supervisor, substructures and facilities available, availability of conditions and basis of cognitive growth, improvement of abilities, clarity of standards and goals and dissertation judgment) is different in each person. In general, it could be said that the students of Ferdowsi University of Mashhad were relatively satisfied with factors affecting their research experience.<sup>[12]</sup>

A study titled "Validation of Research Self-Efficacy Scale for Postgraduate Students of Ferdowsi University and Mashhad University of Medical Sciences" by Salehi used researcher made questionnaire as data gathering tool. The statistical population of this study was the graduate students of Ferdowsi University and Mashhad University of Medical Sciences, with the sample size of 240 students using quota sampling method. The findings showed that the research self-efficacy has sufficient validity and reliability and seven dimensions of self-efficacy including self-efficacy in statistics and analysis, conceptualization, method and implementation, quality research, writing reports, skills, abilities and ethics were identified and confirmed. This tool can be used to identification and valuation of research beliefs, skills and theories of students.<sup>[13]</sup>

Gravaond in his dissertation titled "The role of social factors and learning environment - research on the efficacy of research and teaching - research in graduate students at Ferdowsi University of Medical Sciences" used a research self-efficacy and learning - research performance questionnaire as data gathering tool. The statistical population consisted of students from departments of educational Sciences and psychology, literature and management Sciences of Ferdowsi University of Mashhad and departments of dentistry, medicine, pharmacy and nursery and midwifery of Ferdowsi University of Medical Sciences. The total sample size was selected to be 285 students using quota sampling method. The results showed that there are meaningful differences between educational performance, research self-efficacy and its factors, social factors and sub-factor of teacher support and substructures and facilities of Ferdowsi University of Mashhad and University of Medical Sciences.<sup>[14]</sup>

Amirkhandaghi conducted a study titled "Effect of Continuous self-assessment of the students' research self-efficacy and academic achievement: A neglected element in the development of curricula." The statistical population was the educational Sciences bachelor students of the Department of Educational Sciences and Psychology of Ferdowsi University of Mashhad and the sampling method

used was reachable sampling ( $n = 38$ ). This study used a research self-efficiency questionnaire, self-evaluation and the final exam scores of the students in “research method” as a measure of their educational improvement. There was no difference between the means of the self-efficiency pre-test of test and control groups. However, there was a meaningful difference between the means of two groups in post-test. On the other hand, even though the control and test groups were homogeneously selected, there was a meaningful difference between the educational improvement score of the two groups in the post-test. In general it could be said that constant self-evaluation was effective in increasing the self-efficiency of the students and also positively affected their educational improvement. Therefore, it was suggested that constant self-evaluation should be used in developing educational curriculums.<sup>[15]</sup>

Clarck in a study titled “Examining Possible Influences of String Students’ Self-Efficacy and Musical Background Characteristics on Practice Behaviors” used a statistical population of 101 students that competed with each other in 65 different fields related to music. The findings showed that there is a positive relation between the self-efficiency of the students and their success in music. Furthermore students with high self-efficiency preferred to use cognitive performance strategies whereas the ones with low self-efficiency tended to use different and uncomplicated strategies. The results showed that previous experiences and their relation to music and self-efficiency can positively affect the students’ exercises and help them gain research self-efficiency in music.<sup>[16]</sup>

US BARRIERS questionnaire was used as a data gathering tool in a study by Clossa called “Barriers to research implementation in two Yorkshire hospitals” whose statistical population was the nurses of two hospitals. The findings showed that the most important factors are necessary time and facilities for conducting research, coordination between coworkers in different parts of the hospital, lack of budget for applying changes and statistical analysis. Therefore for nurses to improve, sufficient education, precise statistics and wider distribution of information among nurses are needed.<sup>[17]</sup>

Lev *et al.* in their study used a clinical evaluation questionnaire in order to measure the research self-efficiency in a study called “Faculty mentors’ and students’ perceptions of students’ research self-efficacy.” The statistical population consisted of 21 faculty members, students from each academic discipline or bachelor or master students working on research studies. The findings showed that there is a meaningful difference between the research self-efficiency of students and faculty members of Rutgers University and that the faculty members have better trust in their abilities compared to students.<sup>[1]</sup>

Mullikin *et al.* conducted a study titled “Assessing Research Self-efficacy in Physician-Scientists: The Clinical Research Appraisal Inventory.” They used a clinical research evaluation questionnaire, which was created after long analysis and consisted of 82 factors for evaluating the self-efficiency

and doctors.<sup>[18]</sup> Based on the previous studies and due to the limited number of studies on research self-efficiency in Iran, the goal of this research is to determine the research self-efficiency in the students of Isfahan University of Medical Sciences base on research self-efficiency scale in order to identify the level of research self-efficiency in this university and understand its strengths and weaknesses in this regard.

## MATERIALS AND METHODS

This study uses a survey applied method. The statistical population is all the students of Isfahan University of Medical Sciences and a sample size of 361 students was selected based on Krejcie and Morgan table (353 of which filled the questionnaires). Since the goal of the research was to use students from all departments, category random sampling method was used. Each one of the departments (including the departments of medicine, rehabilitation Sciences, management and medical informatics, dentistry, pharmacy and pharmaceutical Sciences, midwifery, health, nourishment and alimentary Sciences) was considered to be one category and the quota of each department was calculated to be 45 students. This study used the questionnaire created by Salehi *et al.* consisting of 55 questions with a 5 grades Likert scale (1: Very poor, 2: Poor, 3: Mediocre, 4: Good, 5: Perfect) to evaluate the research self-efficiency of the students.<sup>[13]</sup> This questionnaire consists of 7 dimensions (including self-efficiency in statistics and analysis, conceptualization, method and implementation, quality research, writing reports, skills and abilities and ethics). The validity of this tool was confirmed by Psychology and Research Method experts and its reliability was confirmed by Cronbach’s alpha ( $r = 0.84$ ) present in Salehi’s stud.<sup>[13]</sup> Then the analysis of main factors was carried out considering different categories using descriptive statistics (frequency and percentage) and deductive statistics (one-way ANOVA and independent *t*-test). The one-way ANOVA test is used to compare the means of a quantitative characteristic in more than two groups and was used to compare the total mean of research self-efficiency score with the educational degree and department. Furthermore independent *t*-test is used to compare the means of two independent samples of quantitative data and was used to compare the total mean of research self-efficiency score with gender. The statistical analyses were carried out using SPSS 16 software (SPSS Inc. in Chicago).

## RESULTS

A total of 353 students among the 361 selected students of Isfahan University of Medical Sciences answered to the questionnaires, which included 107 male and 246 female students. The educational degree of the selected population was mostly Masters Degree and their age ranged from 18 to 25 years old.

Table 1 of the research self-efficiency dimensions shows that research ethics with a score of  $3.13 \pm 0.94$  had the highest

and quality research with a score of  $2.53 \pm 0.95$  had the lowest scores among all of research self-efficacy dimensions.

Table 2 comparing the total research self-efficacy score of male and female students showed that there is no meaningful difference ( $P = 0.08$ ) between the research self-efficacy score of male ( $2.92 \pm 0.06$ ) and female ( $2.77 \pm 0.71$ ) students of Isfahan University of Medical Sciences.

Table 3 compares the total research self-efficacy score of students of Isfahan University of Medical Sciences based on their educational degree. The results showed that students of Bachelor level had the lowest ( $2.79 \pm 0.74$ ) and students of specialized doctorate level had the highest ( $3.09 \pm 0.71$ ) research self-efficacy scores but here was no meaningful difference between the total research self-efficacy score of different educational levels ( $P = 0.76$ ).

The number of questionnaires gathered was the same in all of the departments listed in Table 4 (44 questionnaires). The results show that the lowest average research self-efficacy score belonged to the department of management and medical informatics ( $2.61 \pm 0.80$ ) and the departments of dentistry and health both had the highest average research self-efficacy score ( $3.04 \pm 0.75$  and  $3.04 \pm 0.69$  respectively). One-way ANOVA test showed that there is no meaningful difference between the average research

self-efficacy score of different departments of Isfahan University of Medical Sciences ( $P = 0.08$ ).

## DISCUSSION

Research beliefs play an important role in conducting or refusing to conduct a research. One of these beliefs is research self-efficacy which is the people's judgment of their abilities in order to organize and conduct meaningful research in different formats. This belief is one of the important factors in guiding researches and creating sufficient motivation for conducting them. Due to the importance of this issue, this study was aimed to investigate the level of research self-efficacy among the students of Isfahan University of Medical Sciences. The results were obtained from investigating each of the seven research self-efficacy dimensions. The five dimensions of self-efficacy in statistics and analysis, conceptualization, method and implementation, quality research and writing reports all had below average scores. On the other hand, the two dimensions of skills and abilities and research ethics had above average scores among the students of Isfahan University of Medical Sciences. This is in agreement with the results obtained by Salehi *et al.* which showed below average scores for all seven dimensions of research self-efficacy.<sup>[13]</sup> Also the results by Baltes *et al.* regarding the research self-efficacy of PhD students showed that they were weak in research methods and quality methods and needed more information.<sup>[19]</sup> Bieshke, Bishop and Garcia investigated the dimensions of conceptualization, early tasks, presenting the results and implementation and weren't satisfied with the research self-efficacy results of the investigated students.<sup>[9]</sup> The findings by Lev *et al.* also showed low research self-efficacy scores for the students.<sup>[11]</sup> It seems that the two dimensions of research ethics and skills and abilities have received more attention in Isfahan University of Medical Sciences compared to other research self-efficacy dimensions. Although it's necessary to note that in order to improve other research self-efficacy dimensions, changes in university curriculum and suitable related workshops are needed. In this study, no meaningful difference was found between the research self-efficacy score of male and female students. In other words, even with the difference between the number of male and female students in the statistical population and the personality differences between them, their research beliefs (one of which is research self-efficacy) were not affected.

In this study, there was no statistical difference between the research self-efficacy score of different departments (although the average scores for the Departments of

**Table 1: Average and SD of the research self-efficacy dimensions among students of Isfahan University of Medical Sciences based on research self-efficacy study**

Dimension	Average	SD
Research ethics	3.13	0.94
Skill and ability	3.11	0.81
Conceptualization	2.96	0.74
Method and implementation	2.78	0.72
Writing reports	2.72	0.9
Statistics and analysis self-efficacy	2.62	0.76
Quality research	2.53	0.95

SD=Standard deviation

**Table 2: Comparison of total research self-efficacy based on gender in students of Isfahan University of Medical Sciences**

Independent t-test (P value)	Gender			
	Male		Female	
	Average	SD	Average	SD
0.08	2.92	0.06	2.77	0.71

SD=Standard deviation

**Table 3: Comparison between the total research self-efficacy score of students of Isfahan University of Medical Sciences based on their educational degree**

One way ANOVA (P value)	Educational degree							
	Specialized doctorate		Professional doctorate		Master's degree		Bachelor degree	
	SD	Average	SD	Average	SD	Average	SD	Average
0.76	0.71	3.09	0.58	2.86	0.60	2.81	0.74	2.79

SD=Standard deviation, ANOVA=Analysis of variance



**Table 4: Comparison between total research self-efficiency score of students of Isfahan University of Medical Sciences based on department**

One way ANOVA (P value)	Nourishment and alimentary sciences		Health		Nursery and midwifery		Pharmacy and pharmaceutical sciences		Dentistry		Management and medical informatics		Rehabilitation sciences		Medicine	
	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average
0.08	0.57	2.81	0.69	3.04	0.85	2.86	0.48	2/89	0.75	3.04	0.80	2.61	0.64	2.70	0.58	2.67

SD= Standard deviation, ANOVA=Analysis of variance

Dentistry and Health were higher than other scores). It seems that students in different disciplines were similar in regard of research beliefs and knowledge about the factors affecting them. However due to the low research self-efficiency scores in almost all dimensions, it's necessary for the management of Isfahan University of Medical Sciences to inform different departments of the importance of research and as a result improving the self-efficiency of the students. The results also showed no meaningful difference between the research self-efficiency score of different educational levels even though the nature of higher educational levels (such as Masters Degree and PhD) makes it necessary for the students to be more skillful in research. Since the research self-efficiency score reported in this study is lower than average, one can conclude that research self-efficiency wasn't improved with the increase of educational level. It seems that Isfahan University of Medical Sciences has failed to implement serious and effective research procedures especially for higher educational levels. One of the reasons for this low research self-efficiency is the lack of suitable workshops for students of different educational levels, causing their knowledge about research procedures to suffer. Studies by Gravaond,<sup>[14]</sup> Amirkhandaghi *et al.*<sup>[15]</sup> and Lossa *et al.*<sup>[17]</sup> highlight the effect of suitable teaching on research self-efficiency. Furthermore in his study, Elise suggested that in order to improve the job finding and professional knowledge of nursery students, nursery teachers should familiarize their students with research methods.<sup>[11]</sup>

### CONCLUSION

Every organization, including universities, use research as the basis of every correct and successful decision and therefore need research for their growth and development. One should always keep in mind that efficient research can stop an organization's deterioration and burnout and guarantee its continued activity. Therefore the education of research staff with correct research beliefs is among necessities. A student with enough research skills can potentially play one of the most important roles in organizational improvement of universities.

Based on the results of this study, the students gained the highest score in research ethics and skill and ability dimensions and other dimensions (including conceptualization, method and implementation, statistical and analytical self-efficiency and quality research) had lower than average scores. It seems that students of Isfahan University of Medical Sciences weren't familiar enough with the research criteria, a fact that was more evident in the students of departments of Management and medical informatics, rehabilitation Sciences and medicine. Therefore holding periodic workshops, adding necessary courses to the curriculum, obligating student to conduct research at lower educational levels, institutionalize of research culture with the help of capable professors, familiarizing the students with books and resources related to research and development, creating research committees and communities in different

departments and allocation of more funds to research activities as a motivational activity are among the possible practical solutions for improving the students' motivations for conducting efficient researches.

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