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The Academic Motivation and Academic Achievement in Iranian Universities of Medical Sciences: A systematic Review and Meta-Analysis

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Motivation is one of the main factors in learning and it can affect different behavioral aspects of students in academic environment. Academic motivation can be considered as the only factor with direct effect on academic achievement. The present meta-analysis study is an attempt to determine academic motivation and academic achievement based on Vallerand's scale and Hermans' questionnaire in students in Iranian universities of medical sciences. The study was carried out as a meta-analysis work on studies published from 2001 to 2018. The relevant studies were searched using keywords "academic motivation" and "academic achievement" in SID, Medline (PubMed), and ScienceDirect. Heterogeneity in the studies was examined using I2 index and data analysis was done in Comprehensive Meta-Analysis software. Out of 16 articles that entered the meta-analysis process; seven articles were based on Vallerand's scale (AMS) and nine articles were based on Hermans' questionnaire (AMQ). Mean and standard deviation score of academic motivation based on Vallerand's scale was 109.9±16.4 and mean and standard deviation score of academic achievement based on Hermans' questionnaire was 96.83±6.38. The effects of sample size and year of publication were measured based on meta-regression. In terms of sample size, the mean score increased with an increase in sample size in the both Vallerand and Hermans studies. In terms of year of publication, the mean score increased with increase in the year of publication in Vallerand's studies and decreased in Hermans' studies ($P<0.05$). The students of Iranian universities of medical sciences were at good level in terms of academic motivation and academic achievement.

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1. Introduction

Over the past decades and along with an increase of emphasis on the role of academic motivation in students' achievement, psychologists have become more interested in surveying and determining the factors effective in academic motivation.[1] It is one of the key acquired motivations that leads an individual towards solving the challenges and achieving higher standards. People with high academic motivation tend to improve and perfect their performance.[2] They follow a specific plan to complete their program, achieve their goals, and develop specific qualities in their work and in return enjoy success in what they do.[3]

Motivation is an intrinsic phenomenon that internally motivates an individual and has its roots in needs.[4] Motivation plays a key role in realization of a goal, energizing the learner, and guiding one's activities and in return development of behaviors.[5] Surveys have shown that the majority of innovations, inventions, discoveries, and creativities have been rooted in hard working attitudes and motivation.[6] Motivation is one of the most important issues affecting academic achievements.[7] It has been shown that there is a relationship between learning and motivation so that learners' previous knowledge is effective in their motivation.[8] Teachers are well aware that communication is facilitated, transfer of information is easier, anxiety is lower, and innovation and learning are higher when the learners have the motivation to learn.[5] Moreover, motivated students have positive motivational effect on teachers so that both the teacher and students are more satisfied with learning process. Studies have also showed that motivation affects all class activities of students.[8] Medical science students undergo a challenging and exciting period of their lives. Facing with several stressors and necessity to adapt to their environment entails mental health and a great deal of self-reliance, which are also needed for academic and professional achievement.[9] Health care personnel experience several complicated problems and making timely and correct decision and choosing the best action need adequate motivation.[1]

Experts have categorized motivation into two main categories of intrinsic and extrinsic motivations. The elements of intrinsic motivation are internal and personal reinforcements and create the interest and attraction to carry out an activity. On the other hand, extrinsic motivation elements refer to the external reinforcements, so that one tries to achieve an independent goal under their influence. In the case of students and academicians, academic motivation is highly important. It refers to the learner's internal desire that guides the learner toward learning and academic achievement. Academic motivation is affected by the external and internal factors.[10]

The results of different studies have indicated that academic motivation is related to several personal and social factors and that these factors have profound effect on academic motivation. Accordingly, personal characteristics,[11] family, university, and social variables are related to academic motivation and achievement.[12] A survey of the factors effective in academic motivation of students at Ardabil University of Medical Sciences listed marital status, family income, hope for a good future, and the level of self-esteem as the factors effective in academic motivation; while gender, losing parents, emotional-family atmosphere, and physical-mental health had no significant effect on motivation.[13] Another survey of academic motivation in medical sciences students in Isfahan, showed a significant and direct relationship between academic motivation and academic achievement; there was also a positive correlation between competitiveness, endeavor, and social interests and grade point average (G.P.A.)[3].

Recognizing academic motivation, the effective factors, and its effect on teaching/learning process in students helps teachers to adopt better methods in designing, planning, and implementing courses. Clearly, the richest and best programs fail to deliver good results without recognizing motivation of students and the effective factors.[11] This paper tries to measure mean score of total academic motivation and academic achievement in the

students of Iranian universities of medical sciences.

Taking into account the role of students of medical sciences in preserving public health, the positive effects of training motivated and more efficient medical teams in improvement of health in the society, the paucity of studies on academic motivation of students in Iranian universities of medical sciences, and the lack of a comprehensive study in this area, the present study is aimed at determining the academic motivation and academic achievement in students of Iranian universities of medical sciences.

Methods

The study was carried out as structured systematic and meta-analysis work, registered in PROSPERO under CRD42018098935. Articles published in Iranian and foreign journals and indexed in SID, Medline (Pubmed), and Sciencedirect between April 2001 and September 2018 were searched using Farsi and English keywords "academic motivation," and "academic achievement". Afterwards, all the resulting articles including Farsi and English papers based on cross-sectional studies (descriptive-analytical) entered the study. A checklist of the papers including authors' names, title, year, and place of study, age range, number of subjects, and mean and standard deviation was prepared. STROBE four stages including identification, screening, eligibility, and included were implemented (Figure. 1). The articles were reported using MOOSE and surveyed in Comprehensive Meta-analysis (v.3). The information of articles entered the study including authors, title, year, place, age range, number of subjects, mean score, and standard deviation is listed in Table 1. Heterogeneity in the studies was examined using I2 test and given the result (I2=%99) that supports heterogeneity of the studies, random effects model was adopted to combined the results (p=0.05). Bias in publication was examined using funnel plot and Egger Test (diagram 1), which indicate publication bias is not significant with Vallerand scale (A) (p=0.993) and with Hermmens questionnaire (B) (p=0.359) (Figure. 2).

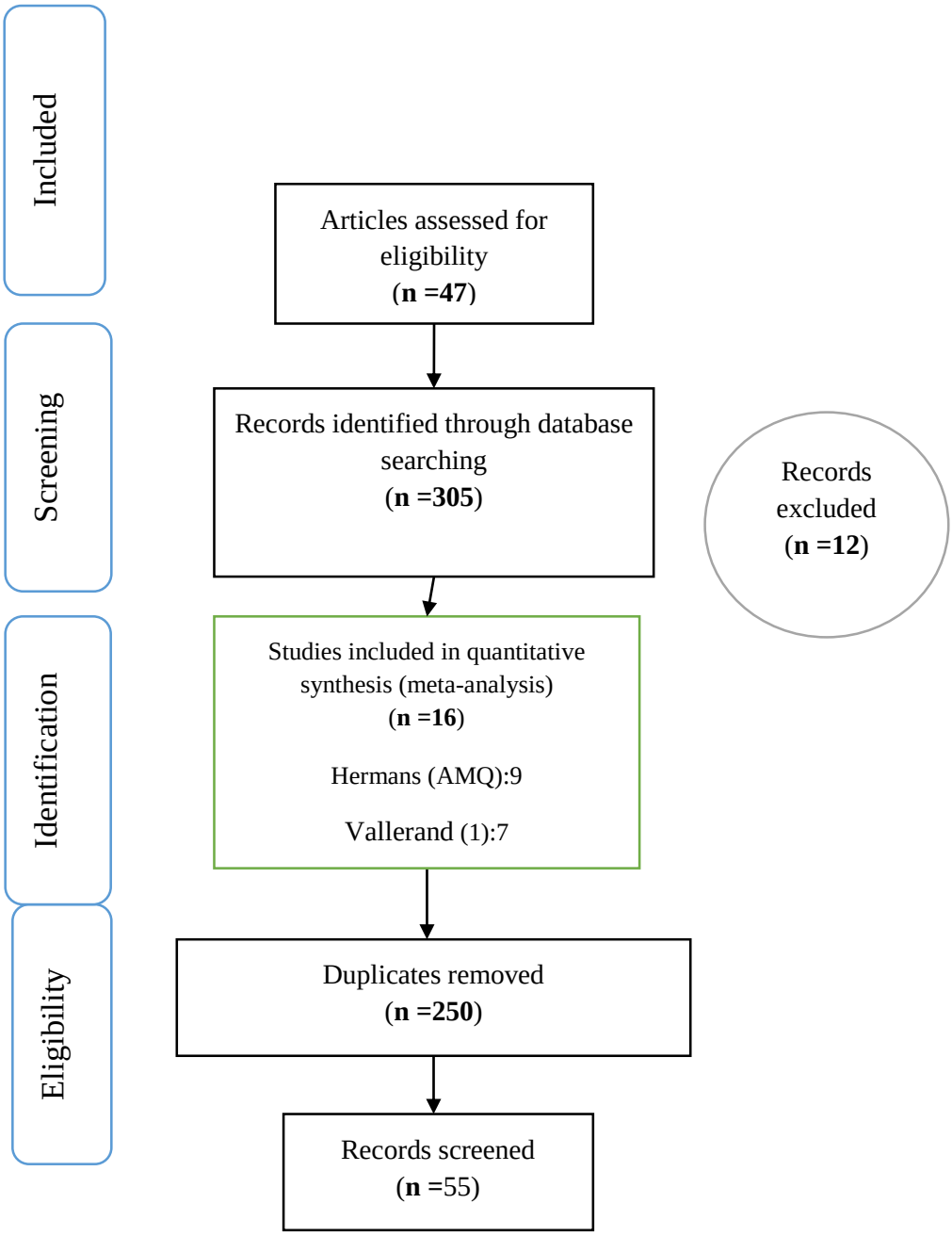

Figure1: Flowchart of the stages of including the studies in the systematic review and meta-analysis (STROBE)

Table 1- Articles entered the study

Academic motivation index	No.	Author	Year	Place	Age	Sample size	Mean and SD
Vallerand questionnaire	1	Ekrami[14]	2015	Shahroud	22	291	141.7113±5.2
	2	Ajam[15]	2016	Gonabad	-	288	96.05±21.35
	3	Sharifi[16]	2016	Qom	-	264	145.21±30.40
	4	Akbari[17]	2015	Birjand	22.1±3.23	285	44.30±4.2
	5	Kiafar[18]	2014	Mashhad		350	81.79±29.65
	6	Milani[19]	2011	Oroumieh	20.6±1.6	137	108.13±8.9
	7	Rouhi[20]	2012	Golestan	20.97±2.47	275	151.20±43.69

Hermand's questionnaire	1	Molazade [21]	2014	Fasa	20.8±1.6	372	83.5±7.7
	2	Molazadeh [22]	2013	Fasa	20.8±1.6	372	72.8±7.2
	3	Sohrabi[23]	2016	Iran Medical Sciences	22.6±5.7	288	84.3±8.3
	4	Bagherpour [24]	2016	Gogan	-	30	96.13±16.45
	5	Moharami [25]	2016	Torbat Heidarieh	19.92±0.61	24	68.60
	6	Atashkar [26]	2014	Tehran	23.43±2.19	347	83.8±75.58
	7	Habibpour [27]	2016	Orumieh	-	377	48.19
	8	Heidari [28]	2015	Isfahan	-	112	20.06±5.30
	9	Khosropour [29]	2014	Kerman	-	97	78.8±65.03

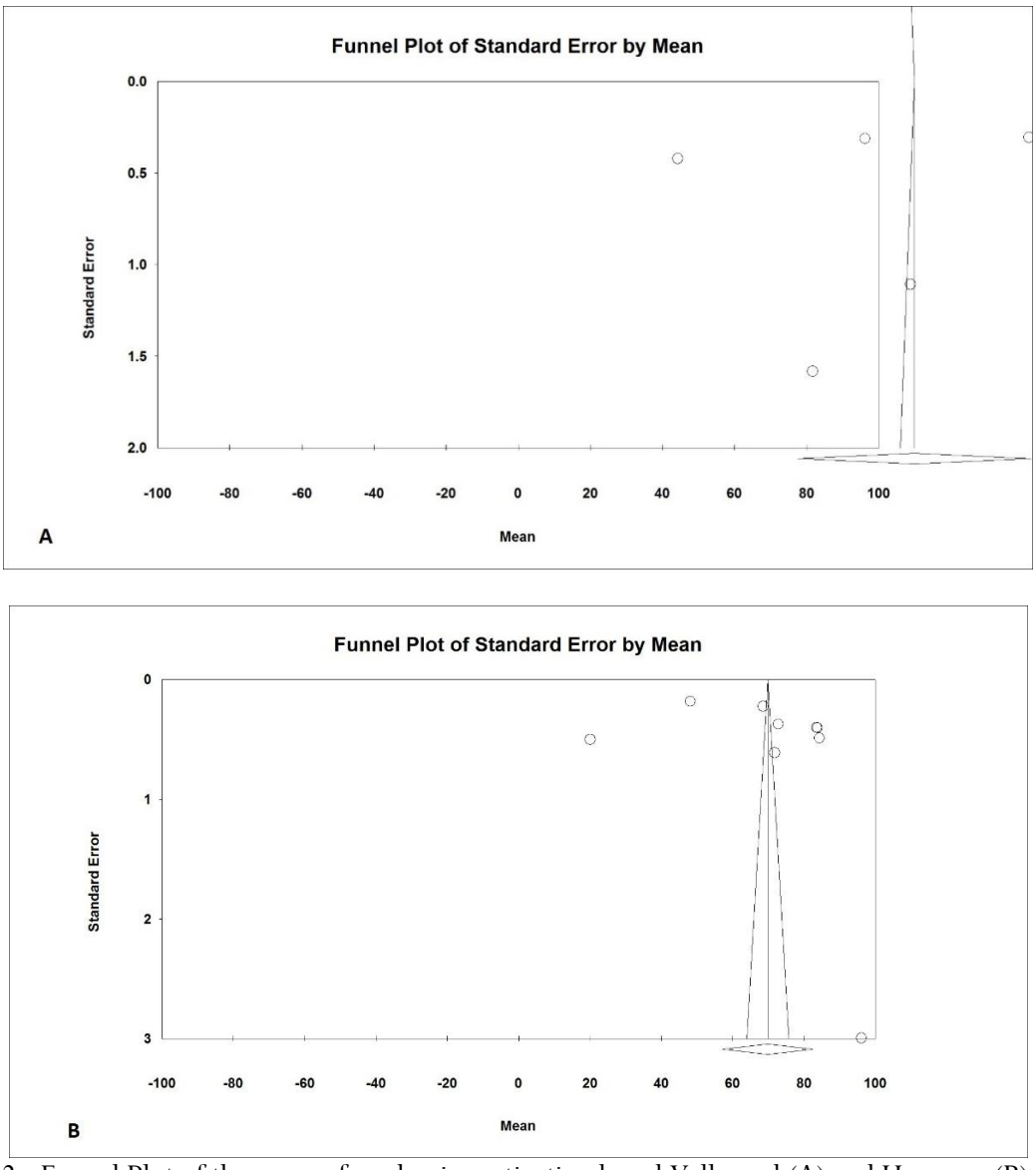

Figure 2 - Funnel Plot of the mean of academic motivation based Vallerand (A) and Hermans (B) indices

Findings

Our survey in the field of mean score of academic motivation and academic achievement in students in Iranian universities of medical sciences resulted in finding 133 articles indexed in SID, 44 articles indexed in Pubmed, and 128 articles indexed in Science Direct. These articles were screened based on the inclusion criteria so that 16 articles entered the meta-analysis process after removing repetitious and irrelevant papers. Totally, 4952 individuals at age range 18-44 years had been studied and mean score and standard deviation of academic motivation based on Vallerand (A) and Hermans (B) indices were 109.9±16.4 and 69.83±638 respectively (Figure. 3). To examine heterogeneity in the articles, the effect of sample size and year of publication were examined based on Meta-regression method. The results indicated that in Vallerand (Z:SLOPE=1.7, Intercept=50.5, P<0.05) and Hermans (Z:SLOP=94.6, Intercept=348.9, P<0.05) studies, mean score increased with an increase in sample size. Moreover, the means score increased with year of publication under Vallerand index (Z:SLOP=33.2, Intercept=-32.9, P<0.05) and decreased with year of publication under Hermans index (Z:SLOPE=-19.8, Intercept=20.1, P<0.05) (Figure. 4, 5).

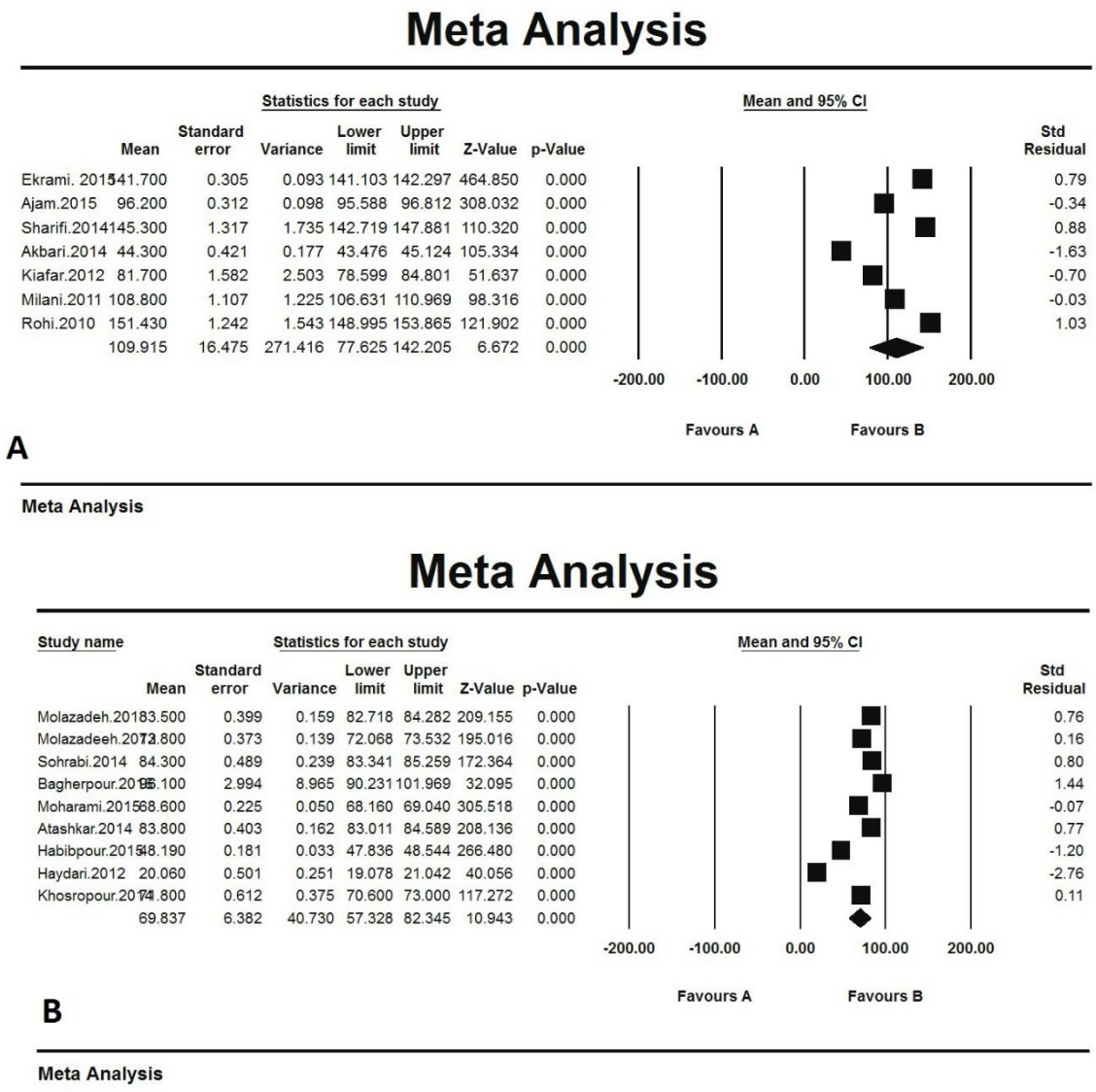

Figure 3- Total mean and standard deviation of academic motivation based on Vallerand (A) and Hemans (B) indices

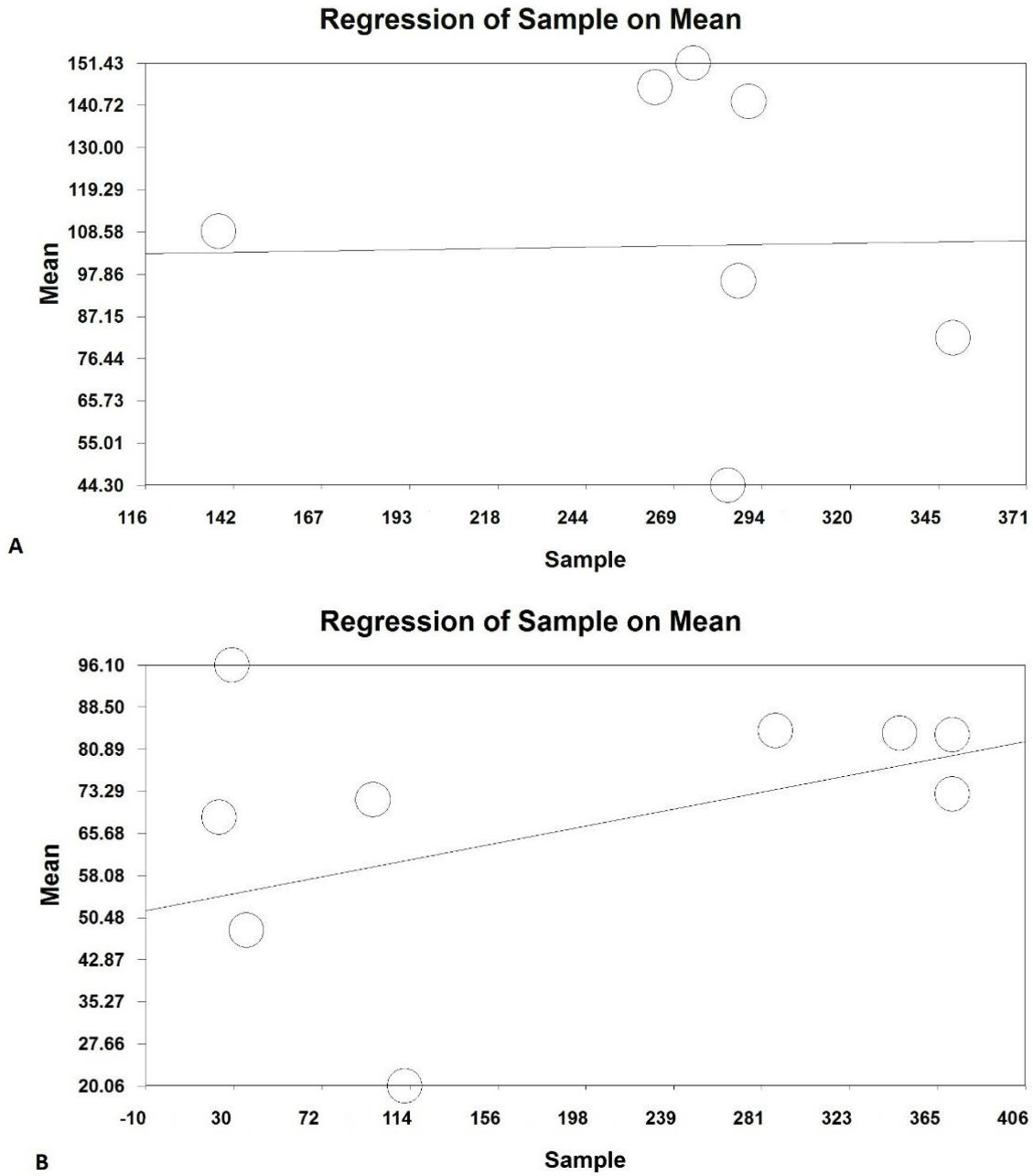

Figure 4- Meta-regression of the total results of academic motivation in Vallerand (A) and Hermans (B) indices based on sample size

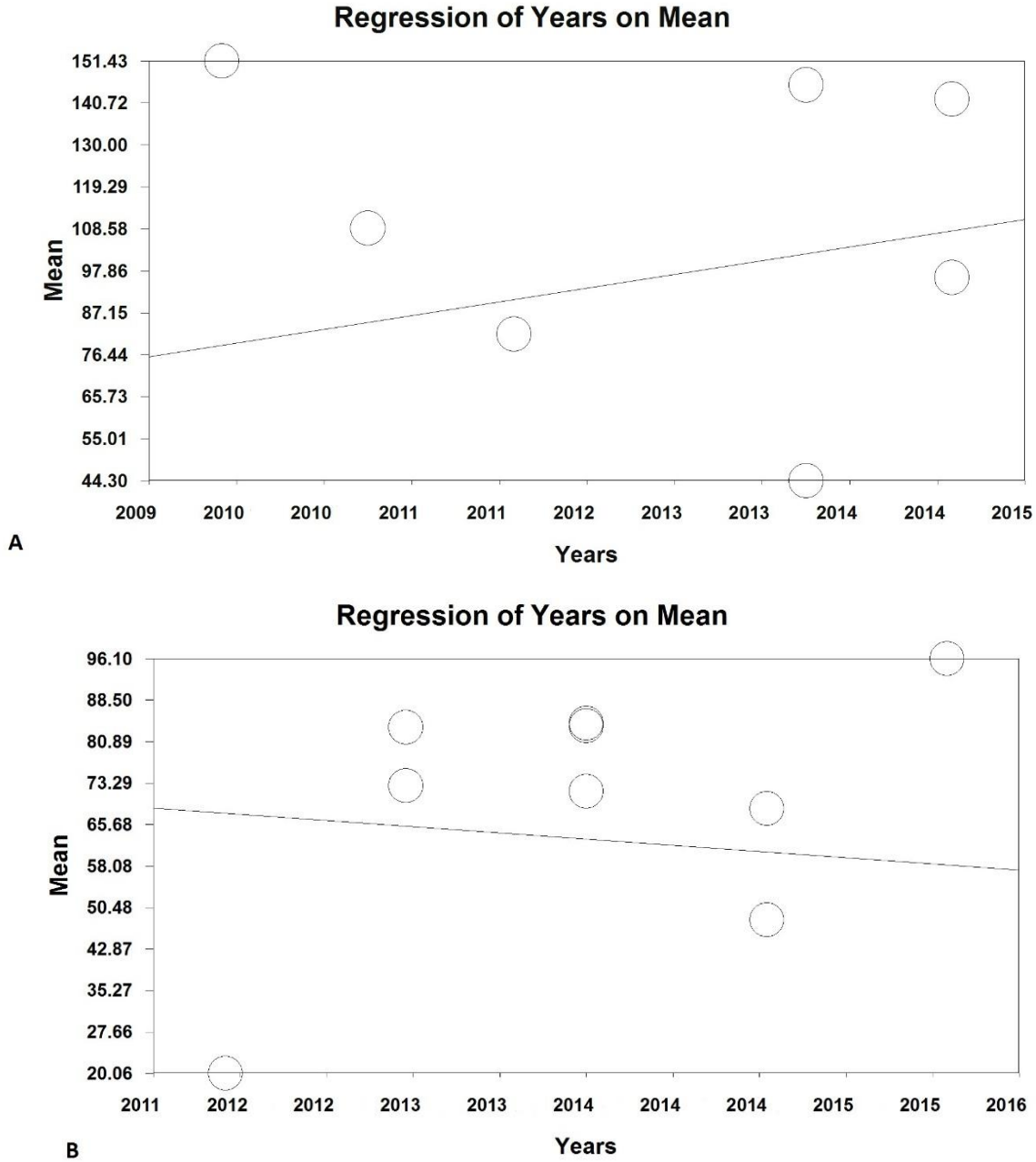

Figure 5- Meta-regression of total results of academic motivation with Vallerand (A) and Hermans (B) indices based on the year of publication

Conclusion

Mean score and standard deviation of academic motivation of students in Iranian universities of medical sciences based on Vallerand index in the Iranian research works was 109.9±16.4 and the score range was from 28 to 196. The highest mean score was 151.20±43.69 reported by Rouhi et al. (2010) and the lowest mean score was 44.30±0.42 reported by Akbari Pourang (2014). To explain the findings, it can be said that academic motivation of students is affected by their intrinsic and extrinsic attributional style. According to attribution theory, people tend to search for the causes of behaviors and events they experience and whether the source of a cause is internal or external and the extent of controllability and stability of the cause have either positive or negative effect on individuals' motivation.[29] Rouhi reported that 56% of students had intrinsic motivation above the mean score and only 23.3% had external motivation above the mean score; this means that academic motivation in students was affected by external factors. Rather than focusing on the task and the

sense of satisfaction, people with intrinsic motivation orientation expect a sort of social reward or punishment for doing or failing to do a task. Moreover, students have different academic motivations based on their gender so that female students in Rouhi's study had higher academic motivation comparing with male students. Students' academic motivation is affected by educational behaviors of teachers as well. Teachers have different beliefs in academic and other fields in terms of complicacy, level, extent, and depth. Guav (2010) reported that mean score of academic motivation of students ranged from -18 to +18 (4.75±5.38).[30] Onder et al. (2014) reported that mean score of academic motivation in Turkey was 5.7±4.2.[31] Since these studies have used different scoring methods, comparing the means scores with the finding of this study is not possible.

Fartier, Valler and Guay surveyed self-determination theory and tried to use academic motivation scale to develop a structural model of academic motivation and academic achievement.[32] They showed that motivation can predict academic achievement to some extent so that the higher the motivation and self-determination in students towards the university, the higher their performance. What makes AMS scale more important is that, despite other tests, it is based on a theory, so that it is actually deigned to measure the theoretical constructs of self-determination theory. The scale was designed in 1989 by Vallerand et al. in French in Canada and normalized to measure academic motivations. It was then translated into English by Vallerand et al. The scale is based on Decia and Ryan's self-determination theory. Bagheri et al. translated AMS scale into Farsi and surveyed it through a field study. The results showed that the scale had a structure with five factors in Iranian society. The scale is comprised of 28 statements and six subscales which in terms of self-determination and in a descending order are 1-intrinsic motivation including motivation to know, motivation toward accomplishment, and motivation to experience stimulation; 2-extrinsic motivation including identified regulation, interjected regulation, and external regulation; 3- motivation. Intrinsic motivation means that the individual performs a task for the sake of satisfaction, accomplishment, interest, reward, and intrinsic and internal joy; only the action per se is important. On the other hand, extrinsic motivation refers to behaviors without self-motivation. Such behaviors are functions of outside world; however, the source of such behaviors is gradually internalized. According to self-determination theory, there are four types of internalization including external regulation (i.e. extrinsic motivation), which is a behavior aimed at obtaining positive outcomes or avoiding negative outcomes. Injection regulation where an external events is completely internalized. Identified regulation happens when a behavior is found valuable by an individual and they assume that they have chosen that behavior in the first place. Integrated regulation is another sort of self-determined internalization and since something is added to the integrated intrinsic structure of an individual, the structure changes and regulation are completely self-determined.[33]

Another scale surveyed in this study was mean score academic achievement based on Hermans' questionnaire, which was equal to 69.83±6.38 with score range from 29 to 116. The highest mean score was 96.13±16.45 reported by Bagherpour et al. (2016) and the lowest mean score was 20.06±5.30 reported by Heidary et al. (2012). Personal characteristics have profound effects on achievement motivation and it is expected that university officials pay more attention to mental and personality aspects of students with regard to their chosen field of study. Moreover, spiritual skills and health were effective in achievement motivation.[34] Zitniakova-Gurgova (2007) reported that mean score of achievement motivation in girl and boy students were 85.47±0.17 and 89.77±17.28 respectively.[35] Guay (2010) reported that mean score achievement motivation was 71.78±8.82.[30] A comparison between Iranian and foreign students of medical sciences indicates that the both groups had a high achievement motivation. Career future and popularity of medical science majors, comparing with other fields, explain this finding.

Hobert Hermans[36] designed Hermans' questionnaire measure of achievement motivation based the theoretical and practical knowledge about the necessity of achievement

and literature review. Based on his findings, he listed 10 distinguishing characteristics of individuals with high and low achievement motivation including 1- high level of wishes; 2- highly motivated to progress; 3-high resistance in the face of moderately hard tasks; 4- tendency to reattempt unfinished tasks; 5- dynamic perception of time (i.e. knowing that things happen fast); 6-futuristic attitudes; 7- importance of competencies and merits in choosing friends and colleagues; 8-recognition based on good performance; 9- accomplishing tasks with highest possible quality; and 10-low risk behavior.

Roughi et al. reported that purpose-orientation and financial rewards were among the highly motivating factors and competitiveness, social dependence and cooperation were among the factor with low motivational effect. This finding indicates tendency in the majority of students. To use purpose-orientation as a motivation, teachers can introduce course plans and objectives of the courses to students. In terms of financial reward, it is possible to dedicate part of the budget of cultural and sport activities to financial reward plans, although cultural and sport activities are also effective and fruitful.[20]

Molavi et al. showed that low score of the variable like hope for a good future, self-esteem, quality of academic factors, family income, and marriage were contributed in low academic motivation in students.[37]

As to limitations of the study, use of different measurement tools by different studies to measure academic motivation an achievement motivations was a limitation. To ensure homogeneity of studies, several studies that had used different tools were omitted. Difference is scoring system of Vallerand's academic motivation scale between Iranian studies and foreign studies made it impossible to compare these studies. Finally, the breakthrough point to distinguish high and low motivation is unclear, which creates ambiguity for researchers.

Conclusion

As the results showed, academic motivation in students in Iranian universities of medical sciences was higher than the mean score based on Vallerand's scale with score range from 28 to 196. The majority of the students had extrinsic motivation rather than intrinsic motivation. Moreover, achievement motivation of the students was desirably higher than the mean score based on Hermans' questionnaire with score range from 29 to 116.

Compliance with Ethical Standards

Conflict of Interest

The authors declare that they have no conflict of interest.

Ethical Approval

The study is registered with Ethics Committee, Kermanshah University of Medical Sciences, and IR.KUMS.REC.1397.187.

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