How Does the Entrance Exam Influence on Educational Success of Doctoral Medical Students in Basic Science Grade?

**Background:** Considering the importance of entering doctoral students to universities with hard competition, in order to detect the predictive power of entrance exam grade in educational achievement in early years, we attempted to investigate the efficacy of entrance exam with basic scientific test.

**Methods:** The existing data from national organization for educational testing and education center of Kerman University of medical sciences were collected in 300 students (medical, dental, pharmacology) in consecutive years (2005-6). Pearson correlation and linear regression analysis were used.

**Results:** In multivariate regression model, the only two predictive lessons for success in basic scientific test in medical students were biology and Arabic language with determinant coefficient (DC) 0.44, in dental students was chemistry (DC = 0.48) and in pharmacology students were biology and physics (DC = 0.46). In addition, there was no correlation between ranking in entrance exam and basic scientific test grade in all groups.

**Conclusion:** As we did not predict, there was no strong relationship between entrance exam grades and basic scientific test. This is the important point that we must know about this weak relationship. These issues could show the low validity of entrance exam, basic scientific tests or remarkable changes in educational level of students entering basic university and early years of entering universities.

**Key words:** Entrance Exam, Comprehensive Basic Science Test, Educational Achievement, Medical Students.
INTRODUCTION

In different countries, schools of medicine have different admission procedure, including cognitive and non-cognitive domains (1). Reforming admission procedures in different majors such as medicine, dentistry and pharmacology might lead to success in profession and as a result improve public health.

Among different academic fields of study, these three majors play a crucial role in public health. It is attempted that motivated and interested students pass entrance exam and study these majors.

One of the problems of admission procedure via entrance exam is range of acceptance criteria; only the participants who have gained special ranges pass the exam. According to the current condition, the question is whether this type of admission is right or not.

In a study conducted in Britain, it was concluded that there is a significant relationship between the results of academic achievement tests and medical students' future profession (2). In Iran, medical, dental and pharmacology students pass basic sciences courses for 2 – 2.5 years after entering the system of professional doctorate; then they should prepare for the comprehensive examination of basic sciences which is a nationwide and standard exam. Students’ educational achievement is assessed based on this exam. According to the study of Fatehi (1) and Roodbari (3), the influential factors of comprehensive exam were age, marital status, proportion, time of basic sciences course, and average of basic sciences courses (1, 3). Ferduson et al. study had a systematic review over the previous studies and realized that there were also other influential factors that lead to medical students’ educational achievement including learning method, female gender and White race (4).

Since the educational system of Iran in admitting the students and basic sciences comprehensive examination is different from other countries, few studies have been conducted to find correlation between entrance exam grade and comprehensive basic sciences exam. For instance, a study conducted in 2000 showed that chemistry (correlation coefficient: 0.56) had the highest correlation with the students' educational achievement. Mathematics, physic, biology, and language correlation coefficient were 0.53, 0.50, 0.48, and 0.39, respectively. In regression analysis, among professional examination, language and gender variables, only chemistry and mathematics had significant correlation in basic sciences test (5). Another study was done in Kuwait to determine factors of medical students’ performance and concluded that average of high school and average of medicine courses had no statistical significant relationship (6).

In other countries, university entrance examination are assessed differently. For example, the study of Kreiter et al. (2007) showed that Medical College Admission Test (MCAT) and Grade Point Average (GPA) have positive predictive relationship with clinical skills in these majors (7). Shahidi and his colleague essay showed that most of the students who had different proportion (42.8 %) and entered the university, had worse educational achievement. Among the students who had the proportion of region 2, 57.6% of them whose diploma average was higher than 15 and lower than 18, gained good grade in basic sciences test and were good at educational achievement (8). Another study held in Iran concluded that creativity, responsibility and the excellence should be considered in selecting talented students (3). Therefore, it could be concluded that in selecting students in the mentioned majors that are especially important, beside average, other factors should be considered as well.

Accordingly, in order to determine the influence of entrance exam scores on educational achievement, the correlation between entrance exam and basic sciences test was analyzed in Kerman University of Medical Sciences (2008 – 2009).

METHODS

This is a retrospective cohort study. Firstly, the required data of medical, dental and pharmacology students, who entered the university in 2005 – 2006 were gathered including age, gender, proportion of the mentioned year, number of participation in the entrance exam, their grade in the country, and their scores in specific and general courses. The data were collected from the files in Central Evaluation Office; then, for each person, the raw score of basic sciences test was received form Directorate General of Kerman University of Medical Sciences.

On the condition that the person could not pass the exam in the first time, his/her first score is considered in this study. Moreover, demographic data of the participants were collected form the files. The data were organized based on a checklist that was specially designed for the study and were analyzed.

Meanwhile, the students who had serious physical or mental problems, the ones whose information were not complete or those who transferred to another place during studying basic sciences were extracted from the study. T-test, chi-square test and analysis of variance were used in the study, also, all the variants were evaluated by multivariate linear regression model and the one that were not significant were omitted through stepwise method. Determine coefficient was used to present goodness of fit. Inclusion criteria for each variant was less than 0.1 p-value. SPSS (15th version) analyzed the data.

RESULTS

In this study, 156 medical, 78 dental and 116 pharmacy students, who have passed the entrance exam and were accepted in Kerman University of Medical Sciences in 2005 – 2006, were analyzed. Gender, the year of entrance to university, their grade in the country, their scores in specific and general courses were analyzed (Table 1).

The total number of students was 212 from three fields of studies, 94 were female and 118 were male. The number of male students was significantly higher than girls. (P <0.05). There was a significant difference between the three majors in literature, Arabic language, theology, biology, physics, chemistry and geology; in all mentioned subjects, the dental students gained better scores except for geology, while the pharmacy students gained better score
Entrance Exam Have Influence on Educational Success

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Table 1. the comparison of gender, the entrance year, different courses percentage, rank in the country, and score of basic sciences among the students who have entered Kerman University of medical sciences in consecutive year (2005-6) are presented.

in biology and Arabic were left (CD = 0.44); in dentistry, only chemistry predicted the basic sciences’ mark (CD = 0.48); and biology and physics were influential in pharmacology (CD = 0.46). In general, biology, geology and Arabic (coefficient determine = 0.42) remained among all of the professional doctorate students.

In table 3, the highest regression coefficient is for chemistry in dentistry (0.76), that shows for every one percent increase in the score in entrance exam, the dental students’ score of basic sciences increases for 0.76. On the contrary, the lowest regression coefficient is for Arabic among all of the professional doctorate students (0.12) which reveals although there is significant relations, the increase of Arabic score in entrance exam has the least significant relation with the score of basic sciences.

**DISCUSSION**

The main and most significant purpose of university entrance examination is to select qualified students, so that students gain better achievements and career according to their knowledge and interests. In fact, the entrance exam should predict students’ educational achievements as far as possible.

The results of the study shows that the students who had higher score were less successful in basic sciences exam. Moreover, it presented the lessons of entrance exam that can estimate the score of basic sciences exam: biology and Arabic in medicine, chemistry in dentistry and biology and physics in pharmacology.
Hajian (2000) studied how entrance exam’s special lessons can predict the basic sciences exam among medical students, the results presented that chemistry and mathematics are more valid predictors, physics and biology are in lower ranks (5). Erfan et al (2010) demonstrated biology, physics, mathematics, chemistry and English as predictor variables of students’ achievement (9). As it is clear, the previous researches only studied medical students, while medical and pharmacology students were not studied before.

The purpose of the current study was to estimate the influence of entrance exam’s lessons on the students’ educational achievement. On the condition that the entrance exam be programed well we can gain better results through better and more influential budgeting. The most available method was to evaluate the students by basic sciences examination. Mohammadi and his colleagues (2002) studied basic sciences examination as a predictor variable in assessing the students’ educational achievements and demonstrated that the mark of basic sciences has significant correlation with pre-internship comprehensive exam which could be considered a valid tool to identify medical students’ educational achievement (10). Panahandeh et al gained similar results in the same year (11).

Undoubtedly, there are various different factors that influence students’ educational achievements, which include: age, marital status, housing, family and economic affairs (5). According to the limitations of the current study on medical, dental and pharmacology students in two consecutive years, all of the information were not available. The purpose of the study was to determine the correlation between entrance exam’s lessons and students’ educational achievements in basic sciences comprehensive exam that were held for the three majors in the country.

**CONCLUSION**

The results did not present a significant relationship between the entrance exam’s scores in different lessons with the basic sciences comprehensive exam, as it was expected. This is an important point and the reasons of the low correlation should be studied carefully. There might be different reasons which include, low credit of entrance exam’s scores or basic sciences comprehensive exam, or due to considerable change of professional doctoral lessons and the students’ knowledge before and after they enter the university.
Entrance Exam Have Influence on Educational Success

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