Original Article

Educational Status of Dental Basic Science Course and its Correlation with Students' Educational Background in Kermanshah University of Medical Sciences

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Abstract

Introduction: Basic science course plays a pivotal role in the academic achievement of the students. The scientific background and educational performance of the students are also influential in this period. The aim of the present study was to investigate the educational status of dental basic science course in the first three admissions (2009-2011) and its association with students' educational background in Kermanshah University of Medical Sciences (KUMS).

Methods: In this descriptive cross-sectional study, all dental students admitted to school of dentistry in 2009-2011 years were included. The students' academic background (scores, grade point average, score of comprehensive basic sciences examination (CBSE) were recorded. Data were analyzed by SPSS 16 using one-way analysis of variance (ANOVA) and independent t-test.

Results: Kermanshah dental students admitted to university in 2009-2011 were mostly female (59.2%), belonged to regions 2 and 3 (81.6%) of university entrance exam, had sciences diploma (89.8%) and their grade point average of diploma was nearly 18. There was a significant difference between the three groups of students admitted to university in Biology, Chemistry, Mathematics, Arabic, English language and Theology lessones of entrane exam (P<0.05). The students' failure rate was 1.5% in university coureses. They all (100%) passed CBSE and were ranked second nationally in the year. There was no significant difference between male and female students in terms of age, diploma grade point average, grade point average of basic sciences and score of CBSE.

Conclusion: Basic science courses of dentistry in Kermanshah enjoyed a rather constant status and students had a good academic level in these courses.

Keywords: Education, Dental Students, Basic Sciences

Introduction

Higher education is one of the most important institutions for educating, developing and providing human resources and a significant factor for the development of country and society. It has a pivotal role in the constant development of every society by producing new knowledge and spreading it (1). In the recent age, there

are fundamental changes in higher education centers and universities. However, the objectives of higher education are rather common around the world (2). Moreover, the rising developments of universities and excessive number of students have negatively affected the quality of educational services (3). The quality of education depends on various factors such as academic content of programs, skilled teachers, educational facilities, and physical condition of classrooms, appropriate teaching method, personal characteristics, scientific associations and students' motivation (4).

Promoting the quality of teaching and learning is one of the major objectives of universities and an essential and inevitable element in improving the quality of education, regular assessment of programs and academic status of students, so that any change in planning and performance requires the evaluation of the present situation (5, 6). Academic performance of students depends on various personal factors before university, the student's activity after admission and physical and educational facilities of higher education centers. Identification of the factors affecting the students' academic status is an appropriate approach to plan and develop educational programs (6, 7). The students' educational status in basic science course, especially in the initial semesters can influence their post-graduate process of education. Numerous studies have been carried out in Iran to investigate the factors affecting the academic trend of students and have suggested comprehensive studies in this regard (4, 7-10).

Basic science course plays a fundamental role in the establishment of academic association of medical, dental and pharmaceutical students, so that the average score in this course plays a major role in passing and gaining a high rank in comprehensive basic science examination (CBSE) (7, 11) and determining the students' academic achievement in the following educational levels, even in a specialty courses. It is necessary to analyze the qualitative and quantitative factors affecting the academic trend of students such as personal (age, gender) and academic characteristics (diploma grade point average, mean score of general and special courses for university entrance exam), scores of courses and university average score by academic methods (4, 7). Also, the status of the educational system of departments and faculties can be investigated indirectly by evaluating the scores of different courses (12).

Faculties of dentistry comprise a major part of medical education and dentistry is usually the first priority for top students in university entrance examination owing to special job opportunities. Further, the mean score of the admitted students in this major is higher than that of all other majors in Iran's university entrance examination. Currently, dental education has undergone fundamental changes. Establishment of numerous dental faculties in recent years and attempts to train efficient dentists has been major objective of the higher education system.

Motalebnejad et al. (2010) analyzed the educational status of clinical courses in Babol students of dentistry and reported no significant difference between students' academic status based on the admission year, but indicated a developing general trend and considered the year of admission to university as factor influencing the students' average score (13). However, Yousefi Mashouf et al. (2002), in analyzing the academic status of Hamadan students of medicine, reported the educational status of students in the first three admission years better than that of the second three admission years (14).

Dentistry school of KUMS has annually accepted around 30 students from 2009. They pass the basic science course over four semesters, starting from the second semester of education year, according to the national curriculum. Given the significance of evaluating the existing programs, assessing their weaknesses and strengths, and revising and modifying them to achieve educational objectives, the present study was carried out to analyze the educational status of dental students in basic science course in the first three admissions (2009-2011) at Kermanshah dental school, and to determine the correlation between scores obtained over this period and their educational background such as diploma grade point average and scores of university entrance examination courses.

Methods

In this descriptive cross-sectional study, all students accepted to dental school of KUMS from 2009 to 2011 (98 students) were included. The personal and academic characteristics of students including age, gender, admission quotas of university entrance exam, the interval between earning diploma and admission to university and scores of general and special courses in university entrance exam were extracted from their academic profile and recorded in specific forms. Having eliminated the transferred and guest students from the study, the scores of courses, grade point average and score of CBSE for 88 students were obtained from the university education office and recorded in the tables.

The scores of students in various basic science courses were also obtained and the number of failures and conditional pass in each course were recorded. To determine the percentage of failing a course, total number of courses was multiplied by the number of students and percentage of failures were calculated. The quantitative data in this study were analyzed by SPSS (version 16)

software using descriptive statistics, one-way ANOVA, tukey test. Pearson correlation coefficient was applied to determine the relationship between variables. P<0.05 was considered significant.

Results

There were 98 students of dentistry in the first three admission periods (2009-2011) in KUMS. After analyzing the personal and educational background, university entrance exam scores, and excluding transferred students, 88 students remained to be included in the study; 59.2% were female, 89.8% had diploma in sciences, 54.1% accepted to university were from region 2 and 27.5% were from region 3 of entrance exam. Their diploma grade point average was 17.93 and the interval between diploma and admission to university was less

than 2 years. There was a significant difference between the three admitted groups in terms of age (P=0.003), but no significant difference was found regarding gender, type of diploma, university entrance exam regions and grade point average of diploma (P>0.05).

Further, during these three periods, the mean age of the students accepted to university increased, the mean of their diploma grade point average slightly decreased and the number of students holding science diploma indicated a relative decline (Table 1). The students admitted to dentistry showed no significant difference in terms of gender. Moreover, there was no significant difference between both genders in terms of age and grade point average of diploma (P>0.05).

Table 1. Comparison of personal and education background of Kermanshah students of dentistry (2009-2011)

Entrance year	Number	Diploma grade point average (20)	Mean of Age (year)	Science Diploma (%)	Region 1 of entrance exam (%)	Region 2 of entrance exam (%)	Region 3 of entrance exam (%)	Other region of entrance exam (%)
2009	35	18.03	18.91	94.3	8.6	57	31.4	3
2010	30	17.97	19.53	93.3	13.3	50	20	16.7
2011	33	17.77	19.58	84.9	12.1	57.6	27.3	3
Mean	32.7	17.93	19.34	89.8	11.3	53.8	27.3	7.6

There was no significant difference between students in three admitted groups regarding the means of physics, geology and literature courses in university entrance exam (P>0.05), but a significant difference was observed between the means of biology, chemistry, Arabic, theology (P=0.000), mathematics and English courses (P=0.006). The highest percentage for special courses was reported for biology and chemistry and for general courses; it belonged to theology and literature courses in entrance exam (Table 2). The mean of special and general courses of university entrance exam indicated no significant difference between males and females; however, the mean of Arabic course was higher in males (51.31±16.35) than in females (47.21±13.69).

The means of grade point average of basic science courses for the students admitted to dental school in 2009, 2010, and 2011 were 15.12±1.1, 15.93±0.9 and 15.4±1.2, respectively, which showed a significant difference (P=0.021). The mean of grade point average for female students were 15.73±1.07 and for male students were 15.23±0.99, which indicated no significant difference. All the students (100%) passed the comprehensive basic

sciences examination in 2012- 2014 and ranked second nationwide in 2012 and 2013 exam. Their average scores were 138.7±11.3, 150.9±18.6 and 119.8±20.9 respectively indicating a significant difference (P=0.000) (Table 3). The mean score of female and male students in CBSE were 136.7±23.9 and 136.3±17.9 respectively, showing no significant difference.

In basic science courses of dentistry, the conditional pass and failure levels in courses were 1.19% and 1.35%, respectively (Table 3). The analysis of the means of basic courses in the three admissions showed that the highest scores for theoretical courses were reported for oral histology and embryology (17.06), tooth anatomy (16.49) and anatomy (16.04), and the lowest scores were reported for physiology (12.44) and microbiology (12.18). In practical courses, the highest score belonged to tooth anatomy (17.62), oral histology and embryology (18.4) and anatomy (17.3) and the lowest scores belonged to physiology (13.52) and microbiology (13.32) courses (Table 4). In all basic theoretical courses of basic sciences, there was no significant difference between male and female students in terms of mean scores, and the

mean score of the female students was higher than that of the male students in other courses except physiology.

Table 2. Comparison of the means for special and general courses in university entrance exam for Kermanshah students of dentistry (2009-2011)

Entrance year	Biology (%)	Chemistry (%)	Math (%)	Physics (%)	English (%)	Arabic (%)	Theology (%)	Literature (%)
2009	59.65	54.51	38.24	54.43	34.70	55.88	77.83	65.42
2010	70.08	65.81	54.40	56.70	30.46	42.50	67.92	67.88
2011	71.51	50.92	49.92	45.93	43.74	44.90	68.48	67.55
Mean	66.84	56.76	47.12	52.70	36.45	47.68	71.65	68.25
P- value	0.000	0.000	0.006	0.60	0.006	0.001	0.001	0.1

Table 3. Comparison of grade point average of basic science courses and comprehensive exam score of Kermanshah students of dentistry (2009-2011)

Entrance year	Grade point average of basic science	Score of Basic Science Exam	Dropout (%)	Failed course	Higher mean of courses	Lower mean of Courses
2009	15.12	138.7	4 (4.17%)	1.36%	17.11	12.74
2010	15.93	150.9	0	1.2%	17.19	14.22
2011	15.40	119.8	0	1.5%	18.24	12.97
Mean	15.47	136.5	1.19%	1.35%	18.24	12.74

Table 4. Comparison of the means of scores for basic theoretical courses of basic sciences between three groups of dental students and statistical differences between them as well as total average of students in each course

Lessens /years	Theory					Practical				
	1388	1389	1390	Total mean	P-value	1388	1389	1390	Total mean	P-value
Anatomy	15.41	15.85	16.97	16.04	0.016	17.24	16.72	17.93	17.30	0.013
Biochemistry	12.84	13.51	13.70	13.35	0.096	14.90	15.69	16.93	15.83	<0.001
Histology	13.19	16.27	13.07	14.16	<0.001	15.13	17.07	14.08	15.41	<0.001
Physiology	13.51	11.61	12.13	12.44	0.001	13.15	14.32	13.13	13.52	0.070
Microbiology	10.48	12.83	13.35	12.18	<0.001	13.36	13.57	13.03	13.32	0.695
Immunology	14.36	16.95	12.70	14.62	<0.001	17.15	17.55	17.05	17.25	0.038
Parasitology	14.42	13.75	12.29	13.49	0.001	15.32	15.97	14.95	15.39	<0.001
Pathology	12.89	14.40	14.21	13.82	0.002	14.98	18.15	18.05	17.02	<0.001
Oral Histology & Embryology	15.9	17.69	17.67	17.06	<0.001	18.79	18.19	18.2	18.4	0.192
Tooth anatomy	16.55	16.5	16.4	16.49	0.96	17.21	17.85	17.86	17.62	0.96
Health	14.58	16.58	15.89	15.64	<0.001	-	-	-	-	-
Genetics	15.32	15.97	14.95	15.39	0.026	-	-	-	-	-
Physics	12.87	12.58	13.45	12.96	0.18	-	-	-	-	-
Psychology	15.87	15.98	17.35	16.41	<0.001	-	-	-	-	-

The analysis of correlation between educational background and educational status of basic science courses indicated that grade point average of diploma, grade point average of basic science courses and score of CBSE had significantly positive correlation with each other (P<0.001). Also, the grade point average of basic science courses and mathematics and biology showed a significantly positive correlation (P<0.05). The highest correlation was reported between biology course of university entrance exam and microbiology and pathology and between English course of university entrance exam and English course of basic sciences. However, no significant correlation was observed between theology course of university entrance exam and similar courses at university (Table 5).

The comprehension examination score of basic sciences showed a significantly positive correlation with most special courses of basic sciences; and the highest correlation was reported for biochemistry, histology, immunology and microbiology (P<0.001) (Table 5). The analysis of courses in comprehensive examination showed that histology and embryology courses enjoyed very good status and rank among most of other courses (data were not present in this study).

Table 5. Correlation between score of university entrance examination courses and basic science courses

Educational Variables	Educational Variables	Pearson correlation	P-value
Diploma Mean (17.93±1.3)	Basic Science Mean (15.47±1)	0.68	<0.001*
	Score of CBSE (136.51±21.3)	0.4	<0.001*
	Mathematic (47.12%±21.7)	0.25	0.02*
	Chemistry (56.76%±13.7)	0.21	0.06*
	Biology (66.84%±12.5)	0.1	0.38
Basic Science Mean (15.47±1.1)	CBSE (136.51±21.3)	0.68	<0.001*
	Mathematics (47.12%±21.7)	0.34	0.001*
	Biology (67.16%±12.5)	0.22	0.05*
	Chemistry (57.23%±13.7)	0.13	0.25
Grade point average of CBSE (136.51±21.3)	Histology (14.16±2.4)	0.76	<0.001*
	Biochemistry (13.35±1.6)	0.80	<0.001*
	Immunology (14.62±2.5)	0.62	<0.001*
	Microbiology (12.18±2.1)	0.62	<0.001*
	Pathology (13.82±1.8)	0.61	<0.001*
	Anatomy (16.07±2.1)	0.57	<0.001*
	Parasitology (13.49±2.2)	0.52	<0.001*
	Physiology (12.46±2.1)	0.50	<0.001*
	Oral Histo/Embryology (17.1±1.7)	0.56	<0.001*
	Tooth Anatomy (16.49± 2.1)	0.48	<0.001*
Courses of entrance exam	**University Courses /(Mean ±SD)**		
Biology (66.84%12.5)	Microbiology (12.18±2.1)	0.40	<0.001*
	Genetics (15.39±2.3)	0.31	0.004*
	Histology (14.16±2.4)	0.23	0.034*
	Biochemistry (13.35±1.6)	0.22	0.046*
	Embryology (17.06±2.6)	0.07	0.052*
	Parasitological (13.49±2.2)	-0.11	0.34
	Immunology (14.62±2.5)	0.07	0.54
	Physiology (12.46±2.1)	-0.06	0.60
	Pathology (13.81±1.8)	0.04	0.69
	Anatomy (16.07±2.1)	0.01	0.90
Chemistry (56.76%±13.7)	Biochemistry(13.35±1.6)	-0.02	0.85
Physics (52.70%±1.7)	Physics (12.96±1.7)	-0.17	0.14
	Computer (16.36±2.3)	0.06	0.59
Mathematics (47.12%±21.7)	Computer (16.36±2.3)	0.23	0.04*
	Physic (12.96±1.7)	0.1	0.18
Theology (72.51%±1)	Theologies (17.54±1.3)	-0.002	0.99
Literature (68.25%±1.6)	Literature(18.38±1.6)	-0.09	0.39

Discussion

The findings of the present study revealed a constant trend for students of dentistry at KUMS regarding the regional quotas of university entrance exam, grade point average of diploma; gender and grade point average of basic science courses, and in the three admissions, the conditional pass and failure rates in different courses of basic sciences were very trivial. They enjoyed a desirable status in comparison with other universities with passing rate of 100% and earning the second rank in CBSE.

Also, the correlation pattern between university entrance exam courses and basic science courses showed a regular and definite trend. The percentage of passing the CBSE in three majors of medicine, dentistry and pharmacology usually was not complete (100%). In our previous study, 68-88% of Kermanshah students of medicine passed CBSE over different years, the obtained rank in most of the courses was not good and none of the courses showed significant correlation with the results of CBSE (10).

Moreover, in most of the studies, the percentage of passing the CEBS in medical universities has not been high (100%) (14, 15).

Despite the different nature of the majors studied, it seems that the quality of education in basic science courses at KUMS has been improved over time. It should be noted that, several factors may have contributed to better educational performance of students of dentistry in basic science courses, such as lower number of students of dentistry (less than 30 person in each class) than the medical students (over 100 person in each class), higher average scores in university entrance exam, lower number of students of non-regional quota, higher motivation and positive view toward future job. In addition, there was a directly significant correlation between grade point average of diploma, grade point average of basic science courses and score of CBSE, which has been taken into account in other studies, as well (4, 7, 10-12).

Definitely, the grade point average of diploma and that of basic science courses play an important role in majors like medicine, dentistry and pharmacology and are considered as predictors and influential factors in the following stages of education. Naderi et al. (2010) investigated the educational status of basic science courses of medicine from the view point of students in Bandar Abbas University of Medical Sciences and reported the strengths and weakness of this course (16).

Further, Johari et al. (5) analyzed the educational status of medical students at Shahed University and Motaleb Nejad et al. (13) reported the clinical educational status of students of dentistry in Babol University. In the study conducted by Johari et al. (5), the grade point average of students and the number of students from non-regional quotas were fundamentally different than those of the present study and other studies (11-12), which is associated with the specific admission conditions of students in Shahed University.

In the present study, there was a significantly positive correlation between major courses of basic sciences and results of comprehensive examination, which is in contrast with the findings of Haghdoost (12) in Kerman. This can be attributed to the differing nature of medicine and dentistry as well as many differences between students and conditions of this majors.The status of basic science courses has been analyzed in many studies in terms of scores of the courses and ranking of different universities in comprehensive examination (7, 10-12). However, using the scores of special courses in university entrance exam is an appropriate criterion to predict the academic performance, which has been emphasized in our previous study (7).

In the present study, as expected, there was a significantly positive correlation between biology course in university entrance exam and most of the main courses of basic sciences. The significant correlation between mathematics course in university entrance exam and grade point average of basic science courses is noticeable. However, unlike us, Hajian et al. (17) reported the highest positive correlation between academic progress in CBSE and chemistry course in university entrance exam, which can be because of capability of high school teachers in some courses and students interest in a special course.

The students' age has been introduced as an influential factor in educational performance (7) and age increase as a risk factor in academic progress. Given the relative increase in the mean age of students and decrease in the mean of grade point average of diploma for the students accepted to dentistry major in Kermanshah, academic failure is expected to occur in the future, and it appeared in the last average scores of CBSE. However, this issue is recommended to be studied in other majors at KUMS and other universities.

Dentists play a pivotal role in promoting the health services and presenting appropriate strategies to provide these services. The academic achievement of students of dentistry is an important issue in dental education, and in case it is not controlled, it will decrease the academic level of the dentists. According to the studies carried out, dental specialists play a key role in providing special services to patients, enhancing the quality of dental care, showing innovation in dentistry and developing clinical research. Success in basic science courses is a key factor for the dentists' achievement, which provides the ground for academic progress and better understanding of the materials in the following stages of education.

Conclusion

Although the educational status of Kermanshah students of dentistry enjoyed a favorable status, there was a sharp decline in the grade point average of some basic science courses that needs to be investigated; also decreased score mean of CBSE is considerable. Similar studies are recommended to be conducted in other dental and medical faculties of Iran.

Acknowledgement

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