Original Article

Significance of primary factors influencing students' performance at the College of Dentistry, King Saud University, Saudi Arabia

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Abstract

Objective: To determine the effect of different enabling factors such as curriculum, role of faculty, academic advising and availability of learning resources and supportive services on the performance of students pursuing their Bachelor's degree in dentistry.

Methods: Data was collected from the male and female students of the College of Dentistry, King Saud University, during the academic year 2008-2009. All undergraduate students (576) constituted the total sample size of the study. The respondents were requested to fill a questionnaire form, which was specially designed in accordance with requirements of the Association for Dental Education in Europe (ADEE). The questionnaire comprised 45 questions addressing all aspects of the relevant factors. The five-point Likert scale was used to evaluate the feedback. All the responses (239) were thoroughly examined and only the completely filled forms (169) were subjected to regression analyses, taking student`s CGPA as a dependent factor and a depiction of their performance. The t-tests were also worked out to evaluate variations in the responses of male and female students to each sub-factor.

Results: The study showed a significant impact of faculty and learning resources and support services on a student's achievement (α= 0.05). Surprisingly, academic advising and the dental curriculum had non-significant effect at 95 % level of confidence. However, the critical analyses acknowledged that the non-significant impact was due to poor performance of the two factors.

Conclusion: The role of faculty and learning resources as well as of support services had significant effect on students' performance. However, there is an immense need to improve the level of academic advising and revise the curriculum to have a significant impact of these factors on the student's achievements.

Keywords: Student performance, Role of faculty, Dental curriculum, Academic advising, Learning resources, Student support services. (JPMA 62: 816; 2012)

Introduction

The 21st century began with many challenges, especially in the health education sector. Oral health being the foremost and a leading line of defense against many diseases was, therefore, given prime importance. A number of dental associations and dental accreditation agencies emerged in different regions of the world to improve the quality of education and training in dentistry. Such associations mainly focus on quantitative and qualitative assessments relating to all aspects of the dental education,[1] including curriculum, role of faculty, staff, laboratories, equipments, clinical services, students' support system, teaching methodologies, learning techniques, academic counselling as well as institutional leadership and learning environment.[2] These attributes have a direct impact on the performance of dental students in terms of interpersonal development, clinical and theoretical skills, provided that these are integrated with highly developed dental curriculum, ethical and professional principles as well as with the cognitive and psychomotor skills.[3]

Most of the published studies about teaching and learning have been carried out in North America and Europe.[4] However, results from other parts of the world could be different due to the huge differences in curricula and education systems. There is an agreement in the literature that improvement of the existing courses and changes in the curriculum may play a significantly positive role in the achievements of medical and dental students.[5] For example, students of Jefferson Medical College (JMC) in Philadelphia, who studied a revised curriculum of pathology, performed significantly better ($P<0.001$) in the National Board of Medical Examiners (NBME) Part-I Examination as compared to those who studied the old courses. This improvement was maintained throughout the entire study period stretching over four years. Consequently, the

curriculum reform was associated with the students' performance and satisfaction.[6] Further studies conducted at Texas A&M University, College Station, USA, proved that updating old courses, revision of curriculum by introducing new courses, enhancement in learning/teaching resources, optimum use of the advanced teaching techniques, class room environment and intensification of communication skills are crucial to raise successful graduates. It was, therefore, recommended that the universities must pay more attention to improve teaching skills by employing advanced teaching methodologies, teaching aids, improved course structure, effective communication skills, academic guidance and students` counselling.[7] Furthermore, the use of teaching aids and information technology has shown promising results on the performance of students.[8] Apart from curriculum, the role of faculty and academic advising have shown significant impact on the overall achievement of students.

Empirical evidence in the available literature indicates the vital impact of student-faculty collaborations on the success and performance of the undergraduates.[9] Pascarella and Terenzini concluded that student-faculty interaction exerts positive impact on performance and achievements of both entities.[10] For instance, a study done to determine teachers' effectiveness[11] indicated a difference of 39% points in students' performance just because of the most effective and the least effective teachers. The achievement gain of students taught by the most effective teachers touched 53 percentage points whereas those taught by the least effective teachers could not cross 14 percentage points.[12] Similar inferences were drawn by Sanders[13] and Wenglinsky.[14] Other factors such as laboratory equipment, clinical facilities, library resources, transportation services, cafeteria, medical treatment services have direct as well as indirect effect on the students' progress and achievements. The schools which allocate sufficient finances for these resources have shown excellent results in relation to the student's performance.[15]

Unfortunately, inadequate research has been done to study the factors affecting the achievement of dental students in Asian and African regions. Therefore, the present investigation was carried out at the College of Dentistry, King Saud University, to explore the effect of curriculum, role of faculty, academic advising and learning resources on students' performance, using Cumulative Grade Point Average (CGPA) as a measure of students` performance.[16] We believe that the findings will be helpful for policymakers, academicians, faculty and students` advisors involved in the process of raising competent dentists.

Materials and Methods

The study was conducted from September 2008 to June 2009 in Deriyah University Campus (DUC, Male) and Malaz University Campus (MUC, Female) of the College of Dentistry, Riyadh, Saudi Arabia. Both campuses offer Bachelor of Dental Surgery (BDS) programmes and are administered by the same dean, vice-deans and chairpersons of different departments.

The study aimed at finding out how was the curriculum influencing students' performance in terms of their grades, and what was the role of faculty in this regard. It also explored if the academic advising available to students at the college was a factor in their performance. Apart from looking at all the existing learning resources and student support services at the two campuses and their impact on students' performance, the study also explored if there were any differences between male and female students in the outcomes of the effect of various factors on performance.

All BDS students (576) at DUC and MUC were eligible to fill the survey forms. The Quality unit of the college supervised the distribution and collection of the survey forms. The students were at liberty to fill these forms according to their personal experience and independent perception. It was made clear to all the respondents that their participation was voluntary and filling of the forms will be taken as an indirect informed consent. The received survey forms were thoroughly examined. Incomplete and partially-filled forms were rejected and only the complete forms were used for statistical analyses.

The questionnaire had 45 questions relating to different aspects of the BDS programme such as Curriculum, Faculty, Academic Advising, Learning resources and Students` support services. All questions were closed-response questions wherein the students were required to score their opinion on a five-point Likert scale.[17] Also, other related demographic information as well as Cumulative Grade Point Average (CGPA) was collected. The CGPA was considered as a measure of students' performance and achievement.[16]

The data was analysed using the SPSS (Statistical Package for the Social Sciences) version 16.0. Considering students' CGPA as a dependent factor, the effect of independent factors was worked out through regression analyses. Analysis of Variance was computed for each factor. Also, t-tests were worked out to evaluate variations in the responses of male and female students to each sub-factor. Significance was tested at $p<0.05$ level of probability.

Results

A total of 576 forms were distributed among all undergraduate BDS students at the College of Dentistry. The returned survey forms were 239 (40.5%). Incomplete forms were rejected (n= 70), while 169 were considered for statistical analyses. Regression analyses with ANOVA and R

Square values were worked out for each factor (Table-1).

The mean values and standard deviations of students' responses under the Course Material category depicted a non-significant effect of the curriculum on the students' performance. The students were satisfied about the clarity of objectives of the courses, reference books and distribution of grades at the start of each semester with a mean score of 3.95±0.072 S.E, while responses to other questions relating to the curriculum were scored between 2.85±0.085 and 3.54±0.075.

Table-1: Regression Analyses.

Factor Analysed	Multiple R	R2	Resutls of Analyses of Variance					
			S.O.V	DF	SS	MS	F	P
1. Course Material	0.330	0.109	Regression	16	6.79	0.42	1.1628	0.30 NS
			Residual	152	55.53	0.36		
2. Role of Faculty	0.383	0.146	Regression	10	9.15	0.915	2.719	0.0041
			Residual	158	53.17	0.33		
3. Academic Advising.	0.14	0.019	Regression	3	1.22	0.40	1.1012	0.35 NS
			Residual	165	61.10	0.37		
4. Learning Resources / Students Support Services.	0.41	0.176	Regression	16	10.97	0.68	2.0305	0.0144
			Residual	152	51.35	0.33		
Total df in and SS in case of each factor	168	62.33						

Table-2: Comparison of mean responses of male and female students regarding Course Material.

No	Question Detail	Mean ± SD	t-test	Probability
1	The information about objectives, requirements, reference books relating to the courses as well as distribution of grades are clear since the start of each semester	3.95±0.94	-2.34**	0.020
2	Availability of sources and references for making decisions	2.85±1.11	0.14 N.S.	0.883
3	Students are provided with grades in a timely fashion	3.14±1.042	-0.96N.S.	0.335
4	The evaluation of students` performance is fair	3.13±0.98	0.95 N.S.	0.339
5	Distribution of the grades is according to the course requirements	3.30±0.98	-2.02**	0.044
6	The amount of work is commensurate with the number of credit hours specified for the courses	3.01±1.12	-0.23 N.S.	0.816
7	Test questions are clear and understandable	2.91±0.93	-1.01 N.S.	0.310
8	Test questions cover most of the topics of the respective courses	3.37±0.87	-1.23 N.S.	0.219
9	Methods of evaluating performance of students greatly vary	3.19±1.01	-0.99 N.S.	0.320
10	Courses help me to improve my skills	3.27±1.07	-1.42 N.S.	0.154
11	Courses help to improve my ability to communicate effectively	3.34±0.97	-0.57 N.S.	0.568
12	Courses help me to improve my ability to solve problems	3.19±1.04	-1.12 N.S.	0.262
13	Content of courses vary greatly	3.44±0.83	0.23 N.S.	0.813
14	Methods of teaching of courses vary greatly	2.97±0.91	0.13 N.S.	0.891
15	Topics of the lectures in each course are appropriately embedded with practical aspect	3.54±0.97	-1.55 N.S.	0.122
16	The faculty-student ratio is appropriate	2.88±1.30	-5.04 N.S.	1.190

N.S.= Non-Significant ** Significant at P<0.05.

Table-3: Comparison of mean responses of male and female students regarding the Impact of Faculty.

No	Question Detail	Mean ± SD	t-test	Probability
17	Faculty members are well-prepared with lecture material	3.74±0.80	-2.69**	0.007
18	Faculty members use teaching methods and teaching aids to enhance learning and understanding of the subject	3.21±1.02	-1.03N.S.	0.302
19	Faculty members support lectures with the latest information available in the scientific articles	4.05±0.86	-0.01N.S.	0.991
20	Faculty members encourage the students to seek knowledge from various sources	3.53±1.023	-2.23**	0.026
21	Faculty members treat students gently and respectfully	3.58±1.09	-3.44**	0.000
22	Faculty members welcome the students' questions	3.83±1.03	-2.778*	0.006
23	Faculty members are keen to tell the students about their mistakes and to develop their knowledge and skills	2.11±0.46	-0.92N.S.	0.353
24	Faculty members are committed to delivery of lectures	3.08±0.97	-1.65 N.S.	0.099
25	Faculty members are committed to the time allocated for lecture	4.20±0.85	-3.68**	0.000
26	Faculty members are available during the specified office hours	3.44±1.22	0.39 N.S.	0.691

N.S.= Non-Significant ** Significant at P<0.05.

Table-4: Comparison of mean responses of male and female students regarding the impact of Academic Advising.

No	Question Detail	Mean ± SD	t-test	Probability
27	The academic advisors provide students with the right information they need	2.92±1.21	-2.16**	0.032
28	The academic advisor is always ready to help students	3.065±1.23	-1.15 N.S	0.250
29	The academic advisor is available during office hours for academic counseling	2.92±1.049	-0.47N.S	0.632

N.S=Non-Significant ** Significant at P<0.05.

Table-5: Comparison of mean responses of male and female students regarding the impact of Learning Resources/Student Support Services.

No	Question Detail	Mean ± SD	t-test	Probability
30	Laboratories equipments are working well	2.66±1.13	-0.48 N.S.	0.631
31	The clinics system and equipments work well	2.89±0.99	1.58 N.S.	0.114
32	Lecture rooms are suitable for students	3.69±1.06	1.11 N.S.	0.266
33	Students find enough time to spend in the library	3.02±1.21	-6.39**	1.51E-09
34	Reference books are available for the students in the library	2.82±1.18	-5.91	1.8E-08
35	Reference books are available for sale in the book bank	2.14±1.09	3.28**	0.001
36	Imaging Center services are always available	1.99±1.17	0.46 N.S.	0.639
37	Computer services are available to students	2.37±1.19	-5.22**	5.14E-07
38	Healthy/ nutritious food is available to the students	2.05±1.20	-1.29 N.S.	0.196
39	Prayers place is available to the students	3.48±1.53	7.39**	6.62E-12
40	Rest area is suitable and available for students	2.28±1.39	-3.15**	0.0019
41	The wash rooms are clean and hygienic	2.24±1.36	3.069**	0.002
42	Appropriate transportation facility is available to students	2.12±1.20	-4.01**	8.9E-05
43	Appropriate parking is available	1.73±1.00	-2.46**	0.014
44	A well-equipped gym is available for students	1.61±1.05	4.75**	4.26E-06
45	The hostel accommodation is appropriate	2.27±1.15	1.02 N.S.	0.310

N.S.= Non-Significant ** Significant at P<0.05.

Comparison of the responses of male and female students exhibited non-significant difference for all questions, except in Question 1 & 5, which related to the course syllabus and grade distribution (P<0.05).

The same method was applied to questions related to the Effect of Faculty on students' performance (Table-3). Regression analyses pertaining to the role of faculty in improving achievements of the students were found highly significant (F (11,157) = 2.45 at P<0.0073). The students' responses were noteworthy for all questions in the category. Mean values for most of the questions varied between 3.44±0.094 to 4.20±0.065. This satisfactory attitude of the students indicated that the faculty was playing a significant role in augmenting students` achievements. However, the average response of the students to question #23 (2.11±0.035) demanded that the faculty needed to focus more on improving cognitive, psychomotor, interpersonal and numerical skills by highlighting as well as correcting students' mistakes.

As far as differences in perception of male and female students were concerned, there were significant variations in responses regarding the role of faculty. These variations were mostly related to the preparedness of the faculty before the delivery of lectures, encouragement by the faculty, respect given by the faculty and adhering to the time limit for lectures. However, no significant differences in the responses were recorded for questions dealing with the effectiveness of teaching methods, latest knowledge and the availability of faculty during their office hours.

Statistically, Academic Advising had a non-significant effect on the students' performance as perceived by the respondents. The overall score for this category was 2.972±0.089 (Table-4). Results indicated that students were less satisfied with the available academic advising mechanism. A comparison of the responses of male and female students exhibited significant difference in providing the right academic information to the students, whereas the other two responses did not depict any significant difference (P<0.05).

As for the factor of Learning Resources and other Support Services, the results showed a significant effect on students' achievement (F (16,152) = 2.45 at α=0.05). Students were significantly concerned about the functionality of equipment in the laboratories as well as in the clinics with mean score values of 2.67±0.087 and 2.89±0.076 respectively (Table-5). Likewise, responses toward the availability of appropriate parking, health and fitness centre, imaging services, nutritious food availability and accommodation facilities were scored very low with mean values of 1.733±0.077, 1.615±0.081,1.994±0.090,

2.053±0.092 and 2.278±0.088 respectively. Among the 16 aspects under this factor, students were found comparatively satisfied with the environment of classrooms (3.69±0.082), time available for availing library resources (3.023±0.093) and prayer space (3.485±0.118). However, the mean overall score for this factor was 2.802±0.091. Furthermore, comparison of the responses of male and female students exhibited significant differences between the two campuses in terms of the availability of library resources, computers and network facilities, prayer place, rest areas, car parking and gym facilities.

Discussion

The study looked at four key areas of the existing BDS programme: curriculum, role of faculty, academic advising, learning resources and student support services, and their impact on the performance of undergraduate students. The participation of students in the study was promising (40.5%). Their feedback demanded drastic changes in course material, methods of teaching and faculty-to-students ratio. Regression analyses revealed highly significant impact of some factors on students' CGPA, which was considered in the present study as an indication for academic achievement.[17]

The students' overall score for curriculum and course material (3.22+0.077) did not reach the satisfaction level of 80%. This necessitates revision of curriculum as well as testing and teaching techniques aiming to enhance skills and practical knowledge of dental students. Though there is no published data showing the correlation between the curriculum and students' achievement in the Middle East, our findings are in line with those of Alzahem et al.[18] They suggested that modification in the curriculum is vital to produce better dentists as well as to reduce mental stress on undergraduates. Hence, careful work on sequencing and coordinating topics and instruction around science reform themes is related to improved students' achievement. For instance, a study conducted at Harvard School of Dental Medicine urged partial revision in the curriculum with more emphasis on additional coursework in practice management.[15] Another example is from South Africa where research component was incorporated in the curriculum of undergraduate dental students to equip them with the skills relating to practical aspects of dentistry.[19] Furthermore, Wishnick[20] found that good alignment between CRT (criterion-referenced tests) and NRST (norm-referenced standardised tests) contribute more than 36% variation in performance of the students. Our study, therefore, recommends that the faculty must seek students' feedback periodically and consider their responses relating to the curriculum, teaching tactics, evaluation methods and articulation of latest research in lectures.

Although students were mostly found satisfied with the faculty, but the overall score for faculty performance (3.48+0.072) was below the satisfactory level of 80%. The college highly qualified and well-experienced faculty members who have graduated from recognised institutions from all over the world. The apparent deficiency could probably be due to the multifarious role of faculty in the college; being teacher, clinical instructor, clinician, researcher, research supervisor, academic advisor, administrator and member in different committees.

The faculty should initiate self-assessment and improve their communication and contact with the students for optimising their role. The present finding is in conformity with previous study by Lietz and Matthews.[21] Such studies have depicted that strong and continuous communication with the faculty for seeking advice in relation to academics and research exerts positive impact on the learning outcomes, particularly for the senior students.[22] Teacher`s effectiveness is one of the most important factors that contribute a lot in the students` achievement and often overcomes other factors such as class strength, gender as well as socioeconomic status of students.[13,14] A recent study carried out at the College of Dentistry has revealed that foreign trained faculty placed significantly higher values on a programme's reputation and research opportunities.[22] Our findings suggest that the school administration should facilitate the faculty to improve their knowledge pertaining to the latest advancements in educational methodologies as well as clinical and research skills in their fields of specialisation. Equipping the faculty with the latest knowledge and skills has become a vital component of medical and dental education, and is even considered more important than improving lecture halls, laboratories and clinics.

The students were clearly dissatisfied with the available mechanism of academic advising at the college (3.00+0.086). Factually, advisors do exert significant impact on the performance of students.[23] The academic advising process is mainly expressed in terms of roles such as advisor, partner, evaluator and trainer.[24] The low score recorded in the study reveals that although advisors may have a great potential to accomplish this task, sometimes they do not perform this job as they should. This leads to poor students' performance.[25] Literature reveals that the students' CGPA is greatly influenced by the advisors' contact, communication intensity and membership in campus organisation though the impact of faculty contact significantly varied between the male and female students.[26] Certainly, academic advising has a massive potential for improvement in the college.

The support services and learning resources had the lowest mean score among the four factors (2.465+0.091). Both male and female students were dissatisfied with the support. This is because campuses are located in small and

congested areas with too little space to meet the demands of the increasing number of students. However, this and other such issues are likely to be resolved with the completion of the new dental hospital and female students' campus in a couple of years. These new projects are going to be equipped with libraries, smart rooms, computer labs, specialized clinics, restaurants, recreation areas and new parking. All these areas seem to have universal applications as reported in other studies.[27-30]

The outcome of the present study should serve as guiding baseline data to help the academicians, administrators and policy-makers in raising competent professionals in the field of dentistry.

Conclusions

Within the limitations of the present study, it does show that faculty and learning resources significantly influence students' performance. However, the curriculum and academic advising had non-significant effect on performance in the present study. Besides, there were significant variations in responses of male and female students in relation to all the four factors, particularly in relation to learning resources. A self-assessment process should be adopted at the college for all students at all levels on a regular basis to monitor performance of each educational factor. Changes incorporated in the light of such a feedback is likely to have a positive impact on the performance level of the students.

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