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Medical courses need to be tailored for dental students

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ABSTRACT

Objective: The purpose of this study was to determine the efficiency of medical education at the dental schools from the perspective of dental students. **Methods:** A questionnaire was distributed to the fourth and final year students at five different dental schools from different geographical regions in Turkey. The satisfaction of 443 dental students with the quality of medical education together with students' perspectives on the ways to enhance the quality of curriculum was ascertained. **Results:** Of the students, 17.4% hold an opinion that they received satisfactory overall biomedical science education. Over half disagreed that biomedical science topics were not integrated with clinical cases. Around one in every three students felt that lecturers were not focused on oral/dental related topics and were underrating dental students. The highest satisfaction was gained on the head and neck anatomy; the least satisfaction was obtained by biochemistry (scores of 5.3 and 3.3 on a 10 point scale, respectively). Over half of the students disagree that the education on the other medical disciplines and on the management of possible emergency conditions were good quality. The most common suggestion given by students for a better education was biomedical science and medicine teaching given in a more relevant way to clinical setting. **Conclusion:** The findings of this study indicate that biomedical science teaching should be more 'tailored' to the needs of dental students who appear to appreciate a curriculum placed in a clinical perspective with an emphasis given to oral health needs.

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INTRODUCTION

In Turkey, foundation of formal dental education dates back to 1908 as an auxiliary division of the medical school in Istanbul. Until that time, dentistry was mainly practiced by quacks or barbers who hold a special permit to practice the profession. In 1933, the length of dental education was increased from 2 years to 4 years. Later on in the 1960's few other dental schools were established to run a 5 year course that become autonomous from the medical schools in the following decade [1]. Since then there has been a tremendous progress in the practice of dentistry and dental education, shaping today's up-to-date dental curriculum. Currently, there are 30 dental schools

all around the country and 12 others are in the progress of initiating dental education.

Upon graduating from the high school, entrance to all Turkish University programs is through undertaking a centrally administered Nation-wide University entrance examination. Dental and medical schools are among the hardest to get in, and the entrance examination is chiefly composed of natural sciences. Therefore, dental students' are regarded having sound knowledge on biology, physics, and chemistry. The first 3 years of the curriculum in dentistry is composed of basic biomedical subjects (such as biochemistry, anatomy, physiology, and pharmacology,) as well as dental subjects. Dental students' have

hands on clinical experience in the 4th and 5th years, wherein half of the time is devoted to clinical internship, and the other half is on didactic course. Clinical medicine subjects (such as internal medicine, general surgery, and otolaryngology) were taught in the 5th (final) year. Biomedical science courses are usually delivered by academic personnel from institutes of biomedical science that are affiliated to medical schools. Nevertheless, in the majority of dental schools, students take the biomedical science courses independently from the medical students.

In the past, dentists were mainly regarded as highly skilled technical health care providers for the restoration of dentition. However, this concept has been shifting to dental practitioners who are responsible for oral health, which can't be considered independent of general body health. It was estimated that in the year 2050, the individuals over 60 years of age will hold the 21% of the world population [2]. That means dental practitioners will face the challenge of providing optimum oral health to increased elderly population many of whom will survive with multiple organ diseases and/or will be receiving a variety of medication that interfere with the dental treatment [3]. What is more, advances in biomedical sciences and technologies have also been making their way into all aspects of dental practice changing traditional diagnosis, risk assessment and treatment approaches [4,5]. The examples include the use of saliva kits for the risk assessment of caries and periodontal diseases, routine use of implant surgery and use of computer and imaging technology for orthodontic treatment. Therefore, graduation of well-equipped dental professionals with a sound knowledge in biomedical science and medicine who will effectively use interdisciplinary research findings to solve clinical problems and apply new technological advances to oral health environment is becoming even more important than it was in the past [5,6]. Current literature emphasizes the need to reshape the traditional dental education to accentuate biomedical science, internal medicine and surgery relevant to dentistry in dental curriculum [3-10]. In addition, a study performed at the University of Birmingham demonstrated that dental students' generally consider oral biology subjects necessary and fundamental for dentistry and dental education [11]. Martínez-Alvarez *et al.* showed in their survey that only half of the deans and heads of basic science departments/units in dentals schools in Southern Europe (including France, Spain, Portugal, Italy, Greece and Malta) were satisfied with the basic science education that their students' receive, saying that in general there was a poor coordination between the basic medical science subjects and the other subjects in the dental curriculum [12].

In the present study, the efficiency of medical education (i.e., biomedical science, other interrelated disciplines of medicine and medical emergencies) in selected dental schools in Turkey was determined from the perspective of the senior dental students'. In addition, opinions of dental students' on the enhancement of medical education in dentistry were gathered.

Study Design

This study was reviewed and approved by the Institutional Review Board at the Suleyman Demirel University.

The efficiency of medical education as part of a dental curriculum was investigated from the perspective of dental students'. Students' who completed the courses where their opinion was asked for and, those who have been actively exposed to clinical settings were included into the study. Therefore, "preclinical" students' were excluded from the study.

First inclusion criterion was having been actively exposed to clinical settings. A questionnaire form was distributed to the 4th and final year students' at the end of the academic year in five dental schools from different geographical areas in Turkey (Suleyman Demirel, Cumhuriyet, Istanbul, 19 Mayıs and Ataturk University). The students' were reminded that participation was voluntary, and responses would remain anonymous.

The questionnaire form consisted of four parts. The first part included items related to the quality of curriculum and facilities provided and the attitude of the tutors in biomedical science courses. A five level Likert-type scale was used (response options ranged from 0 = strongly disagree to 4 = strongly agree). A visual analogue scale (VAS) was used in the second part to ascertain students' satisfaction level with each specific biomedical science course. Third part, aimed at final year students, included items related to education on interconnected medical disciplines and confidence in the management of medically complex cases and medical emergencies (using a five level Likert-type scale). Finally, students' were asked to provide feedback on how to enhance the quality of basic medical science and medicine courses in their dental school in an open-ended written format.

RESULTS

Of 966 students, 443 were participated in our study. Therefore, a participation rate of 46% was achieved. Although 279 (63%) respondents were from the 4th year and 164 (37%) were from the final year; 251 of the participants were female (56.7%), and 192 were male (43.3%). The distribution of the respondents by the dental schools they attend is as follows: 90 from Cumhuriyet University, 96 from Suleyman Demirel University, 100 from Istanbul University, 62 from 19 Mayıs University and 95 from Ataturk University.

While 39.5% stated that they attended the courses regularly, 46.3% attended the course less regularly and 15.2% rarely attended the courses.

Of the students, 17.4% hold an opinion that they received satisfactory overall biomedical science education. When areas related to curriculum and facilities were analyzed, 29.8% strongly disagree/disagree that the course hours were long enough, 49.2% stated that they had poor laboratory facilities. Although 55.5% strongly disagree/disagree that interactive learning was sufficiently

integrated in their syllabus, 61.9% strongly disagree/disagree that clinical cases were incorporated into biomedical science topics. Around one in every three to four students' felt that tutors were not focused on oral/dental related topics, unresponsive to and underrating dental students' [Table 1]. Table 2 demonstrates the satisfaction level of education achieved in each course on a 10 mm VAS. In general, below average scores were achieved. The highest satisfaction was gained on the head and neck anatomy, the least satisfaction was obtained in biochemistry (scores of 5.3 and 3.3, respectively).

Over half of the students' strongly disagree/disagree that the education on the other medical disciplines and on the

management of possible emergency conditions were of good quality. On the other hand, only 39.8% lacked confidence in managing complex medical conditions during dental treatments and 46.3% felt incapable of managing potential emergency situations [Table 3].

The distribution of perceived quality of education regarding biomedical course facilities, curriculum, and attitudes of tutors and regarding medicine relevant to oral health and emergency medicine for each dental school was presented in Figures 1 and 2. The distribution of satisfaction with specific biomedical courses for each dental school was given in Figure 3.

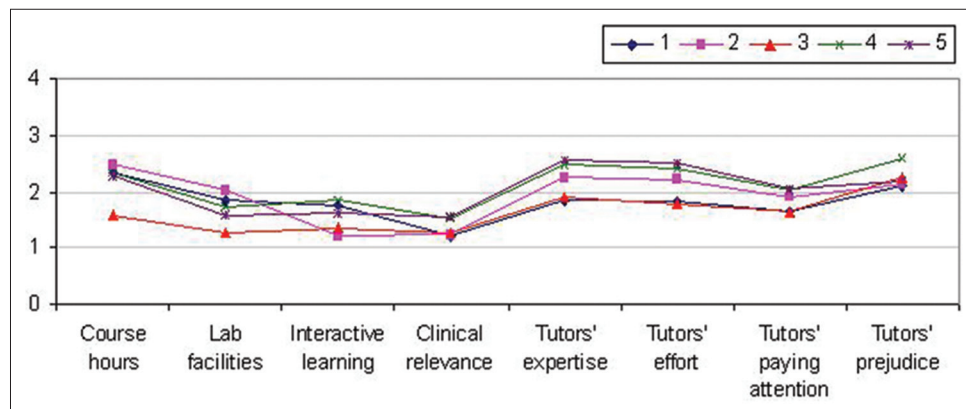


Figure 1: Distribution of perceived quality of education regarding course facilities and curriculum and attitudes of tutors for each dental school coded with numbers. (1) Cumhuriyet University, (2) Suleyman Demirel University, (3) Istanbul University, (4) 19 Mayıs University, (5) Ataturk University

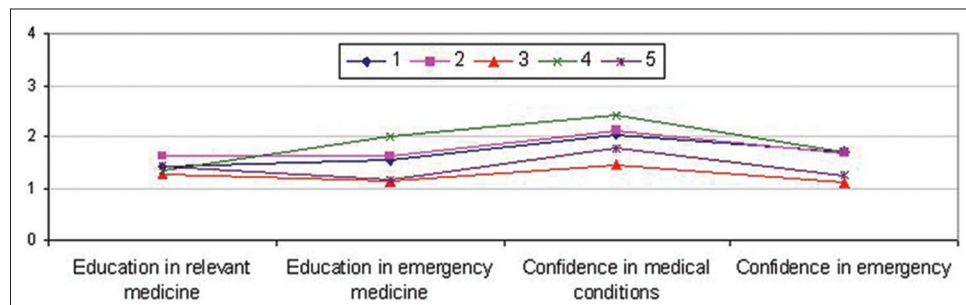


Figure 2: Distribution of perceived quality of education regarding courses on relevant medicine and emergency medicine for each dental school coded with numbers. (1) Cumhuriyet University, (2) Suleyman Demirel University, (3) Istanbul University, (4) 19 Mayıs University, (5) Ataturk University

Table 1: Students' opinion in relation to basic medical science education they received in pre-clinical years. The values expressed as percentages as well as mean±SD

	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Mean±SD
Generally good biomedical science course	12.9	38.4	31.4	15.1	2.3	1.6±1.0
Items related to facilities and curriculum						
Sufficient course hours	6.1	23.7	22.8	40.6	6.5	2.2±1.1
Sufficient lab facilities	14.0	35.2	21.7	26.0	2.9	1.7±1.1
Course utilizes interactive learning	21.0	34.5	17.8	24.4	2.3	1.5±1.1
Course relevant to clinical cases	19.0	42.9	24.2	12.4	1.6	1.3±1.0
Items related to attitude of the tutors						
Knowledgeable on dental topics	5.6	19.9	29.8	40.0	4.5	2.2±1.0
Making an effort to be understood	6.5	21.7	29.3	37.2	5.2	2.1±1.0
Taking dental course serious	9.9	27.3	33.2	28.2	1.4	1.8±1.0
Prejudiced against dental students'	8.4	20.5	21.0	40.0	10.2	2.2±1.1

SD: Standard deviation

Responses of students' in their own words to enhance the quality of basic medical science courses were given in Table 4. The students' most common complaint was that course contents exhaustively covering the whole body systems with little concern on head and neck region and oral health. The most common suggestion was the integration of biomedical science into clinical practice in general, but more specifically into oral health.

DISCUSSION

We believe it is the students' right to demand for the optimal professional training and to express opinion in their education.

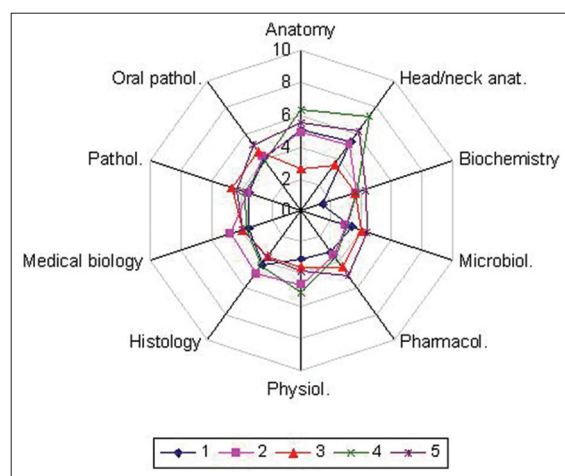


Figure 3: Distribution of satisfaction with specific biomedical courses for each dental school with numbers. (1) Cumhuriyet University, (2) Suleyman Demirel University, (3) Istanbul University, (4) 19 Mayıs University, (5) Ataturk University

Table 2: The mean $\pm$ SD of students' satisfaction level with each specific biomedical course measured with a 10 mm VAS

Biomedical course	Mean $\pm$ SD
Biochemistry	3.3 $\pm$ 2.3
Microbiology	3.6 $\pm$ 2.2
Medical biology/genetics	3.9 $\pm$ 2.4
Pharmacology	4.0 $\pm$ 2.3
Physiology	4.0 $\pm$ 2.3
Histology and embryology	4.1 $\pm$ 2.5
General pathology	3.9 $\pm$ 2.5
Oral pathology	4.4 $\pm$ 2.7
Whole body anatomy	4.7 $\pm$ 2.6
Head and neck anatomy	5.3 $\pm$ 2.8

VAS: Visual analogue scale, SD: Standard deviation

A comprehensive study elicited the perspectives of 605 dental students from 20 dental schools in North America about the quality of their educational program in general using a strengths, weaknesses, opportunities, and threats analysis [13]. Dental students' were positive overall about their learning experiences in dental schools, but identified several areas that appeared weakness of their dental education including disorganized and inefficient clinical learning environment; teaching and testing that focus on memorization; lecturers/instructors who exhibited poor teaching methods and/or poor attitudes; and inconsistency among lecturers/instructors during evaluation of student performance. Students' desired a well-organized and efficient curriculum with the best possible clinical experience and a training that is up-to-date about clinical techniques and technology, which is provided by faculties who have an interest in the students' welfare.

Ideally dental education should not only cultivate technically skillful dentists but also graduate physicians with an understanding of biomedical science and medicine at a fairly high level to manage patient's oral health needs. Thus, besides technique-oriented clinical dentistry courses, biomedical science that provide students the scientific basis for the clinical treatment of patients and related medicine courses take up an essential part of dental education. Therefore, the present study analyzed the opinion of dental students particularly on the quality of biomedical/medical teaching in their curriculum. It was disappointing that only 17.4% of the students' participated in our study agreed that the biomedical/medical science they received was in good quality.

The most pronounced dissatisfaction with the biomedical science course was that the course content being disengaged with and unrelated to oral health and oral diseases. Similarly, Kristensen *et al.* reported that Danish dental students' were in general happy to learn about the whole human body and health sciences, but they wanted to have these courses specifically relevant to dental context [14]. In addition, one of the common criticisms of our students' was that didactic teaching in early years was too condensed which allowed little time to digest the accumulated information. Retention of basic science knowledge as well as acquisition is an essential requirement for medical and dental students' to integrate the knowledge into clinical practice. A curriculum connecting basic science to clinical needs would encourage students' to appreciate biomedical science better. Furthermore, rather than memorization of the facts they would develop critical thinking skills to address problems they may face in their future clinical

Table 3: Final year students' opinion in relation to education together with their confidence on medically-related conditions and emergency medicine

	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Mean score $\pm$ SD
Good education in other relevant medical specialties	14.6	51.2	18.9	14.0	1.2	1.4 $\pm$ 0.9
Good education in emergency medical conditions	14.0	37.8	20.7	20.7	6.7	1.7 $\pm$ 1.1
Perceived competence in complex medical conditions	8.5	21.3	29.9	37.8	2.4	2.0 $\pm$ 1.0
Perceived competence in medical emergencies	12.8	33.5	32.3	19.5	1.8	1.6 $\pm$ 1.0

The values expressed as percentages as well as mean $\pm$ SD

Table 4: Some of the common complaints and suggestions made by students'

Complaints	
We are presented with a bulk of idle knowledge relating to the other parts of the body yet insufficient knowledge specifically on head and neck region and oral health	
Too much info condensed in a short time and so is forgotten in a short time	
At first, the tutors should, themselves, accept the fact that biomedical science courses are necessary for the dental students as much as it is for medical students'	
Tutors from the other medical branches constantly belittling us which makes me feel worthless and discourages me attending the courses	
Suggestions	
The biomedical science should be integrated into oral health situations	
Relevant clinical examples should accompany the theoretical biomedical information in the preclinical years; clinical situations should be supported by related background theoretical information in the clinical years	
The lectures should be presented in a more figurative way rather than monotonous verbal speeches	
More interactive teaching should be organized	

practice. This would also overcome the dissolution of unrelated/unused knowledge learnt in preclinical courses by time. Dennis suggested that clinical correlations should be included in the basic science courses starting from the very first lecture on the very 1st day of the course [7]. Problem based learning (PBL) may be a useful tool to achieve this goal. Nevertheless, a study performed at the University of Liverpool showed that overall knowledge recall in the basic science by dental students on PBL or conventional didactic courses did not differ [15]. In addition, dental students' were shown to prefer teacher-centered learning rather than student-driven and research-based learning approaches [11]. From the other perspective Scheven claimed that continued learning of oral biology during clinical years and close integration of the basic sciences with clinical training and/or having research-based activities at a later stage in the dental curriculum may enrich dental education [11].

In dental curriculum, while dental faculty teaches technique-based clinical courses, non-dental faculty often teaches the science/medicine courses. Dental pre-clinical curriculum includes many of the same courses as the medical schools have and the same instructors affiliated with a medical school generally give the courses. However, dental students' participated in our study expressed their concern on being discouraged by biomedical science lecturers who make constant statements that dental students' will not need the biomedical knowledge in their profession as much as the medical students'. One would expect that fully integrated curriculums where dental and medical students' receive basic medical science courses in the same class would solve the problem of discrimination of dental students'. However, in a survey, those students' who attended basic science curriculum with medical students' as a combined class felt that although the combined course prepared them as a better health care professional working with patients with a variety of medical problems, they were sometimes treated as "second-class citizens." One of the narration was "We are continuously belittled and put down by medical students and tutors who seem to think that dental students' have a hard

time with the medical curriculum even though our averages are comparable to theirs" [13]. Although do not seem practical, Kerosuo *et al.* asserted that merging dental and medical students' in a group without the teachers' awareness enables dentistry as an equal partner with medicine and not as a "little brother" [16]. Moreover, one in every four dental students' believed that instructors had inadequate background on related dental/oral topics. It appears that the basic science tutors must have a better idea of why their subject matters to oral health. This may require an academic program coordinator to assure cooperation between dental faculty and biomedical science faculty to shape the scope and content of the biomedical science didactic material. A peer evaluation of basic science courses by clinical faculty (and vice versa) was also suggested by Dennis in 2010 [7].

Students' included in the present study rated higher scores of satisfaction with oral pathology and head and neck anatomy compared with general pathology and anatomy. This may be due to the additional teaching in oral pathology and head and neck anatomy given in the oral diseases and oral maxillofacial surgery courses during clinical years. Nonetheless, it seems that students' can comprehend tangible subjects (such as anatomy) more easily than intangible subjects like biochemistry. Therefore, theoretical subjects should be presented in a more figurative and, relevant way to clinical scenarios. Interrelation of the each biomedical science should also be displayed with clinical examples such as portrayal of an oral pathology together with microbiology, biochemistry and pharmacology connotations.

Our results also showed that teaching of the other branches of medicine that have a connection with oral health such as otolaryngology, plastic surgery and internal medicine needed improvements. Only 15.2% satisfied with the education on other branches of medicine related to oral health. In 1995, Institute of Medicine in its report called for a reform of dental education for closer integration of dentistry with medicine [10]. To take one step further, several authors advocated that dental education should be merged with medical education for dentistry to become a specialty of medicine, under the name of oral medicine and for dentists to be educated as oral physicians [3-9]. Until radical changes made in dental education, some modifications may sparkle the quality of medicine training in dental education. The emphasis on essential medical material presented to dental students' should be reinforced to enhance the dental student's medical perspective. The solutions for a better education in medicine would also involve exposure of dental students' to hospital environments that requires protocols made with medical hospital directors for the internship of dental students'. This includes participation of dental students' in hospital-based dental activities such as operating room dentistry/oral surgery as well as internship in other relevant disciplines for the care of outpatient and hospitalized patients and emergency room work.

One of the limitations of the study was that the participants were restricted to students' only hence the results may be biased in favor of the students' perspective. In addition, students' are not in the position to have an expert opinion on the optimal course content. Further studies are, therefore, warranted, including the faculty members specialized in

clinical dental profession as well as faculties in biomedical science and other clinical medicine disciplines who have long experience in practice and are able to define the shortages in biomedical and medicine teaching in an active way.

The findings of this study indicate that biomedical science teaching should be more “tailored” to the needs of dental students’ who appear to appreciate a curriculum placed in a clinical perspective in general and with an emphasis given to oral health needs. The lecturers/instructors in biomedical science who are based in the medical school and have no dental background would not be able to estimate the true needs of the dental students’ from the biomedical information. One of the strategies to improve the quality of biomedical science education for dental students’ would be familiarizing these lecturers/instructors with the dental field. Orientation of the instructor would require sufficient dental knowledge to integrate his specialty with the dental field. Another strategy would be that the courses of biomedical sciences in the dental schools are taught by dentists specialized in biomedical fields. The pros and cons of the two strategies should be discussed by the academic program administrators in dental and medical schools to make modifications to increase the quality of biomedical science and medicine courses in the dental curriculum.

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