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Evaluation of the Achievement of Educational Objectives Program of Mashhad Dental School from the Perspective of Basic Science Students

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Abstract

Aim: The present study was designed to investigate the degree of achievement of the educational goals of Mashhad Dental School's educational program from the perspective of basic sciences students in the academic year 2018-2019. By examining the current situation, it is possible to improve the educational quality of the program.
Methods: To measure the achievement of educational goals, a checklist and a questionnaire were prepared based on the educational headings in the dental education regulations approved by the Ministry of Health and Medical Education and approved by the School of Dentistry. After classification, the desired information was evaluated descriptively using SPSS-20 software and the chi-square statistical test. $P<0.05$ was considered significant.
Results: Significant differences did not exist between the two sexes regarding the achieved goals, except for the dental material basics course. The achieved goals were not significantly different between the students with "A "average score and other students in any of the courses. Also, significant differences were not found in any courses in the realized goals between students with different interests in the field of dentistry.
Conclusion: Fulfillment of educational goals is lower in the less applicable courses for the field of dentistry in the basic sciences, which indicates the necessity of curriculum revision to achieve higher quality education.

Keywords: Dentistry, Education, Evaluation, Attitude

Background

According to the report of the World Federation of Medical Education, an inordinate increase in the number of medical education centers has occurred around the world during the last two decades. Similar to other countries, the number of medical education centers, has been growing rapidly in Iran in recent years (1-3). The increase in the number of medical education universities, and the subsequent growth in the number of students, will lead to an increase in the workforce and improved access to medical care at the community level, which is considered a positive situation. However, increased number of students has led to insufficient attention to the quality of education. This has prompted officials and policy-makers to make changes related to the structure, mission, goals, functions, and

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practices of the education system (4-6).

universities research centers, including universities, play central role in the growth and development of societies. Therefore, improving the quality of education in universities leads to the achievement of development goal. Hence, the third social-cultural and economic development law of our country is regarding improving the quality of universities (5). Higher quality education requires identification of the strengths and weaknesses of education, and strive to achieve the desired goals. In order to change the medical education system to achieve its goals, there is a need for continuous evaluation of the training program. In fact, improving the quality of education requires an appropriate evaluation mechanism (7, 8).

The purpose of educational goals is to designate precise educational processes for learners to accomplish. In fact, the goal of educational activities is to develop awareness and potential human abilities. There is no doubt that the goals of the educational system can change according to the changing conditions of time and place. Also, the cultural and political situation of a society has a significant effect on these goals. In addition, as mentioned, conditions change gradually, it is necessary to adjust the educational goals according to these changes. For this purpose, the needs of the society should be evaluated continuously at intervals, and the goals of the educational system should be revised in order to meet the needs of individuals and the society (9- 11).

Educational processes become useful when the desired goals are achieved during or after training. Receiving information about the quality of the program and the degree of success and usefulness of training requires evaluation. Through evaluation, it is possible to make judgments about educational programs and to implement the program, continue education, or modify and make necessary changes. This process has been increasingly expanded in the education systems of the world in recent years, and along with quantitative development, much attention has been paid to qualitative evaluation in higher education centers. Measuring various skills of students is an important indicator to show their learning ability (9-11).

Evaluation informs the teacher if his teaching activities need to be revised. It also informs the students of their educational activities. Another advantage of evaluation is to determine the value of the program itself regarding issues such as validity of attainable goals, choosing the best and content, and providing goals and objectives.

During evaluation, knowledge, skills, educational processes, and professional values should be examined. In any type of evaluation, educational values should be maintained, and the realization of desirable academic goals should be considered. The present study was to investigate the degree of achievement of educational goals of Mashhad Dental School's educational program from the perspective of basic sciences students in the academic year 2018-2019. This, in turn, will assist in improving the educational quality of the program and allow for better designing and preparation.

Methods

To measure the achievement of educational goals, a checklist and a questionnaire were used, which were prepared based on the educational topics contained in the dental education regulations approved by the Ministry of Health and Medical Education and approved by the Faculty of Dentistry. In order to standardize the questions, in each subject, questions were used that were previously evaluated and had an appropriate discriminant coefficient and difficulty factor. The face validity of the questionnaire was confirmed by professors of Mashhad Dental School who had at least five years of teaching experience, and its reliability was also confirmed by statistical tests (test-retest). CVR and CVT indices were used to check the validity of the questionnaires, which were obtained as 0.89 and 93, respectively. For the reliability of the questionnaire, the test-retest method was used, and the ICC index for the questionnaire was 0.94. Internal consistency of the questionnaire was evaluated using the Cronbach alpha of 0.83, which confirms the reliability of the questionnaire.

The questionnaire used in this study included two parts. The first part contained questions related to the students' profiles, and the second part contained questions related to basic sciences courses. After stating the importance of the issue and assuring confidentiality, the forms were distributed and completed electronically. After receiving the forms, the completion of all the different parts was first assessed. SPSS-20 software (Chicago, USA) was used for statistical analysis. In order to determine the students' attitude, each question was divided into two categories: realized (very high, high, and medium) and unrealized (low and very low).

Quantitative variables were described by means and standard deviations, and qualitative variables were described by frequency and percentage. The t-test was used for comparison of quantitative variables between the two groups and ANOVA for

the three groups. The correlation of qualitative variables was checked by the Chi-square test, and the correlation of quantitative variables was checked by the Pearson correlation test. All tests were two-sided, and the significance level was less than 0.05.

Results

In this study, the degree of achievement of the objectives of the educational program of Mashhad dental school was investigated from the point of view of 143 basic sciences students. In 2017, 48.3% (98 students) and in 2018, 51.7% (84 students) entered the study. Those with an average grade of "A" were 22.4% (32 students), and 77.6% (111 students) had an average grade of non-A.

Basic sciences courses questions

The number and percentage of each of the answers given to the questions about basic sciences courses are given in Table 1. In questions 1, 3, 4, 6, 7, 13, and 16, the highest frequency was related to the low-achieved objectives, and in other questions, the highest frequency was related to the medium-achieved objectives. Assuming that medium, high, and very high-achieved items are considered as fulfilled, and low and very low-achieved items as unfulfilled. Figure 1 has been drawn in order to better understand the amount of realization of the goals of the dental education.

As can be seen in this graph, in the subjects of computer, parasitology, anatomical sciences, community oral health, psychology, physiology, dental equipment, and nutrition in health, the achievement rate of the goals of the dental education program was below 50%, and the lowest achievement rate was related to dental equipment (6.3%). In other courses, the rate of achievement of the objectives of the dental education program was more than 50%, and the highest rate of achievement was related to the biochemistry course, with 75.5%.

Table 1. The number (percentage) of answers to questions related to the basic dental science course

	Question	Very little	Low	Medium	Much	Very much
1	To what extent have you familiarized yourself with the computer and its application in dentistry in the course of basic science?	46(32.2)	66(46.2)	23(16.1)	8(5.6)	0(0)
2	To what extent are you familiar with the local tissue changes of the oral cavity and other organs of the body, independently or in connection with systemic diseases and the compatibility of these changes and their application in clinical practice, prognosis and treatment of lesions?	21(14.7)	48(33.6)	54(37.8)	18(12.6)	2(1.4)
3	To what extent have you acquired the scientific knowledge and practical skills necessary to understand human anatomy in the course of basic sciences?	7(4.9)	52(36.4)	49(34.3)	31(21.7)	4(2.8)
4	To what extent have you gained knowledge in the course of basic sciences about the parasitic and fungal diseases that cause lesions in the mouth and mucous membrane, as well as the parasitic infections that may be transmitted by the dentist to the patient or that he/she himself/herself may be infected with?	28(19.6)	70(49.0)	40(28.0)	2(1.4)	2(1.4)
5	To what extent have you learned about the human immune system in the course of basic science?	13(9.1)	54(37.8)	61(42.7)	14(9.8)	1(0.7)
6	To what extent have you learned the cellular and microscopic structure of the human body in the course of basic science?	64.2)	66(46.2)	50(35.0)	21(14.7)	0(0)

7	To what extent have you become familiar with health and treatment organizations and medical education in Iran and international health organizations in the course of basic sciences?	8(5.6)	64(44.8)	51(35.7)	20(14.0)	0(0)
8	How much in the basic science course h ave you gained knowledge about the structure of the body in terms of biochemistry?	2(1.4)	33(23.1)	73(51.0)	35(24.5)	0(0)
9	To what extent have you learned the stages of human embryo development in the course of basic science?	16(11.2)	36(25.2)	71(49.7)	18(12.6)	2(1.4)
10	To what extent have you learned about the personality development and growth of children and adolescents and the factors that cause psychosomatic diseases in the course of basic science?	24(16.8)	49(34.3)	59(41.3)	11(7.7)	0(0)
11	To what extent have you learned about the phenomenon of heredity (genetics) in humans at the family and population level in the course of basic sciences?	12(8.4)	49(34.3)	64(44.8)	17(11.9)	1(0.7)
12	How much have you learned in the course of basic sciences of medical physics and its connection and application in medicine and dentistry?	7(4.9)	60(42.0)	61(42.7)	14(9.8)	1(0.7)
13	To what extent have you learned about the operation cells, organs, body and their relationship with each other (physiology) in the course of basic science?	19(13.3)	70(49.0)	45(31.5)	7(4.9)	2(1.4)
14	To what extent have you become familiar with the structure of microorganisms and their relationship with common oral and dental diseases (microbiology) in the course of basic science?	12(8.4)	42(29.4)	73(51.0)	14(9.8)	2(1.4)
15	To what extent have you become familiar to the structure of viruses and their relationship with oral diseases in the course of basic science?	10(7.0)	59(41.3)	62(43.4)	12(8.4)	0(0)
16	To what extent have you become familiar with dental tools and equipment and how to use and maintain them in the basic science course?	53(37.1)	81(56.6)	9(6.3)	0(0)	0(0)
17	To what extent have you learned about mental illness and disorders related to dental diseases and their treatment methods in the course of basic sciences?	10(7.0)	55(38.5)	71(49.7)	7(4.9)	0(0)
18	To what extent have you learned about the types of cells and their composition, as well as the natural elements that make up the hard and soft tissues of the teeth, oral cavity, jaws and adjacent tissues?	10(7.0)	52(36.4)	65(45.5)	15(10.5)	1(0.7)
19	To what extent have you become familiar with the types of foods and their impact on public health and dentistry in the course of basic science?	10(7.0)	61(42.7)	62(43.4)	10(7.0)	0(0)
20	To what extent have you been able to use the necessary knowledge of scientific texts in a foreign language in the basic science course?	8(5.6)	60(42.0)	61(42.7)	14(9.8)	0(0)
21	To what extent have you become familiar with infectious and dangerous diseases that are transmitted through blood, saliva, or breathing, as well as the transmission of these diseases from patients to dentists and vice versa in the course of basic science?	16(11.2)	53(37.1)	58(40.6)	15(10.5)	1(0.7)
22	To what extent have you become familiar with the materials used in dentistry and their properties in the course of basic science?	8(5.6)	51(35.7)	60(42.0)	21(14.7)	3(2.1)

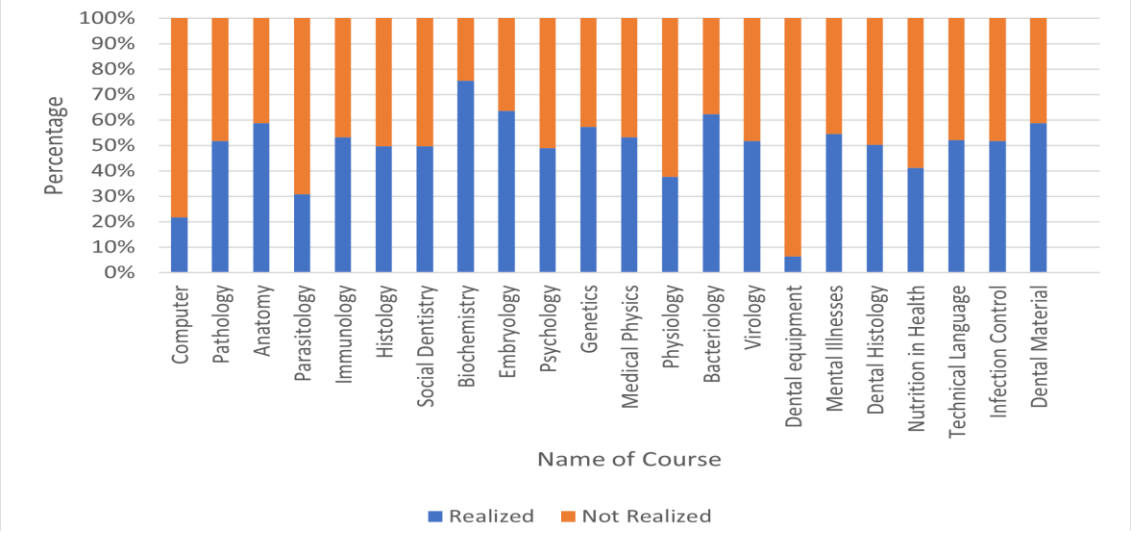


Figure 1: The percentage of achievement of the general goals of the dental education program by each basic science course

In Table 2, the number and percentage of realized educational goals are given according to students' GPA and course name (Table 2). As can be seen, from the point of view of students with non-"A" grades, in 14 lessons (63.6%), the goals of the dental education program has been realized, but in eight lessons (39.4%), more than 50% of the goals of the dental education program have not been realized. While from the point of view of students with a grade "A" average, in only nine courses, 50% or more than 50% of the objectives of the dental education program have not been realized. In all the courses, there was no significant difference between the students with an average grade of "A" and the rest of the students in terms of realizing the dental education program.

Table 2. Comparison of the achievement of the general goals of the dental education program between students with average grade "A" and the rest of the students

Name of Course	Non-A grade		A grade		Chi-square
	Realized	not realized	Realized	not realized	
Computer	21(18.9)	90(81.1)	10(31.3)	22(68.8)	χ2=2.22 p=0.136
Pathology	57(51.4)	54(48.6)	17(53.1)	15(46.9)	χ2=0.03 p=0.860
Anatomy	62(55.9)	49(44.1)	22(68.8)	10(31.3)	χ2=1.70 p=0.192
Parasitology	36(32.4)	75(67.6)	8(25)	24(75)	χ2=0.64 p=0.422
Immunology	59(53.2)	52(46.8)	17(53.1)	15(46.9)	χ2=0.00 p=0.998
Histology	55(49.5)	56(50.5)	16(50)	16(50)	χ2=0.00 p=0.964
Social Dentistry	57(51.4)	54(48.6)	14(43.8)	18(56.3)	χ2=0.57 p=0.449
Biochemistry	84(75.7)	27(24.3)	24(75)	8(25)	χ2=0.01 p=0.938
Embryology	70(63.1)	41(36.9)	21(65.6)	11(34.4)	χ2=0.07 p=0.791
Psychology	56(50.5)	55(49.5)	14(43.8)	18(56.3)	χ2=0.45 p=0.504
Genetics	61(55)	50(45)	21(65.6)	11(34.4)	χ2=1.16 p=0.282
Medical Physics	62(55.9)	49(44.1)	14(43.8)	18(56.3)	χ2=1.46 p=0.227
Physiology	42(37.8)	69(62.2)	12(37.5)	20(62.5)	χ2=0.00 p=0.972
Bacteriology	70(63.1)	41(36.9)	19(59.4)	13(40.6)	χ2=0.14 p=0.705
Virology	59(53.2)	52(46.8)	15(46.9)	17(53.1)	χ2=0.39 p=0.531
Dental Equipment	6(5.4)	105(94.6)	3(9.4)	29(90.6)	χ2=0.66 p=0.415
Mental Illnesses	61(55)	50(45)	17(53.1)	15(46.9)	χ2=0.03 p=0.855
Dental histology	54(48.6)	57(51.4)	18(56.3)	14(43.8)	χ2=0.57 p=0.449
Nutrition in health	48(43.2)	63(56.8)	11(34.4)	21(65.6)	χ2=0.81 p=0.369
Technical language	54(49.1)	56(50.9)	20(62.5)	12(37.5)	χ2=1.79 p=0.181
Infection control	56(50.5)	55(49.5)	18(56.3)	14(43.8)	χ2=0.33 p=0.563

Dental materials	62(55.9)	49(44.1)	22(68.8)	10(31.3)	χ2=1.70 p=0.192

Table 3 shows the number and percentage of realized educational goals by sex and subject name. As can be seen, from the point of view of male students, more than 50% of the goals of the dental education program have not been realized in half of the courses, while from the perspective of the female students, only 50% or more than 50% of the goals of the dental education program have not been realized in eight courses. Only in social dentistry and dental materials courses was there a significant difference between female students and male students in terms of the realization of the dental education program. Hence, in the social dentistry course, the percentage of achievement of educational program goals in males was about 20% more than in females, which was statistically significant (p=0.014). In the course of the basics of dental materials, the percentage of achievement of educational program goals in female students was about 22% lower than male students, which was also statistically significant (p=0.006).

Comparison of the achievement of the general objectives of the dental education program between students with different degrees of interest in the field of dentistry, for each basic sciences course

Table 4 shows the number and percentage of realized educational goals by the degree of students' interest in the field of dentistry and the name of the course. As can be seen, there was no significant difference between students with different interests in the field of dentistry in terms of dental education program realizing in any course.

Table3. Comparison of the achievement of the general objectives of the dental education program between female and male students for each basic science course

Name of course	Female students		Male students		Test result
	realized	Not realized	realized	Not realized	Chi-square
Computer	61(76.3)	19(23.8)	51(81)	12(19)	χ2=0.46 p=0.498
Pathology	40(50)	40(50)	29(46)	34(54)	χ2=0.22 p=0.637
Anatomy	34(42.5)	46(57.5)	25(39.7)	38(60.3)	χ2=0.11 p=0.734
Parasitology	55(68.8)	25(31.3)	44(69.8)	19(30.2)	χ2=0.02 p=0.888
Immunology	37(46.3)	43(53.8)	30(47.6)	33(52.4)	χ2=0.03 p=0.871
Histology	39(48.8)	41(51.3)	33(52.4)	30(47.6)	χ2=0.19 p=0.666
Social Dentistry	33(41.3)	47(58.8)	39(61.9)	24(38.1)	χ2=6.01 p=0.014
Biochemistry	17(21.3)	63(78.8)	18(28.6)	45(71.4)	χ2=1.02 p=0.312
Embryology	30(37.5)	50(62.5)	22(34.9)	41(65.1)	χ2=1.01 p=0.750
Psychology	42(52.5)	38(47.5)	31(49.2)	32(50.8)	χ2=0.15 p=0.696
Genetics	31(38.8)	49(61.3)	30(47.6)	33(52.4)	χ2=1.13 p=0.287
Medical Physics	37(46.3)	43(53.8)	30(47.6)	33(52.4)	χ2=0.03 p=0871
Physiology	51(63.8)	29(36.3)	38(60.3)	25(39.7)	χ2=0.18 p=0.674
Bacteriology	28(35)	52(65)	26(41.3)	37(58.7)	χ2=0.59 p=0.443
Virology	37(46.3)	43(53.8)	32(50.8)	31(49.2)	χ2=0.29 p=0.589
Dental Equipment	74(92.5)	6(7.5)	60(95.2)	3(4.8)	χ2=0.45 p=0.503
Mental Illnesses	33(41.3)	47(58.8)	32(50.8)	31(49.2)	χ2=1.29 p=0.255
Dental histology	39(48.8)	41(51.3)	32(50.8)	31(49.2)	χ2=0.06 p=0.808
Nutrition in health	48(60)	32(40)	36(57.1)	27(42.9)	χ2=0.12 p=0.730
Technical language	38(47.5)	42(52.5)	30(48.4)	32(51.6)	χ2=0.01 p=0.916
Infection control	37(46.3)	43(53.8)	32(50.8)	31(49.2)	χ2=0.29 p=0.589
Dental materials	41(51.3)	39(48.8)	18(28.6)	45(71.4)	χ2=7.48 p=0.006

Table 4. Comparison of the achievement of the general objectives of the dental education program between students with different degrees of interest in the field of dentistry, for each basic science course

Name of course	intensity of interest in the field of dentistry					Test result Chi-square
	Very high	High	Moderate	Low	Very low	
Computer	5(35.7)	6(18.8)	16(23.5)	1(5.6)	3(27.3)	p£=0.264
Pathology	8(57.1)	16(50)	33(48.5)	14(77.8)	3(27.3)	χ2=8.01 p=0.091
Anatomy	9(64.3)	22(68.8)	41(60.3)	8(44.4)	4(36.4)	χ2=5.36 p=0.252
Parasitology	6(42.9)	10(31.3)	16(23.5)	8(44.4)	4(36.4)	χ2=4.38 p=0.357
Immunology	11(78.6)	14(43.8)	39(57.4)	9(50)	3(27.3)	χ2=8.28 p=0.082
Histology	6(42.9)	15(46.9)	36(52.9)	10(55.6)	4(36.4)	χ2=1.68 p=0.794
Social dentistry	8(57.1)	17(53.1)	31(45.6)	9(50)	6(54.5)	χ2=1.02 p=0.906
Biochemistry	7(50)	25(78.1)	54(79.4)	13(72.2)	9(81.8)	p£=0.241
Embryology	8(57.1)	21(65.6)	46(67.6)	11(61.1)	5(45.5)	χ2=2.40 p=0.662
Psychology	5(35.7)	17(53.1)	36(52.9)	7(38.9)	5(45.5)	χ2=2.42 p=0.659
Genetics	7(50)	17(53.1)	41(60.3)	13(72.2)	4(36.4)	χ2=4.39 p=0.362
Medical Physics	3(21.4)	17(53.1)	40(58.8)	10(55.6)	6(54.5)	χ2=6.59 p=0.159
Physiology	3(21.4)	12(37.5)	24(35.3)	11(61.1)	4(36.4)	χ2=5.95 p=0.203
Bacteriology	11(78.6)	18(56.3)	44(64.7)	11(61.1)	5(45.5)	χ2=3.58 p=0.466
Virology	8(57.1)	20(62.5)	31(45.6)	9(50)	6(54.5)	χ2=2.73 p=0.603
Dental Equipment	2(14.3)	1(3.1)	5(7.4)	0(0)	1(9.1)	p£=0.400
Mental illnesses	11(78.6)	20(62.5)	31(45.6)	9(50)	7(63.6)	χ2=6.79 p=0.147
Dental histology	9(64.3)	16(50)	30(44.1)	12(66.7)	5(45.5)	χ2=4.17 p=0.384
Nutrition in health	9(64.3)	12(37.5)	27(39.7)	6(33.3)	5(45.5)	χ2=3.86 p=0.425
Technical language	9(64.3)	14(45.2)	36(52.9)	6(33.3)	9(81.8)	χ2 =7.88 p=0.096
Infection control	7(50)	17(53.1)	38(55.9)	7(38.9)	5(45.5)	χ2=1.87 p=0.759
Dental materials	8(57.1)	17(53.1)	39(57.4)	14(77.8)	6(54.5)	χ2=3.26 p=0.516

p£: Fisher's exact test result

Discussion

In this study, the degree of achievement of the objectives of the educational program of Mashhad Dental School was investigated from the point of view of 143 basic sciences students. In response to questions related to treatment skills, providing health education, conducting research, providing treatment and prevention services, and providing a treatment plan, they evaluated the educational goals as fulfilled.

In response to the question related to the report on the prevalence and occurrence of oral diseases, more than 50% assessed the educational goals as unfulfilled. In the courses of oral diseases, immunology, histology, biochemistry, embryology, genetics, medical physics, bacteriology, virology, oral histology, English language, infection control, and dental materials, educational goals were fulfilled. In the courses of computer, parasitology, anatomical sciences, community oral health, psychology, physiology, dental equipment and nutrition in health, the rate of achieving the goals of the dental education program was below 50%. In any course, there was no significant difference between students with an average grade of "A" and other students in terms of their opinion about the fulfillment of objectives of dental education program.

So far, several studies have been conducted on the improvement of educational programs during clinical restorative (11), orthodontics (12), pediatrics (13), and prosthetics (14) courses in Iran. However, the studies on the students of basic sciences of dentistry were scarce. Due to the importance of basic sciences courses, this study was conducted with the aim of investigating the fulfillment of basic sciences educational goals in Mashhad dental school.

In the study of Gharaei et al. (15), which investigated the education of the Mashhad Dental School; the learners pointed out the poor student-teacher relationship in the basic sciences courses, and from their point of view, students' feedback did not receive enough importance. According to the studies, this can be due to the presentation of topics without considering the status of the students. According to the study of Siabani et al. (16), large number of basic sciences topics, lack of clinical applicability from the students' point of view, and the professors' expectation for accurate learning of the courses, are among the factors of dissatisfaction in learning these courses.

than 78% satisfaction. In the mentioned studies, the target population was medical intern students. It seems that if community oral health materials are presented in an applied manner and students participate in the topics presented, interest could possibly increase, and educational goals could be achieved (15).

It seems that many of the courses presented during the basic sciences for dental students were not according to their application in the future, and this can decrease interest, learning, and failure to achieve educational goals. One of the important factors in increasing students' motivation to learn university courses is the necessity of learning these courses to perform future tasks. The neglect of clinical teachers from the theoretical foundations of courses may lead to a deepening of the gap between basic sciences courses and clinical courses (20).

In Ahangari et al.'s study (21), anatomy courses were the most practical and biochemistry courses were the least practical according to the students. Heydari et al. (20) also stated that pharmacology, anatomy and English language courses were the most practical and biochemistry and medical physics were the least practical. It should be noted that according to the latest educational program of Mashhad dental school, the courses of pharmacology and dental anatomy were removed from the basic sciences. Therefore, they were not investigated in this study.

Conclusion

In this study, in the subjects of computer, parasitology, anatomical sciences, community oral health, psychology, physiology, dental equipment, and nutrition in health, the rate of achieving the goals of the dental education program was below 50%. As it seems, the fulfillment of educational goals is lower in the less applicable courses for the field of dentistry in the basic sciences, which indicates the necessity of curriculum revision to achieve higher-quality education.

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