

### Evaluation of teaching through lecture with new methods of student-centered teaching in medical students

**Background:** Research about teaching methods and students' education is an important subject which can improve the quality of education. This study was performed to compare three educational methods: teaching through lecture, presentation by small group of students, student's search and study of topics before the class.

**Methods:** This quasi-experimental study was conducted on 42 students' of 5<sup>th</sup> semesters of basic science course, in Mashhad faculty of medicine. In order to compare the learning outcomes, usefulness and clarity of subjects, similar three subjects were selected from health education sessions and presented with one of the three methods. Descriptive examinations of the most important entries were taken with a similar structure at the end of each session. The collected data was analyzed by using SPSS 11.5 software and statistical tests of repeated measurements, McNemar and Spearman correlation.

**Results:** Mean of exam scores, in method of study before the class was the highest and after that students' presentation was more than the lecture ( $P < 0.001$ ). The frequency of students who had great interest in students' small group presentation, search and study before class was more than lecture method ( $P = 0.02$ ).

**Conclusion:** Interest rate and student exam scores in student-centered teaching methods were more than the lecture by the teacher. This study showed that students' active role in teaching process can provide a better outcome and higher satisfaction for learners.

**Keywords:** Teaching Method, Lecture, Student-Centered Teaching, Learning, Satisfaction

### مقایسه آموزش پزشکی با روش‌های جدید معارف پزشکی

**توسعه و اهداف:** آن‌ها در مورد روش‌های آموزش پزشکی در دانشگاه‌ها یکی از موضوعات مهم و مهمی است که می‌تواند به بهبود کیفیت آموزش و رضایت دانشجویان کمک کند. این مطالعه با هدف مقایسه سه روش آموزشی: آموزش از طریق سخنرانی، ارائه موضوعات به گروه‌های کوچک دانشجویان، جستجو و مطالعه موضوعات قبل از کلاس انجام شد.

**روش‌ها:** این مطالعه نیمه تجربی بر روی ۴۲ نفر از دانشجویان ترم پنجم پزشکی مشهد صورت گرفت. به منظور مقایسه نتایج آموزشی، میزان اثربخشی، رضایت و قابلیت شفاف سازی موضوع از دیدگاه دانشجویان سه موضوع مشابه از لیست جلسات آموزشی درس بهداشت دانشجویان انتخاب و با سه روش متفاوت ارائه شد. در پایان هر مبحث، امتحان تشریحی با ساختار مشابه از دانشجویان اخذ شد. تحلیل داده‌ها با استفاده از نرم افزار SPSS 11/5 و آزمون‌های آماری اندازه‌گیری‌های متواتر، مک نامار و همبستگی اسپیرمن صورت گرفت.

**نتایج:** میانگین نمرات آزمون در روش مطالعه مبحث قبل از کلاس توسط دانشجویان بالاتر از دو روش دیگر بود و سپس روش ارائه دانشجویی قرار داشت ( $P < 0.001$ ). درصد دانشجویانی که به روش ارائه گروهی دانشجویان و مطالعه پیش از کلاس اظهار علاقه زیاد کرده بودند نسبت به روش سخنرانی بیشتر بود ( $P = 0.02$ ).

**نتیجه‌گیری:** اظهار علاقه و نمره آزمون دانشجویان در روش تدریس دانشجوی محور از روش سخنرانی بیشتر بود؛ به نظر می‌رسد در روش‌های آموزشی که دانشجویان نقش فعالی دارند، یادگیری آنها عمیق‌تر شده و می‌توانند نمرات بهتری کسب نمایند.

**واژه‌های کلیدی:** روش تدریس، سخنرانی، دانشجوی محور، یادگیری، رضایت.

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### مقایسه آموزش در دانشجویان پزشکی به روش سخنرانی و روش‌های نوین دانشجوی محور

**مقدمه:** پژوهش در زمینه نحوه تدریس و آموزش به دانشجویان یک موضوع مهم بوده که نتایج آن می‌تواند باعث بهبود کیفیت آموزش گردد. مطالعه حاضر با هدف مقایسه سه روش آموزشی سخنرانی توسط مدرس، ارائه کنفرانس دانشجویان، جستجو و مطالعه مبحث قبل از کلاس توسط دانشجویان انجام گرفت.

**روش:** این مطالعه نیمه تجربی بر روی ۴۲ نفر از دانشجویان ترم پنجم پزشکی مشهد صورت گرفت. به منظور مقایسه نتایج آموزشی، میزان اثربخشی، رضایت و قابلیت شفاف سازی موضوع از دیدگاه دانشجویان سه موضوع مشابه از لیست جلسات آموزشی درس بهداشت دانشجویان انتخاب و با سه روش متفاوت ارائه شد. در پایان هر مبحث، امتحان تشریحی با ساختار مشابه از دانشجویان اخذ شد. تحلیل داده‌ها با استفاده از نرم افزار SPSS 11/5 و آزمون‌های آماری اندازه‌گیری‌های متواتر، مک نامار و همبستگی اسپیرمن صورت گرفت.

**یافته‌ها:** میانگین نمرات آزمون در روش مطالعه مبحث قبل از کلاس توسط دانشجویان بالاتر از دو روش دیگر بود و سپس روش ارائه دانشجویی قرار داشت ( $P < 0.001$ ). درصد دانشجویانی که به روش ارائه گروهی دانشجویان و مطالعه پیش از کلاس اظهار علاقه زیاد کرده بودند نسبت به روش سخنرانی بیشتر بود ( $P = 0.02$ ).

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**واژه‌های کلیدی:** روش تدریس، سخنرانی، دانشجوی محور، یادگیری، رضایت.

### میثیکل تعلیمی مراکز میں روایتی روش اور اسٹوڈنٹ بیسڈ روشوں کا موازنہ

**بیگ گراؤنڈ:** تعلیمی روشوں کے تعلق سے تحقیقات ایک اہم موضوع ہے جس کے نتیجے میں ہم تعلیمی معیار بہتر بنا سکتے ہیں۔ یہ تحقیق کلاس میں لکچر، اسٹوڈنٹس کانفرنس، اور کلاس سے قبل درسی مواد کے مطالعے کی روشوں میں موازنہ کرنے کی غرض سے انجام دی گئی ہے۔

**روش:** یہ نیم تجربی تحقیق مشہد میڈیکل کالج میں پانچویں ترم کے طلباء پر انجام دی گئی۔ اس تحقیق میں بیالیس طلباء نے شرکت کی۔ یہ تحقیق دوپزار تیرہ میں انجام دی گئی۔ اس تحقیق میں حفظان صحت کے موضوع سے تین مختلف مسائل کو مختلف طریقوں سے پیش کیا گیا۔ ہر کلاس کے بعد طلباء سے ٹسٹ لیا گیا، نتائج کا تجزیہ اعداد و شمار سے کیا گیا۔ اسی طرح سے تجزیے لئے ایس پی ایس ایس سافٹ ویئر بھی استعمال کیا گیا۔

**نتائج:** لکچر کی روش کے متوسط نمرہ کانفرنس اور اسٹوڈنٹ اسٹڈی سے کم تھے۔ کلاس سے پہلے مطالعہ کرنے کی روش کالج کی روش کی نسبت زیادہ طلباء نے خیرمقدم کیا تھا۔ کانفرنس کی نسبت زیادہ طلباء نے کلاس لکچر کو ترجیح دی تھی۔

**سفارشات:** اسٹوڈنٹ بیسڈ روشوں کو طلباء نے زیادہ پسند کیا تھا جس کی وجہ سے یہ ظاہر ہوتا ہے کہ ایسی تعلیمی روشیں جن میں طلباء بھی سرگرم ہوں ان کی تعلیم میں زیادہ موثر ہوتی ہے اور وہ بہتر کارکردگی دکھا سکتے ہیں۔

**کلیدی الفاظ:** روش تدریس، لکچر، سیکھنا، اطمینان، طالب علم مرکز

## INTRODUCTION

Nowadays creativity in improving teaching and learning methods, are highly considered for assessment of faculties' abilities and students' educational needs (1). Selection of appropriate teaching method and applying students' view about strengths and weaknesses of teaching is essential for increasing the learners' motivation and improving the learning process (2). Teacher-centered and student-centered approaches are two major types of teaching approaches (3). Lecture is a traditional teacher-centered method, that placing students in a passive role, and cannot significantly involve learner participation (4). Important elements in active learning are reading, writing, speaking, active listening and giving feedback in lecturing, the teacher has a key role in the teaching-learning process, whereas in student-centered approaches, students take an active role in learning and due to its focus on deep thinking, there is greater emphasis on the use of student-centered approaches (5-7). Combining traditional methods with modern techniques has also been suggested, some studies expressed that pure lecture presentation may produce a minimal effect but if it is combined with other methods such as class or group discussion or teachers' recitation questions answered by students, the learning process will be improved (4).

Failure to selection of the appropriate teaching method, can lead to lower interest in students. In order to educate learners and development of their creativity, recent studies focus on the use of active teaching methods for students (8). It is a long time that the theoretical courses for medical students are mostly taught through the traditional lecture method, but recently, lecture method is much criticized because of its non-accountable for student academic needs, low-stimulus for further study and non attractive for students

It is a long time that the theoretical courses for medical students are commonly taught through the traditional lecture- method, however, recently, this method has been heavily criticized for being unaccountable to students' academic needs, de-motivating students' further research and non attractive for them (8). Research about effective teaching methods is an important issue, and the results of which can improve the quality of education (9). The aim of this study is to compare the learning outcomes, and to evaluate effectiveness, satisfaction and clarity of presented subjects in three methods: Lecture by the teacher, presentations by small groups of students, search and study of topics by the students before the class.

## METHODS

Participants in this study were 45 female students, studying in their 5th semester of basic science course, in Mashhad faculty of medicine in 2012. The inclusion criteria were Iranian students, participation in all three training sessions, participation in three final exams and informed consent to participate. Analysis was performed for 42 students who met the inclusion criteria.

In order to compare the learning outcomes, usefulness of

teaching method and clarity of the issues, three topics with similar content and difficulty were selected from a list of health education training sessions (infant health, childhood health, adolescence health) and each topic was presented with one of the three methods. Methods of teaching were lecture by the teacher using slide showing, presentation by small groups of students (a 20-minute lecture with power point presentation), search and study of the topic before the class (a 5-minute student presentation of related paper in each group).

Students answered the same descriptive examination from the most important materials at the end of each training session. Knowledge, comprehension and application of educational materials were assessed by the type of questions based on Bloom's Taxonomy one and two. Scoring scale of questions was similar and the maximum score of each exam was 10. Effectiveness, students' satisfaction, usefulness and clarity of subjects in each of three teaching methods were assessed by a self administered questionnaire. Content and face validity of the questionnaire were evaluated by community medicine specialists and its reliability was determined by Cronbach's alpha (at more than 0.70).

The collected data was analyzed by using SPSS software version 11.5. Normal distribution of quantitative data was assessed by Kolmogorov-Smirnov test. Repeated measurement was employed in order to compare the scores obtained by each student. Spearman correlation coefficient was applied to evaluate the correlation between each exam scores and effectiveness, students' satisfaction, usefulness and clarity of subjects in each of three teaching methods. McNemar test was applied to compare the frequency of high, medium or low student interest rates in three different educational methods. The significance level was considered less than 0.05.

## RESULTS

Mean students' exam scores in different teaching methods were in method of search and pre class study of topic by the students  $8.4 \pm 1.5$ , in the small group students' presentation  $7.2 \pm 1.6$ , and in lecture by the teacher  $4.1 \pm 1.7$  ( $P < 0.001$ ). Also, there was a statistically significant difference between exam scores of small group students' presentation method and search and pre class study of topic ( $P = 0.001$ ). The frequency of the students' opinion about effectiveness, satisfaction and clarity of topics in three teaching methods was shown in table 1.

The Spearman correlation scores of teaching methods with students' opinion about, satisfaction, clarity of topics and effectiveness of them were shown in table 2. A significant relationship was not found between test scores and students' opinion.

The frequency of students who had great interest in study of topic before the class was more than lecture method ( $P = 0.02$ ). Although a greater percentage of students reported that lecture method have been more useful and effective than presentation by students' small groups, but the difference was not statistically significant ( $P = 0.08$ ).

**Table 1. The frequency of the students' opinion about effectiveness, satisfaction and clarity of topics in different teaching educational methods**

Teaching Method	Students' Opinion	Low (%)	Moderate (%)	High (%)
Presentation by students' small groups	Clarity of subjects	2 (4.8)	8 (19.1)	32 (76.2)
	Satisfaction	3 (7.1)	7 (16.7)	32 (76.2)
	Effectiveness	3 (7.1)	14 (33.4)	25 (59.5)
Lecture	Clarity of subjects	1 (2.4)	6 (14.3)	35 (83.3)
	Satisfaction	6 (14.3)	22 (52.4)	14 (33.3)
	Effectiveness	3 (7.1)	10 (23.9)	29 (69.1)
Study of topic before the class	Clarity of subjects	2 (4.7)	13 (31.1)	27 (64.3)
	Satisfaction	3 (7.1)	12 (28.6)	27 (64.3)
	Effectiveness	4 (9.5)	12 (28.6)	26 (61.9)

**Table 2. The Spearman correlation score of teaching methods with students' opinion about, satisfaction, clarity of topics and effectiveness**

Educational method	Clarity	Satisfaction	Effectiveness
Presentation by students' small groups	0.02	0.03	0.14
Lecture by the teacher	0.14	0.11	0.003
Study of topic before the class	0.06	0.25	0.20

## DISCUSSION

The results of this study indicated that medical students earn higher exam scores in student-centered teaching methods compared with lecture method. The comparison between the two scores showed that the score of presentation by students' small groups and presentation the related paper were significantly higher than the lecture method.

Teacher-centered teaching methods are the most common methods applied by teachers in most countries (10, 11). While encouraging teachers to use modern, student-centered approach is recommended, sometimes applying modern methods of training for teachers is difficult. Because teachers have been trained in different ways in the past and they may be concerned about the fact they could not transfer to students, all the required content, in limited time with new teaching methods (8, 12).

The frequency of students who had great interest in student-centered teaching methods was more than lecture method; this can indicate the students' interest in modern methods of teaching, particularly the use of electronic resources to study. Since the medical education is not limited to years of studying in university and continues after graduation too, it would be better if training for search in scientific resources and emphasis on doing evidence-based medicine start for students in medical basic sciences level (13, 14)

In a similar study although lecture by the teacher is a more

common teaching method in most universities, it can provide low opportunities for students' participation; besides, training materials will be significantly forgotten in a short time (15, 16).

Due to the explosive increase in medical information, medical students need to learn computer skills and information about electronic resources management, and therefore, this can provide opportunities for them to participate in teaching and engage them in scientific searching (17, 18). Also Medical Colleges Association of America suggests that student training in medical universities should be a way to enable them to use information and modern technology (19).

Researches on the effect of study topics before the session by the students have shown that in this approach students will be able to perform pre-class study with specific timing and better get prepared for training, especially with the most important new educational resources, i.e. the electronic ones (2, 20-22).

In this study, the comparison of clarity of topics in lecture with two other methods, higher percentage of students expressed greater clarity of the lecture. Also, in another study at Tehran university, students expressed greater educational impact of lecture method rather than e-learning; they have mentioned that teachers give more information about the educational content in the lecture; and it can make the learning process easier (14). However, in this study, the educational method of small group presentation and pre-class study was followed by lectures by the teacher;

it must be noted that the training style was not virtual. The exam scores of student in student-centered teaching methods were higher than the lecture method. It seems that

in teaching methods where students play an active role, their interest and satisfaction are greater and they can get better exam scores.

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