

Effectiveness of clinical training and evaluation by mixed method on cognitive learning of anesthesiology students

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ABSTRACT

Introduction: Clinical training is the most important part of medical sciences education and an innate part of it, which is recognized as the basis of professional training in terms of importance. But, it is obvious that traditional methods such as lecturing cannot be used today to effectively teach all of skills to learners and this is particularly true in the case of clinical skills training. Thus, this study is aimed to compare the effects of clinical training and evaluation by mixed method with routine method on practical learning of Anesthesia undergraduate students in clinical settings. **Material and Method:** this quasi-experimental study was conducted in Gerash School of Medical Sciences. The study population was all six-semester students in two consecutive academic years and they were divided by non-random method to control group (20 students) and case group (20 students). Clinical education and assessment in terms of cognitive objectives in operating room section was performed on students in the case and the control groups with mixed (new student-centered method) and routine methods, respectively. A researcher-made cognitive test was designed to measure learning. Student satisfaction with clinical training techniques was evaluated with a researcher-made test. SPSS-19 statistical software and t-test were used with Paired- and Independent-samples to analyze the data. **Results:** both mixed and routine methods could significantly enhance cognitive learning of the students. Comparing the two methods, cognitive learning was significantly improved by the student-centered mixed method than the routine method. Student satisfaction with student-centered mixed method was more than the routine method. The results showed that score (28.69) after the implementation of the routine method in the control group was higher than the scores (13.38) before this process. An increase in mean scores was observed in the case group after offering the educational strategies, so that mean scores in this group changed from 13.69 (before implementation of training strategies) to 34.53 (after implementation of training strategies). Related results to student satisfaction with training techniques in the groups showed that 52.6% and 88.2% of the students in the case and the control groups expressed respectively that use of training technique needs to spend time. 76% and 40.4% of the students in the case and the control groups expressed respectively that the training technique was worth spending time with. 92.4% and 47.1% of the students in the case and the control groups expressed respectively that they enjoyed the training technique. 62% and 35.5% of the students in the case and the control groups expressed respectively that the training technique had caused them to learn informative content from their classmates. **Discussion:** student-centered mixed method is a suitable method to enhance cognitive learning of Anesthesia undergraduate students in clinical settings. However, verification of this finding needs further study. According to the information given above, it was found that students mean score in the case group was higher than the control group. Student satisfaction was also high in the case group. The results also revealed that most of the students were willing to use this method in the future.

Keywords: Cognitive learning, clinical learning, clinical assessment.

Introduction

One of fundamental basis of educational systems that has been seriously neglected is training method or teaching method.

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Teaching and ways of providing it as well as uniformity and too much use of a teaching method will not allow achievement to educational goals. Teaching is both an art and a science and a teacher should be aware of its update knowledge. Nowadays, training process is unfortunately limited to providing a roofed room called class, a blackboard, chairs and benches as well as two human members called students and a teacher. Teaching in this

case is only a relationship between students and teacher for transmission of one-way information^[1].

Clinical training is the most important part and innate part of medical sciences education that is recognized in terms of importance as a professional education^[2]. In this regard, use of suitable and creative training methods is of great importance for teaching^[3]. It is obvious that all skills cannot effectively be

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taught to learners using traditional methods such as lecturing. This is particularly true in the case of clinical skills training^[4]. One of methods proposed for clinical skills training and for making education nearer to clinics is change of traditional educational plans and creation of programs which can actually enhance decision-making ability and clinical skills^[5]. Evaluation of students' learning is one of the important parts of educational programming that quality of training cannot be realized without it^[6, 7]. Assessment of students' learning in clinical settings that requires observation of performance of learners in real environments is more difficult than classroom assessment^[8, 9]. The results of our studies in Iran suggest that clinical assessment of medical sciences students is not suitable^[10, 11]. Several factors influence on learning of individuals, and selection of teaching methods by teachers is one of the most important factors in this process. Students' learning style and fitness of training methods with learning styles is another important and affecting factor on learning^[12, 13]. Low effectiveness of training periods has led teachers to follow suitable methods for teaching and evaluating of students. Today, more attention to the philosophy of humanism has led to use of learner-centered methods in education and assessment^[14]. If training activities are designed so that they stimulate motivation of learners for the activity, this training will increase skill and ability as well as clinical functions in the learners. Clinical skills training should include training in different aspects of learning and it is better to use a combination of different educational methods for this purpose^[5]. In this context the ways that some researchers have proposed for clinical skills training include lecturing, questioning and answering, exercising and repeating as well as group discussion, role-playing, simulation, case study and work unit^[15]. Since learning involves the use of techniques that obligate learners to activity, application of active learning and participation in training combined with contemplation is considered as an effective method in training^[16]. According to the above cases as well as the importance of clinical methods for anesthesia during surgical procedures and lack of attention to new and student-centered learning styles in clinical training, the aim of this study was to design a new mixed method using Kolb's learning theory, portfolio-based learning method and group discussion. The impact of this training method on practical learning and satisfaction of anesthesiology undergraduate students during a semester was investigated in comparison with conventional clinical training method.

Material and Methods

This quasi-experimental study was conducted after obtaining permissions from Research Administrator of Gerash university of Medical Sciences and dean of faculty of Nursing. The study was approved by Institutional Ethics Committee of Gerash School of Medical Sciences. All moral principles governing on human experimental studies were taken into consideration.

This study had examined the influence of mixed method on the case group compared with the control group. Population of this study was all sixth semester-students (40 people) of Anesthesiology undergraduate in two consecutive years from Gerash School of Nursing and they had passed two consecutive years of anesthesia training course in the second semester. It is noteworthy that Anesthesiology undergraduate in Iran includes a four-year training period in the field of Anesthesia to obtain a bachelor's degree. Inclusion criteria in the study were included the choice of anesthesia^[3] training unit at the time of the study,

the choice of anesthesia^[3] theoretical method at the time of the study as well as willingness and consent to participate in the study. After obtaining necessary permits from authorities of Gerash University of Medical Sciences, sixth semester anesthesiology students were non-randomly divided into control groups (4 groups) and experimental groups (4 groups). It should be noted that due to lack of permission of Education Department of the School, allocation of students in the clinical groups was non-randomly predetermined and all incoming students were used in this research. A researcher-made test was used to assess cognitive learning of anesthesiology students in operating room. The test was designed according to syllabus approved by Iran Ministry of Health, Treatment and Medical Education for training period of Anesthesiology undergraduate students in operating room. The test designing was based on reference books designed in this field and it was consisted of 40 questions and each was accompanied with a list of four choices of answer that evaluated cognitive learning. It should also be noted that these questions were used in pre-test and post-test. The validity of this test was determined by content validity. For this purpose the test was given to 10 Anesthesiology professors who had teaching experience in operating room section. Necessary changes were applied in the questionnaire after receiving their feedbacks. It is noteworthy that the questionnaire was also given to Educational Science Professors to determine the content-related validity. To determine reliability of the questionnaire, the pilot study was conducted on 20 anesthesiology students at fourth semester and reliability of the test was calculated equal to 0.82 using the Kuder-Richardson (KR) Formula. In order to increase credibility of the study in this research, clinical instructor was unaware of designed questions and the cognitive test was held by other research partners.

To prevent from interaction between students of the control and the experimental groups on each other, the first two groups of training were considered as the control group and the second two groups were considered as the experimental groups. This caused the students in the control group to be unaware of differences in training method and of their evaluation method with the students in the experimental group until when they had completed their training program. All of the students in the control and the case groups were under clinical education during one semester (in each year of entrance) in operating room of Gerash Imam Ali medical and educational center. Clinical training and assessment with mixed method was performed on the students in the case groups, so that clinical lesson plan was given to the students at the first day of training and after offering of required information. Written cognitive pretest was taken from all the students at the same day. Practical method of working with mixed method was also taught to them at the same day and they were given an opportunity to ask their own questions in this area. Clinical training of the students in the field of cognitive objectives and using the mixed method began at the second day of training. They were asked to effort during one day of training to learn at least an educational point based on cognitive goals which had set out in lesson plan and to learn some points in the final hour and then present them orally in the presence of the other teammates and coaches and share them with the other classmates and argue with them about that field. If it was required, the coach could lead the student toward more complete learning and he/she should offer more detailed description in a subsequent session. In the case that the student offered education at the end of the day, a positive score was awarded to his/her and otherwise a

negative score was considered for the student. Each student was responsible to gather all trainings provided by him/her and collect them as a personal work set and deliver it to the instructor. The students must try throughout the training period to be aware of own strengths and weaknesses using guidance of own clinical instructor and taught subjects and experiences and enhance their learning strategies.

Clinical assessment was performed according to presentation of a work set by each student and conducting of cognitive test at the end of the period (written cognitive post-test). Written cognitive pre-test was taken from the students in the control groups on the first day of training. Then, students' clinical training and evaluation about cognitive goals was performed with the routine method that was used for Anesthesiology undergraduate students. Clinical training about cognitive goals was performed in this method with clinical conference conducting method and case presentation method. Clinical assessment was also performed with questioning and answering methods during the period and conducting of a cognitive test at the end of the period (written cognitive post-test). To measure the student satisfaction of clinical method (in both groups), a researcher-made questionnaire with 9 questions was designed and its context validity was met by receiving viewpoints of 8 experts and applying of changes. Its degree and reliability was calculated equal to 0.8 using Cronbach's Alpha Formula and the obtained results from this questionnaire were evaluated. It was tried in this study that except teaching and evaluation method of cognitive goals that were conducted by two different methods on the students of both groups, the other factors be considered the same for the members of both groups. For example, students training were done by one of researchers who was trained about guide preparation method and evaluation of the mixed method. The two groups were also similar in clinical education and the environment was tried to be the same as much as possible for the students of the control and the experimental groups.

SPSS-19 statistical software was used for research data analysis.

For scoring the test, a score of 1 was given to each correct answer and the other options were not rated. So, the score of each student ranged from 0 to 40. In order to check pre-scores and post-scores in each group, t-test was used with Paired Samples and Independent Samples t-test was also used to compare the scores related to both groups.

Results

A number of 40 Anesthesiology undergraduate students in sixth semester had participated in this study. All of them were benefiting from free education. Mean age related to the control group and the case group was equal to 20.30 ± 0.48 and 20.46 ± 0.51 , respectively. Demographic studies also showed that grade point average was equal to 16.29 ± 1.84 and 15.78 ± 2.57 for the control group and the case group, respectively. The results related to One-Sample t test showed that there was no significant difference at level of 5% between the control group and the case group in age and grade point average compared to each other (Table 1).

Table 1: The level of 5% between the control group and the case group in age and grade point average compared to each other.

Factors	Mean	Standard deviation	Sig. (2-tailed)
Age	20.38	0.11	0.02
Grade point average	16.03	0.36	0.01

Factors	Mean	Standard deviation	Sig. (2-tailed)
Age	20.38	0.11	0.02
Grade point average	16.03	0.36	0.01

The obtained results from examination of students based on the questionnaire before and after the test showed that post-test scores (28.69) were higher than pre-test scores (13.38) of implementation of the routine method of training. According to One-Sample t test as well as Paired Sample t test, no significant changes at level of 5% was observed between scores before and after implementation of the research. This shows that routine method of training had been successful to some extent in advancing and promoting of the students' scientific training (Table 2).

An increase in mean scores was observed after presentation of educational strategies in the case group, so that mean scores in this group changed from 13.69 (before implementation of educational strategies) to 34.53 (after implementation of educational strategies). According to One-Sample t test as well as Paired Sample t test, a significant change at level of 5% was observed between scores before and after implementation of the research. This shows that implementation of student-centered training method promote scientific level of the students (Table 2).

Table 2: The Mean scores and the results related to One-Sample t test and Paired Sample t test in the control and the case groups

Group	Mean	Standard deviation	Sig. (2-tailed)
The control before	13.38	1.55	0.000
The control after	28.69	1.43	0.000
The case before	13.69	1.65	0.000
The case after	1.71	34.53	0.000

The comparison of the case group scores after implementation of the new training method with the control group after implementation of the routine training method based on Paired-Sample t test also showed that there was an increase in mean scores of the case group than the control group. The change was statistically significant at level of 5% (Table 3).

Table 3: The results related to comparison of mean scores in the control and the case groups after implementation of the training method, based on Paired-Sample t test.

Group	Mean	Standard deviation	Sig. (2-tailed)
The control after-the case after	5.84	2.26	0.000

The results related to survey of the students as well as assessment of students' satisfaction with the training method showed that 90.3% of the students in the case group and 88.2% of the students in the control group tended to continue using of their own training method. A small percentage of the students (52.6%) in the case group and 40.4% of the students in the control group expressed that the application of training method used in their group needed to spend some time. 76% of the students in the case group and 47.1% of the students in the control group stated that the training method used in their group was worth spending time with. 92.4% of the students in the case group and 44% of the students in the control group expressed that the training method used in their group had been enjoyable for them. 5.5% of the students in the case group and 30.1% of the students in the control group expressed that the training method used in their group had been boring for them. The results of the assessment scores

revealed that 91.6% of the students in the case group and 80.3% of the students in the control group had been equally involved in activities and there was no discrimination in the meantime. 62% of the students in the case group and 35.5% of the students in the control group expressed that the training method had led the students to learn informative content from their classmates. 73% of the students in the case group and 51% of the students in the control group tended to continue the clinical method of anesthesia. The results related to the students' overall satisfaction showed that the mixed training method in the case group allocated to itself the score 18.5 from overall score 20. While this parameter in the control group devoted to itself the score 14 from overall score 20, which revealed that the students had greater satisfaction with the new method of training and this method was more effective in advancing clinical training goals in the field of anesthesiology.

Discussion

Undoubtedly, education and cognitive learning, have critical role in ensuring the dynamism and efficiency of any society [17, 18]. One of the requirements of medical and paramedical training is alteration in education and teaching methods which today are taken into consideration in universities around the world. Various studies are performing to evaluate the effectiveness of various training methods in universities around the world and in Iran [19]. The results of the present study which was performed by the goal to investigate new methods of clinical training on Anesthesiology undergraduate students showed that the post-test mean score in the groups under modern training method (student-centered method) had increased than the score before the implementation of the test. According to independent sample t test and the comparison between the control and the case groups after implementation of new training method, it was found that there was statistically a significant difference between the groups. So that the mean scores in the case group was higher than the mean scores in the control group after the end of the study, which indicated the success of the new training method of Anesthesiology undergraduate students.

As previous studies have suggested, professors should teach the students quality of learning of contents instead of teaching of the entire contents. Professors should increase depth of students' learning with participation of them in training and increase their motivation for learning [20, 21]. It has been also stated that the new training methods in which students are challenged cause interaction to perform between teachers and students so that the students to be placed in the center of educational process. Professors in this method act as a designer for learners subjective experiences instead of knowledge transferring and so the learners will achieve to greater success in the area of education [22]. Studies also have stated that training by students themselves as in class seminars causes greater learning in students. This is one of modern training methods [23]. Past studies have expressed that when a teaching method is combined with student-centered and teacher-centered methods, students will pay attention to the lecture of instructor with completely active mind and in a situation that receive effective factors in improvement of learning due to their participation. This makes the students to learn contents more effectively and so they can also teach the contents to other individuals [24]. The results of current study have showed that the mixed method in which Anesthesiology undergraduate

students are involved in clinical training is more effective than the traditional method. The mean scores increase after intervention. Experts of teaching methods have stated that the traditional teaching methods can be organized and reviewed in order to have useful function in training process [24]. The results of this study as well as the mean scores have revealed that the new method have had a useful function in training process. This is consistent with results of previous studies.

The results obtained from assessment of student satisfaction indicated that the students in the Department of Anesthesiology were willing to provide innovative clinical training method and the students in this research were satisfied with this method of training. 91.6% of the students were equally involved in learning and there was no discrimination. Only 5.5% of the students did not satisfy with this method and this was a very low percentage. The results also showed that 90.3% of the students need to use modern and mixed methods, which reflects student satisfaction with new and student-centered methods. The results of the study revealed that overall satisfaction of the students in the new training methods allocated the score of 18.5 from 20 to itself compared to the routine training group. This indicated the success of the present method as well as level of the students' interest to the new method.

Studies conducted related to trail investigation of a student-centered learning method in training of Basic Medical Sciences showed that students most preferred the student-centered methods. So it is recommended that serious and quick action be taken toward changes of training methods and stated that students agreed with changes in routine training method. Studies also stated that the new method did not take long time and it was worth spending time with. In addition, performance of group works was more enjoyable. On the other hand, it was stated that students had learned a lot from their classmates [25]. In a research conducted on nursing students about comparison of three teaching methods including lecturing, questioning and answering and students' teaching (student-centered method) showed that the mean of students' satisfaction with learning in the third method was more than the other two methods [26]. In another study, entitled Cooperative Teaching which was a student-centered training method performed on medical students, scores mean related to student satisfaction before implementation of cooperative method showed a significant difference in the teaching group compared to after implementation of the method [27]. Other studies also showed that use of cooperative method for teaching caused a significant increase in learning and student satisfaction level [28]. This is consistent with the results of this research.

Investigation on implementation of training in student-centered small group method and level of student satisfaction and learning was investigated in the past and this study showed the role of teaching among small groups on increase of student satisfaction level and reported that learning process had been facilitated in these groups. Teaching by a student-centered method, group discussion and in small groups was recommended for teaching of undergraduate students [29]. Other similar studies was done on the level of satisfaction of students from other fields except anesthesiology and on comparison of traditional and new teaching methods and all revealed that the students were satisfied with the new teaching method [30-32]. Most studies showed that student satisfaction with methods in which students actively participate in their learning was at a higher level than teacher-centered methods. Participation of students in teaching-learning process had desirable results [24]. This is consistent with our findings.

According to the questionnaire, 90.3% of the students had deemed necessary the need of using modern and mixed methods. Past studies also expressed that most students willing to use student-centered and interactive methods for learning [33]. According to Badri and Rezaei, learners who had trained with cooperative method not only had higher level of course contents learning, but also had greater responsibility than their assignments and other members of the group and had better interaction with other members than those who were taught with traditional methods [34]. The results of current research also showed that 62% of the students stated that the new method of training led to learn informative contents from their classmates and 76% expressed that it was worth spending time using the new method. This is also consistent with the findings of previous researches. So, re-evaluation of the training method in clinical sciences seems necessary in order to achieve effective training methods. Anesthesiology educators should identify factors affecting on quality and quantity of training and should introduce negative and preventive factors as clinical education problems. Without any doubt, identifying the problems is the first step to reduce them and the students themselves are the best and the most reliable sources to assess clinical training problems, since they have direct and immediate presence and interactions with this process. As a result, it is necessary that various studies in this field to be performed with larger samples and with different conditions of training, to obtain more sure results. The results of the current study are only a part of vast results of student-centered training of Anesthesiology students and its status should always be evaluated to improve the quality of clinical training [18, 35, 36].

Conclusion

According to the above, it was found that the student mean scores in the case group were higher than the control group and the student satisfaction was also high in the case group. The results also revealed that most of the students tended to use this method of training in the future. According the results and the present study based on efficacy of active teaching methods and student satisfaction with clinical training of the field of anesthesiology, it seems that the application of this method of training by other instructors in other fields can also eliminate the weakness of thinking and learning in students. Weakness of thinking and learning is considered as one of problems of higher education and universities.

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References

- Campbell JR, Kelly DL, Mullis IVS, Martin MO, Sainsbury M. Framework and Specifications for PIRLS assessment. 2001. 2th ed. Chestnut Hill, MA: Boston College.
- Farnia F. Productivity in clinical education from the viewpoints of nursing and midwifery students. *Yazd Uni Med Sci Health Ser.* 2000;8(2):68-72 [Persian].
- Conway J, Sharyey R. Integrating on campus problem based learning: Issues and challenges in using computer mediated communication. *Nurs Educ Today.* 2002;22(7):552-62.
- Davis D, O'Brien MA, Freemantle N, Wolf FM, Mazmanian P, Taylor-Vaisey A. Impact of formal continuing medical education: Do conferences, workshops, rounds, and other traditional continuing education activities change physician behavior or health care outcomes? *JAMA.* 1999;282(9):867-74.
- Murdoch Eaton D, Cottrell D. Structured teaching methods enhance skill acquisition but not problem solving abilities. *Med Educ.* 1990;33(1):19-23.
- Fakhri A, Komeli Thani H, Shakournia A. Student Evaluation Method by Faculty Members in Clinical Environments of Ahvaz Jundishapur University of Medical Sciences. *Iranian Jou Med Edu.* 2005;5(14):53-60 [Persian].
- Ebrahimi H, Zarvaj Hosaini R, Odi D. Investigating of the problems of educators when evaluating the nursing students of the Faculty of Medical Sciences at the shahrood Medical Sciences. *Iranian Jou Med Edu.* 2005;4(14):58-65 [Persian].
- Mahara MS. A perspective on clinical evaluation in nursing education. *J Adv Nurs.* 1998; 28(6):1339-46.
- Friedman M, Mennin SP. Rethinking critical issues in performance assessment. *Acad Med.* 1991; 66(7):390-5.
- Fakhari A, Kargarmaher MH, Gholizadegan A. The viewpoints of medical interns about testing methods in clinical settings. *Iranian Jou Med Edu.* 2005;5(14):65 [Persian].
- Delaram M, Aein F. The study of the strengths and weaknesses of the clinical education of the University of Medical Sciences. *Iranian Jou Med Edu.* 2005;3(14):73 [Persian].
- Payami Bousari M, Fathi E, Moosavinasab N. Comparing the Effect of Lecture Combined with Question and Answer, and Team Member Teaching Design on Nursing Students' Achievements. *Iranian Jou Med Edu.* 2006;6(2):45-51 [Persian].
- Sarchami R, Hossaini S. Relationship of learning styles with educational progress of nursing students in Qazvin. *Jou Qazvin Uni Med Sci.* 2004;8(1):64-7 [Persian].
- Tiwari A, Tang C. From process to outcome: the effect of portfolio assessment on student learning. *Nurse Educ Today.* 2003;23(4):269-77.
- Abate FR. Teaching for better learning: A guide for teachers of primary health care staff. Geneva: World Health Organization; 1993.
- Abedini Z, Jafar Begloo E, Raiesi M, Dadkhah Tehrani T. Effectiveness of Reflection in Clinical Education: Nursing Students' Perspective. *Iran Jou Nurs (IJN).* 2011; 24(71): 74-82 [Persian].
- Darvishi M, Nazer MR, Alipour MR. Investigating the end of patients suffering from diabetic foot hospitalized in Be'sat hospital of IRIAF from 2009 to 2014. *Bio Med Res.* 2017;28(10): 4630-33.

18. Moazen B, Rezaei F, Lotfizadeh M, Darvishi M, Farzadfar F. "Mind the Gap" in reporting the outdated statistics. *Int J Health Policy Manag.* 2014; 3: 295-96.
19. Ghasemian Safaei H, Farajzadegan Z. Active participation of student s in teaching. *Iranian Jou Med Edu.* 2012;11(9):1129-30.
20. Zarshenas L. Interactive model teaching is student-oriented. *Quarterly Jou Edu Med Sci.* 2009; 6.
21. Palmer W. Simple, surprising, useful? Three questions, for judging teaching methods. *Pedagogy.* 2003;3(2):87-285.
22. Rezaei K, Kouhestani H, Sajadi M, Jadidi R. The Use of Collaborative Teaching approach by faculty members and Its related factors: A study in Arak University of Medical Sciences, 2010 on the motivational beliefs and self-regulating learning strategies. *Iranian Jou Med Edu.* 2012;12(6):410-19.
23. Chanchalor S, CHomphotong P. Teaching model focus utilizing a student centered strategy for vocational students. *World Trans Engin Tech Educ.* 2004;3(1):75-8.
24. Mc Naull FW, Mclees SP, Belyea MJ, Clipp EC. A comparison of education methods to enhance nursing performance in pain assessment. *J Contin Educ Nurs.* 1992; 23:267-271.
25. Forghan Parast K. Trail of a student-centered learning method on Basic Medical Sciences teaching, *Iranian Jou Med Edu.* 2002;2(1):1-7.
26. Adib Hajbaghery M. Effect of three educational methods on Anxiety, learning satisfaction and education progression in nursing students. *Strides in Development of Medical Education Jou Med Educ Dev Cen Kerman Uni Med Sci.* 2008; 5:35-42.
27. Ataei N, Panjehpour M. Comparison the effectiveness of problem based learning with lecture-based method in teaching metabolic biochemistry. *IJME/ Special issue for educational development and health promotion.* 2012;11(9):1318-25.
28. Sadeghi R, Sedaghat MM, Sha Ahmadi F. Comparison of the effect of lecture and blended teaching methods on students' learning and satisfaction. *J Adv Med Educ Prof.* 2014;2 (4):146-50.
29. Ghotbi N, Shirazi M, Jalai Sh et al. Implementation of targeted training with work practice in small groups for the second year students of the field of Physiotherapy: comparison assessment of training impact on the level of satisfaction and learning. *Scientific Research Jou Mod Reh Tehran Uni Med Sci.* 2011;5 (3):60-66.
30. Zolfaghari M, Mehrdad N, Parsa Yekta Z, Salmani Barugh N, Bahrani N. The effect of lecture and E-learning methods on learning mother and child health course in nursing students. *Iranian Jou Med Edu.* 2007; 7 (1): 31-39 [Persian].
31. Salimi T, Shahbazi L, Mojahed Sh, Ahmadieh MH, Dehghanpour MH. Comparing the effects of lecture and work in small groups on nursing students' skills in calculating medication dosage. *Iranian Jou Med Edu.* 2007; 7 (1) :79-84 [Persian].
32. Shirazi M, Parikh SV, Alaeddini F, Lonka K, Zeinaloo AA, Sadeghi M, Arbabi M, Nejatiasaf AA, Sharivar Z, and Wahlstrom R. Effects on knowledge and attitudes of using stages of change to train general practitioners on management of depression: a randomized controlled trial. *CJP.* 2009; 54(10): 43-50.
33. Ataei N, Panjeh Pour M. 2014. Comparing the effectiveness of interactive and traditional methods of active teaching on satisfaction and learning of Clinical Biochemistry Course in Pharmacy Students, *Jou Edu Dev Med Sci.* 8 (19): 81-91.
34. Bdry G.R, Rrzaei A. Comparison of teaching methods based on active thinking and traditional teaching methods on the boy student's learning level of social studies. *Jou Edu Sci.* 2012; 4(16):107-20.
35. Sekhavati, E., Rahimian-Boogar, M., Khodadoost, M., Afkari, R. The study on relationship among self-control and performance of family with social adaptation in high school students at Abadeh City. *Cumhuriyet Sci Jou.* 2015;36(4):1724-37.
36. Sekhavati, E., Rahimian-Boogar, M., Khodadost, M., Afkari, R. Explaining the link among self-controlling and children parenting techniques and mental insurance of high school pupils. *Jou Med Life.* 2015;8 (3):156-168.