Effect of training workshop and problem solving methods in training of cardiopulmonary resuscitation (CPR) on nursing and anesthesia students' performance and awareness of Dezful university of medical sciences.

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Abstract: The present research in terms of its purpose is a pragmatic study and in terms of controlling variables is semi-experimental. The research instrument consists of a 43 item survey for measuring awareness in six fields of resuscitation generals, assessment, ventilation, circulation, automatic shock and asphyxia that sum score of these six areas makes the general awareness besides a checklist of measurement of ccardiopulmonary resuscitation (CPR) performance. To test the hypotheses, multivariate variance analysis MANOVA, follow-up test of ANOVA in context of MANOVA, multivariate covariance analysis of MANCOVA, multivariate covariance analysis in context of MANCOVA, and follow-up test of LCD were applied. With educational interference it got evident that both methods were effective on increase of students' awareness and performance meaningfully compared to pre-test in all areas of awareness and performance. In a way that, the general awareness score achieved from 32 to 39 and performance score form 17 to 19 (p=0.001). Considering the impact of workshop on the students of either majors, it was realized that the nursing students were meaningfully superior than anesthesia students in rate of awareness (p=0.014). Though, considering performance, mean scores of students showed no meaningful difference and both methods had the same impact. Comparing the impact of problem solving method on the students of nursing and anesthesia, the problem solving for nursing students was meaningfully more influential on performance(p=0.009). However, no meaningful difference was observed between mean scores of students' performance in the problem solving method.

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1. Introduction

History of coping with death backs to human civilization and CPR has been used as one of invaluable emergency operations in case of accidents or to survive patients and victims, either in pre-hospital or inter-hospital conditions. The cardiac arrest includes sudden stop of pumping function of heart may be recursive by an immediate interference, otherwise is fatal. Following heart arrest, pulmonary arrest or vice versa may happen, too. CPR, in fact, consists of a series of operations are taken by the present rescues in order to return the function of three vital heart, lung and brain functions besides preventing from brain death that is the ultimate goal of any CPR operation.

In the United States of America and Canada, annually, 350000 peoples face with heart arrest and need CPR. Based on the census bureau of U.S. and Canada, it is estimated that per 100000 populations, 50 to 55 peoples suffer from heart arrest annually. Also, census bureau of England reported that about 30000subjects per year suffer from hear arrest outside hospital and get cured by the rescue. Though, unfortunately there is no such exact data about hear arrest, and respiratory arrest and their consequent CPR operations. (Brim Nejad et al, 2007). According to official census of WHO that is presented in the official web site of ministry of health and medical education of Iran, per every 100000 peoples, 466 patients will die from heart diseases.

Thus, many factors are influential on the CPR operation such as lack of access to specialized personnel, delay in initiation of circulation operation and circulation techniques are among the most controversial problems (Brim Nejad et al, 2007). The main problem in CPR needed patients are dearth of sufficient professional knowledge and skill of patients, relatives, nurses, or even physicians responsible for primary health care (PHC) and emergency actions for the patients (Omidi far et al, 2008). If CPR operation occurs fast 40 to 60 per cent of occasions will save victims. However, any successful CPR operation requires the competence and performance of the rescuer that is dependent to

rate of knowledge and awareness of the present rescuers (Cheraghi et al, 2011).

Effective tainting of CPR operation to medical sciences students can up to great extent prohibit from predictable deaths. For maximization of quality of CPR training some proper training methods must be enjoyed. There are many failures in the traditional method like: inconsistency of the training programs with participants' needs, inefficient of trainers in training CPR operation, and lack of sufficient time for practice (Hoykori et al, 2001).Today's, nurses fortunately have realized the gap between theoretical knowledge and clinical skills as well as their inability in playing their clinical roles (Hasan pour, et al,2006) and have found that active training methods lead to improvement and shows a meaningful relation with theoretical and clinical training. In nursing an anesthesia, knowing how to perform medical tasks is insufficient, but ability to integrate knowledge, attitude, values and skills for providing more professional services sound momentous (Fesharaki et al, 2010).

Since education plays a principal role in performing CPR more correctly, several studies have indicated that not only in field of performance, but also in having enough knowledge and awareness about CPR, nurses display many malfunctions (Cheraghi et al, 2010). The present researcher, also as a result of his personal experiences about heart arrest and pulmonary arrest encountered with lack of sufficient knowledge and improper performance among the rescue team like physicians, nurses and anesthesia experts.

Accordingly, due to significance of effective training of CPR operation through active procedures like problem solving, and training workshops can be some suitable and influential solutions for removing this weakness. It is hopeful; the obtained results from the current study can make considerable changes in medical education system from training and teaching viewpoints. Moreover, the obtained results can be used in educational planning of medical higher education. Consequently, the rate of deaths has been happening as a result of heart and pulmonary arrest will decrease in Iran.

Thus, the current research aims at comparison of two problems solving and training workshop methods in educating CPR operation in order to answer this question whether or not there is any meaningful difference between effectiveness of problem solving method and training workshop on nursing and anesthesia students' performance and awareness in training of CPR operation.

2. Materials and methods

2.1 Methodology

the present study is a type of pragmatic in its end and a semi- experimental with pre-test and post-test research in terms of controlling variables, and participants.

2.2 Population

the research population consists of all bachelor students of nursing and anesthesia 2010-2010 entry of medical sciences university of dezful who have not received any CPR training so far and were interested in participating in the study. They formed a general size of 100 subjects.

Sampling method and sample size: Due to limited number of students, 100 participants, the purposeful sampling was used. Table 1-4 shows frequency distribution of the samples. Of all students who were interested in participation in CPR period, 86 subjects including 30 male and 56 female were selected. Considering the samples frequency per each major, 42 were anesthesia and 44 were nursing students.

2.3 The research instrumentation

Since rate of awareness and rate of performance are objectives of measurement, a test of measuring awareness besides a checklist for measurement of rate of performance was adapted.

The first research instrument: It is a test of measuring awareness with two sections. Te first section relates to demographical information of participants with 7 items and the second section contains 43 items in six fields of resuscitation generals, assessment, ventilation, circulation, automatic shock and asphyxia. The general received scores in these areas indicate the rate of the samples' general awareness. All items were in form of true-false questions and 1 score per each true answer and a zero for the false answer. As it was mentioned earlier, rate of participants; awareness was measure from 0 to 43.

The second research instrument:The observed checklist assess the samples' performance with 20 variables.the data in this instrument was collected through the researcher's observation and evaluation during the practical test on a special training model of CPR simulation. The sum score ranged from 0 to 20.

2.4 Validity and reliability

To verify the face and content validity of the test and the observational checklist comments of ten faculty of nursing and anesthesia departments were asked and after modifications, the validity of instruments via Spearman's correlation coefficient, degree of correlation between answers was estimated 0.723 for the test and 0.712 for the checklist.

Reliability: For determining the test and checklist reliability, Chrobach's alpha was adapted that the result for the test was 0.84 and for the checklist was 0.81.

2.5The data collection

The first step: filing out 7 items of demographical information by all participants.

The second step: administration of the theoretical and practical pre-test for all participants. Here, the subjects answered to 43 test items measuring awareness in six areas of resuscitation generals, assessment, ventilation, circulation, automatic shock and asphyxia in 20 minutes. That is, each true answer scored 1 and for each false answer scored 0. Finally, the obtained scores from six areas showed general awareness about CPR. The maximum score was 43 and the minimum was zero.

Then, each student was given 5 minutes to test their performance on CPR in ore-test. In this stage, the researcher evaluated rate of subjects' skill; through the observational checklist. It contained 20 items of evaluation and scored from 0 to 20. If the operation was performed correctly 1 score, if imperfect 0.5 and not doing or failure in doing it 0 was given. In this stage, sum of all 20 skills was considered as rate of performance.

The third stage: the anesthesia and nursing students were randomly divided into two different groups. In group 1, students of each major received workshop trainings for CPR. This workshop was hold within three days. In day 1, programs of the theoretical workshop were presented in two 1:30 hour sessions. The presented materials contained theoretical issues on CPR like (CPR general, assessment, ventilation, circulation, auto shock and asphyxia).

In day 2 and 3, participants of training workshops of anesthesia and nursing were classified into three 6-9 peoples and each group practiced the learned material on a CPR mannequin simulator. The workshop was conducted by video projector, PowerPoint, slide and some training files about CPR operation as well as group discussions. The researcher was present in the workshop as the advisor. The content of training workshop was adjusted based on CPR manual 2010 of the American Hear Association. The students in second group were divided into three 6-7 people groups for conducting the problem solving method. Here, the researcher functioned as the trainer in the first session by use of training booklets and speech. Accordingly, the students got familiar with general issues.

In this stage, five previously prepared scenarios in accordance with American Heart Association 2010 were determined. Then, in each 1:30 hour session one of scenarios was given to the students and they discussed about their problems, and learning needs. To solve their problems, students were referred to different information sources like library documents, the internet, attaining films, educational models, and other resources. In the next session, after negotiating about the problem solution for 1:30 hours, different aspects of it were reviewed. The researcher here was a mediator and facilitator. With regard to the number of scenarios, five sessions for problem and five sessions for discussing on the solutions for three days were held. Soon after each solution session, the students practiced the scenarios on a simulated model of CPR in the center of clinical skills.

The fourth stage: Post test: all students immediately after finishing the training period were evaluated either theoretical or practically based on the pre-test method. In this stage, the collected data included personal information, measurement of six areas of awareness and the general awareness, the assessment check list of the students' CPR performance. In test of measuring awareness, 43 items for evaluation of six areas and 20 measures for the checklist were used. The sum score of awareness test were determined as an index of the students' awareness about CPR scored from 0 to 43 and scored 0 to 20 for observational checklist of the students' performance. Finally, the data were statistically analyzed.

3. The data analysis

In order to analyze the data, first descriptive statistics was utilized. Tables of distribution frequency, diagrams, mean and standard deviation were created. Then, for testing the research hypotheses, multivariate variance analysis MANOVA, follow-up test ANOVA in context of MANOVA, multivariate covariance analysis of MACOVA,follow-up test of one –way covariance analysis in context MANCOVA and follow-up test of LSD were utilized.

Table 1. frequency distribution and percentage of samples' performance (Weak performance 0-12), (average performance 13-16),(strong perorrmance17-20)

			before	after	General samples
Rate of performance	low	frequency	86	0	86
		percentage	100.0%	.0%	50.0%
	average	frequency	0	13	13
		percentage	.0%	15.1%	7.6%
	high	frequency	0	73	73
		percentage	.0%	84.9%	42.4%
total		frequency	42	86	86
		percentage	100.0%	100.0%	100.0%

As Table (1) shows, in pre-test the weak performance has the highest frequency, 86 subjects about 100%, and strong and moderate performance has the lowest frequency, 0 subject about 0.0%. in the post –test, however, the strong performance possess the greatest frequency, 73 subjects about 84.9%, average performance, 13vsubjects about 15.1% and weak performance, 0 subject about 0.0%.

Table 2. frequency distribution and percentage of samples' awareness(Weak performance 0-17), (average performance 17-32),(strong perorrmance32-34)

			before	after	General samples
Rate of awareness	low	Frequency	23	0	23
		percentage	26.7%	.0%	13.4%
	average	frequency	63	14	77
		percentage	73.3%	16.3%	44.8%
	high	frequency	0	72	72
		percentage	.0%	83.7%	41.9%
total		frequency	42	86	86
		percentage	100.0%	100.0%	100.0%

According to Table 2, in pre-test average awareness has the highest frequency, 63 subjects about 73.3%, and low awareness has frequency, 23 subject about 26.7% and high awareness had the lowest frequency 0 subject about 0.0%. In the post – test, however, high awareness possesses the greatest frequency, 72 subjects about 83.7%, average awareness, 14vsubjects about 16.3% and low awareness, 0 subject about 0.0%.

Table 3. central indexes and scatterings of scores related to CPR performance and awareness among all students

			number	mean	sd	minimum score	Maximum score
Training workshop and problem solving	Rate of performance	before	86	2.2442	.99334	1.00	5.00
		after	86	18.5814	1.01129	16.00	20.00
	CPR generals	before	86	4.5116	1.76064	.000	9.00
		after	86	8.4767	1.39517	5.00	11.00
	assessment	before	86	3.8140	1.53785	.000	7.00
		after	86	6.8372	1.25427	4.00	9.00
	ventilation	before	86	2.0698	1.27224	.000	5.00
		after	86	4.3953	.87150	2.00	6.00
	circulation	before	86	2.2558	1.56571	.000	5.00
		after	86	5.0000	.95794	3.00	6.00
	Auto shock	before	86	1.0000	.97014	.000	3.00
		after	86	4.0581	1.34911	.000	6.00
	Asphyxiation	before	86	1.9070	1.36879	.000	5.00
		after	86	4.4535	.76169	1.00	5.00
	General awareness	before	86	15.5581	5.31060	2.00	28.00
		after	86	33.2209	3.94790	23.00	39.00

Considering Table 3, mean score of general performance before training ranged 1 to 5 which after training it increased to 16 to 20. Mean scores of rate of awareness for all six areas were from 2 to 28 before training and reached 23 to 39 after training.

As Table 4 indicates, the workshop method could successfully increase performance mean scores of the anesthesia students compared to the nursing students. On the other hand, in field of general awareness in the workshop method, the nursing students achieved higher mean scores rather than the anesthesia students.

As Table 5 shows, the problem solving method could successfully increase performance mean scores of the nursing students compared to the anesthesia students. On the other hand, in field of general awareness in the problem solving method, the nursing students attained higher mean scores rather than the anesthesia students.

As Table 6 indicates level of significance for all tests is 0.001. That is, the mean of tests in at least one of performance and awareness scores either before or after the CPR training (among all students) has a meaningful disparity. It should be mentioned that the Wilks Lambda test value is equal to 0.013 and F test value is equal to -1712.834 that represents a meaningful difference between scores of performance and awareness both before and after CPR training in

level of significance 0.001. to examine the difference between scores of CPR performance and awareness before and after training among all samples, the one – way variance analysis MANOVA was utilized. Table 13 represents the results.

Table 4. central indexes and scatterings of scores related to CPR performance and awareness among all students in workshop method (mean scores differences of before and after the test)

mean			**sd**
Rate of performance	Anesthesia	18.300	.207
	Nursing	17.880	.185
CPR generals	Anesthesia	7.850	.321
	Nursing	8.920	.287
assessment	Anesthesia	7.050	.278
	Nursing	7.320	.249
ventilation	Anesthesia	4.100	.194
	Nursing	4.120	.174
circulation	Anesthesia	4.550	.228
	Nursing	5.360	.204
Auto shock	Anesthesia	2.950	.303
	nursing	4.200	.271
Asphyxiation	Anesthesia	4.200	.195
	Nursing	4.320	.174
General awareness	Anesthesia	30.700	1.029
	nursing	34.240	.920

Table 5. central indexes and scatterings of scores related to CPR performance and awareness among all students in problem solving method (mean scores differences of before and after the test)

Mean disparity			**Sd**
Rate of performance	Anesthesia	19.000	.161
	Nursing	19.316	.173
CPR generals	Anesthesia	8.591	.273
	Nursing	8.421	.294
assessment	Anesthesia	5.727	.187
	Nursing	7.263	.201
ventilation	Anesthesia	4.727	.169
	Nursing	4.684	.182
circulation	Anesthesia	4.773	.166
	Nursing	5.263	.178
Auto shock	Anesthesia	4.500	.222
	nursing	4.526	.239
Asphyxiation	Anesthesia	4.591	.123
	Nursing	4.737	.132
general awareness	Anesthesia	32.909	.490
	nursing	34.895	.527

Table 6. results of multivariate variance analysis MANOVA on CPR performance and awareness before and after training among all students

Name of test	value	F	df	Error degree of freedom	Sig.
	.987	1712.834	7.000	164.000	0.001
Wilks Lambda	.013	1712.834	7.000	164.000	0.001
	73.109	1712.834	7.000	164.000	0.001
The largest root	73.109	1712.834	7.000	164.000	0.001

Table 7. results of monovariate variance analysis in context MANOVA on CPR performance and awareness before and after training among all students

		Sum of squares	df	Mean of squares	F test	Sig.
Training workshop and problem solving	Rate of performance	11476.890	1	11476.890	11422.97	.0010
	CPR generals	676.052	1	676.052	267.936	.0010
	assessment	393.023	1	393.023	199.597	.0010
	ventilation	232.558	1	232.558	195.582	.0010
	circulation	323.814	1	323.814	192.227	.0010
	Auto shock	402.145	1	402.145	291.274	.0010
	Asphyxiation	278.843	1	278.843	227.278	.0010
	General awarenss	13414.890	1	13414.890	612.715	.0010

According to Table 7, the F value for mean of performance and awareness of CPR among all students in level of significance 0.01 is meaningful. Thus, H0 is rejected and the test is meaningful. As a result, it can be concluded that with 99% level of confidence there is a meaningful difference between scores of performance and awareness of CPR for all students before and after training. This disparity, is evidently shows the impact of training on increase of performance and awareness scores. In other words, CPR training through workshop and problem solving methods for all students in all areas maximizes the general awareness in comparison to before traing stage. This proves, therefore, the effectiveness of CPR training with both methods.

Table 8. results of multivariate variance analysis MANCOVA on CPR performance and awareness in workshop training (with controlling pre- training stage)

Name of test	value	F	df	Error degree of freedom	Sig.
Pilaei effect	.337	2.690	7.000	37.000	.023
Wilks Lambda	.663	2.690	7.000	37.000	.023
Heelting effect	.509	2.690	7.000	37.000	.023
The largest root	.509	2.690	7.000	37.000	.023

As Table 8 indicates level of significance for all tests is 0.001. That is, the mean of tests in at least one of performance and awareness scores between anesthesia and nursing students through workshop method (with controlling the pre-training stage) has a meaningful disparity. It should be mentioned that the Wilks Lambda test value is equal to 0.663 and F test value is equal to -2.690 that represents a meaningful difference between scores of performance and awareness for both anesthesia and nursing students in training thorough workshop method (with controlling the pre-training stage) in level of significance 0.001. To examine the difference between scores of CPR performance and awareness among anesthesia and awareness students, the one – way covariance analysis in context MANCOVA was utilized. Table 15 represents the results.

Table 9. results of monovariate variance analysis in context MANOVA on CPR performance and awareness in workshop training (with controlling pre- training stage)

		Sum of squares	df	Mean of sqaures	F test	Sig.
Training workshop method to anesthesia and nursing students (with controlling the stage before the training)	Rate of performance	1.960	1	1.960	2.288	.1380
	CPR generals	12.721	1	12.721	6.189	.0170
	assessment	.810	1	.810	.525	.4730
	ventilation	.004	1	.004	.006	.9390
	circulation	7.290	1	7.290	7.011	.0110
	Auto shock	17.361	1	17.361	9.456	.0040
	Asphyxiation	.160	1	.160	.211	.6480
	general awareness	139.240	1	139.240	6.574	.0140

Table 10. follow-up test of LSD for evaluation of possible differences between scores of CPR performance and awareness in workshop method for all anesthesia and nursing students

		disparity of means	Sig.
Rate of performance	Training workshop anesthesia-nursing	.420	.1380
CPR generals	Training workshop anesthesia-nursing	-1.070	.0170
assessment	Training workshop anesthesia-nursing	-.270	.4730
ventilation	Training workshop anesthesia-nursing	-.020	.9390
circulation	Training workshop anesthesia-nursing	-.810	.0110
Auto shock	Training workshop anesthesia-nursing	-1.250	.0040
Asphyxiation	Training workshop anesthesia-nursing	-.120	.6480
General awareness	Training workshop anesthesia-nursing	-3.540	.0140

According to Table 9, the F value for mean of rate of performance, CPR generals, assessment, ventilation, circulation, auto shock, asphyxiation and general awareness in level of significance 0.01 is meaningful. Thus, H0 is rejected and the test is meaningful. As a result, it can be concluded that with 99% level of confidence there is a meaningful difference between scores anesthesia and nursing students in all six areas (with controlling the pre-training stage). This difference is toward the nursing students who received trainings via workshop. In other words, CPR training through workshop among the nursing students could maximize their mean scores in CPR generals, assessment, ventilation, circulation, auto shock, asphyxiation and general awareness in comparison to anesthesia students' mean scores. The mean scores of nursing and anesthesia students trained via workshop displayed no meaningful difference in 0.01 level of significance.

The results of Table 10 represent that mean score difference of CPR generals, circulation, auto shock, and general awareness among nursing and anesthesia students trained with workshop method are meaningful in 0.01 level of significance. This difference is larger for CPR generals, circulation, auto shock, and general awareness among nursing students who were trained through workshop. That is, in CPR generals, circulation, auto shock, and general awareness had a better efficiency for nursing students compared to anesthesia students in training.

Table 11. results of multivariate variance analysis in context MANCOVA on CPR performance and awareness in problem solving training (with controlling pre- training stage)

Name of test	value	F	df	Error degree of freedom	Sig.
Pilaie effect	.557	5.938	7.000	33.000	0.001
Wilks Lambda	.443	5.938	7.000	33.000	0.001
Heelting effect	1.260	5.938	7.000	33.000	0.001
The largest root	1.260	5.938	7.000	33.000	0.001

As can be seen in Table 11, all level of significance are meaningful in 0.01. this shows that mean scores of samples have a difference in one of rate of CPR performance and awareness among anesthesia and nursing students trained by problem solving method (with controlling pre-training stage). It should be said that the Wilks Lambda test value equal 0.443 and F value 5.938. these values indicate a meaningful difference in mean scores of performance and awareness scores among nursing and anesthesia students in the problem solving method (with controlling pre-training stage) in level of significance 0.01. To do more examination on possible differences among mean scores of performance and awareness of the students in problem solving method (with controlling pre-training stage) the one –way covariance analysis in context MANCOVA was used. Table 18-4 presents the results.

Table 12. results of monovariate variance analysis in context MANCOVA on CPR performance and awareness in problem solving method (with controlling pre- training stage)

		Sum of squares	df	Mean of squares	F test	Sig.
Problem solving method to anesthesia and nursing students (with controlling the stage before the training)	Rate of performance	1.017	1	1.017	1.794	.1880
	CPR generals	.294	1	.294	.179	.6740
	assessment	24.050	1	24.050	31.215	.0010
	ventilation	.019	1	.019	.030	.8630
	circulation	2.452	1	2.452	4.061	.0490
	Auto shock	.007	1	.007	.007	.9360
	Asphyxiation	.217	1	.217	.651	.4250
	general awareness	40.197	1	40.197	7.625	.0090

As Table 12 shows, the computed F value for mean scores of assessment, circulation ad general awareness in 0.01 error of measurement is meaningful, this H0 is rejected and the test is significant and a difference exists between two groups of anesthesia and nursing students in problem solving method (with controlling pre-training stage). it can be said that, with 99% level of confidence there is a meaningful difference between mean scores of assessment, circulation and general awareness among the nursing and anesthesia students in the problem solving method (with controlling pre-training stage). This difference so, is toward the nursing students who received trainings in fields of assessment, circulation and general awareness through the problem solving method. In other words, training through the problem solving method could increase the nursing students' mean scores of assessment, circulation and general awareness higher than the anesthesia students. Considering other areas of awareness and performance, the problem solving method created no meaningful difference between students' mean scores in 0.01 error of measurement.

Table 13. follow –up test of LSD for detailed examination of possible difference between mean scores difference of CPR awareness and performance with problem solving method among nursing and anesthesia students

		Disparity of means	Sig.
Rate of performance	Problem solving anesthesia-nursing	-.316	.188
CPR generals	Problem solving anesthesia-nursing	.170	.674
assessment	Problem solving anesthesia-nursing	-1.536	.001
ventilation	Problem solving anesthesia-nursing	.043	.863
circulation	Problem solving anesthesia-nursing	-.490	.049
Auto shock	Problem solving anesthesia-nursing	-.026	.936
Asphyxiation	Problem solving anesthesia-nursing	-.146	.425
general awareness	Problem solving anesthesia-nursing	-1.986	.009

Results of Table 13 indicate that mean scores disparity of assessment, circulation and general awareness among anesthesia and nursing students who trained via the problem solving method in level of 0.01 is meaningful, this difference is toward the nursing students who trained CPR operation via the problem solving method. That is, the nursing students were more efficient than the anesthesia students were in areas of assessment, circulation and general awareness.

4. Conclusion and discussion

The present research was an attempt for removing problems on CPR trainings. In this regard, two problem solving and workshop were considered in educating CPR and its impact on the nursing and anesthesia students' performance and awareness of medical sciences university of dezful. The achieved results showed that before training 23 subjects, 26.7% possessed low awareness (0-20), 63 subjects 73.3% had average awareness (23-34) and no subject found with high rate of awareness. These results is in accordance with Almasoudi (2012), Makinen (2010), Ildiko (2010), Kocaman (2009), Ozturk (2008), Chun (2008), Aari (2008), Sern (2008),Afzal Zadeh (2011), Cheraghi (2011), Norouzi (2011), Shjaei (2011), Abedini (2010), Zarshenas (2010), Baghchi (2010), Abolhasani (2010), Jafari (2009), Madanlou (2009), Sadegh zadeh (2009), Omidi far (2009), Panjouei (2007), and Brim nejad (2007)

5. Recommendations:

1. It is suggested that more future studies should be conducted on similar population for reaching exact data and comparison.
2. It is suggested that some students are carried out for measurement of sustainable learning of students after a six month period on their rate of awareness and performance.
3. It is recommended that in the future researches for assessment of students' performance OSCE test and checklist are used for simultaneous evaluation and the results compare together.
4. It is suggested that for validation of the current research results, other similar studies get administered in other medical majors in order to expand the power if generalizing results.

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