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Survey of the awareness level of nurses about last guidelines 2010 of cardiopulmonary resuscitation (CPR) in educational hospitals.

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ABSTRACT

Aims: Cardiopulmonary resuscitation (CPR) is the most important skill of clinical staff and it is necessary for them to be aware of its last changes. This study had been done to determine the awareness level of nurses of the last 2010 CPR guidelines.

Methods: This descriptive cross-sectional study was conducted with 321 samples, which had been chosen with sample randomly method in Kermanshah's hospitals in 2011. The tools for collecting data were a researcher made questionnaire with face and content and reliability of (r=%74). Data was analyzed by STATA-11 software and ANOVA, Tukay,Tamhane and Bonferoni tests.

Results: Level of awareness was classified to: %20.2 excellent, %65.4 good, %14 moderate and %3 weak. There was no significant statistical correlation between level of awareness and age, work experience and graduate degree, but level of awareness was higher in nurses that had experience of passing CPR training, doing or observing it ($p<0.001$). The most score of awareness was related to external cardiac massage.

Conclusion: It is suggested that to teach CPR according to guidelines of 2010 in nurses postgraduate training and to have more emphasis on electroshock therapy and Automatic External Defibrillation (AED), Laryngeal Mask Airway (LMA) and combitube intubations, reasons of termination and undoing of CPR interaoseus injection and induced hypothermia.

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1. Introduction

The most important clinical staffs' skill in saving injuries and patients' life is CPR. The

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first international congress of resuscitation in 1973 regarded this way as a necessary action for saving life and suggested general teaching in the world. From 1979, 1985, 1992, 2000, 2005, 2010 up to now the resuscitation program has been studied and progressed [1]. Perhaps the most important suggestion in basic resuscitation program is the usage of foreigner automatic electroshock by amateurs' people [2]. In the new resuscitation guideline, about cardiac massage, it has been emphasized on the fast and tough pressure at the beginning of the witness's resuscitation program. This kind of massage has to be done at least with the pace of one hundred times per minute for all the victims except the infants with less than one month. It is necessary that after every massage the chest returns to its first place and cardiac massage must not be stopped for any different reasons. The ratio of cardiac massage to the respiratory ventilation in resuscitation action has been changed to the ratio of thirty massages to two respirations in all the ages and in one or two amateur rescuers and just in professional rescuers for kids, the ratio of fifteen to two has been recommended [3]. For the infants of less than one month in hospital the ratio is three to one [4].

Respiration must be given in a second in all the ages and must cause rising of the chest and hyperventilation must be prevented. In electroshock therapy one time-shock has been recommended and immediately after that with the beginning of cardiac massage, ventilation must be continued for two minutes. This should be continued for at least five cycles or two minutes and the cardiac rhythm must be controlled again. In the case of using AED (Automatic External Defibrillation) according to the maker companies, control permission of the rhythm after two minutes has been given [5]. In the new resuscitation it hasn't been recommended to use the pace maker for Asystol and there was an emphasis on the continuous of resuscitation and medication [3]. The most important medicine in resuscitation is Epinephrine, but there are some reports about the possible effect of Vasopressin after the failure of being cured by Epinephrine and electroshock [1]. The way of prescription of resuscitation medicines is intravenous but interaoseus injection is used as the current method in the cases that there is no access to the vein and it is more preferable to endotracheal method [2]. After that the successfulness of resuscitation has been proved, it is recommended to use induced hypothermia with temperature of 32 to 34 centigrade at a period time of 12 to 24 hours and to be heated again after 24 hours [6].

In the new recommendations the resuscitation of pregnant mothers, resuscitation general interventions in addition to the replacement of womb to the left side with sleeping the patient to the left side to the extent of fifteen to thirty degrees (that the path of inferior venacava is open), cardiac massage in a part higher than the center of sternum, electroshock therapy according to the remedial guidelines of VT and VF and sometimes emergency Hysterectomy are recommended [3, 6]. In the infants that have cyanosis with pulse more than one hundred, oxygen must be prescribed from freeway and if with these actions cyanosis signs are not disappeared, ventilation with positive pressure and putting tube in endotracheal must be used. In the case of needing to cardiac massage , the number of massage is between one hundred to one hundred twenty per minute with doing ventilation to the extent of 40-60 times per minute [3].

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Table 1: 95% of confidence interval for scores of CPR awareness level in different graduate degree.

Graduate degree	Score
Associate diploma	21.61-26.86
BS	25.53-26.73
Discontinued BS	25.38-30.31
MSc	25.38-30.39

Need of awareness of these principles and correct usage of knowledge in the practicable form is among teaching obligations to the nursing students [7] and the occupied nurses [8] that in addition of foreign country the effect of education program in learning and awareness of resuscitation principle has been indicated in Iran too [9]. In medical university of Oroumieh, nurses' dexterity in using electroshock has been reported at a high level [10]. It is while it has been reported that in medical university of Ardebil, high percent of internes were not at an acceptable level of theory awareness and practicable skills [11]. Either in Tehran medical university, the awareness of medical staff about resuscitation principles is remarkably imperfect [12]. Persh and colleagues (2010) in Hidenberg University of Germany reported that awareness of nurses about resuscitation pattern of 2010 is little [13]. Nagashima and colleagues (2003) in Japan studied the awareness of nurses about the new guidelines of new CPR too and reported that many of them are not aware of the last CPR guidelines [14] (Table 1).

Observance of important practicable points that had been indicated in the last resuscitation guidelines can add to the successful cases of resuscitation and it is necessary that all the people who are active in CPR action use these suggestions and recommendations in a way, teach them, observe and manage doing of them in clinical environment. Regarding the importance of this issue and mentioning this point that there was no similar study in Kermanshah's medical university up to now , and the necessity of this issue that knowing the awareness and knowledge level of nurses is one of the most important elements of training need assessment for regulating postgraduate teaching program, this survey has been done with the main goal of "determining the level of awareness of nurses staff of Kermansha's selected hospitals about the last resuscitation guidelines of 2010."

2. Methods

This descriptive cross-sectional study had been done in nurses society of Kermanshah and the number of samples had been estimated to 330 people, this number was with noticing to the gained number of the pilot study with the confidence interval of 95 percent and power of 90 percent for comparing in four groups that has been chosen with simple randomly form and with noticing to the nurses list of every hospital. The most important limitation of the research was decreasing the number of nurses in one of the educational centers of Kermanshah that according to the statistical estimation 66 people had to be participated in this study that after referring to this center we could have sampling from 57 nurses. The reason of decreasing the number of nurses was retirement of some of them in the current year. With informing the statistical counselor and being sure that the results are not distorted, the information had been entered in statistical software. So the final number of samples reached to 321 people. After collection of the data, descriptive and presumption analysis had been done with using STATA-11 statistical software. For summarizing the data, counting of the average and indicators standard deviation

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and determining the percent had been used. For analyzing the data according to quantitative and qualitative characteristics, two-dimensioned tables in number and percent form had been used for investigating the equality of variance of three groups, ANOVA test and for comparing the scores of the groups, one-sided variance analysis and compares test of Piesen Tukey , Bonferoni and Tamhin had been used and $p<0.05$ was regarded significant.

Tools for collecting data were a researcher made questionnaire included demographic questions and forty questions about the level of awareness of CPR. Questions from one to seven were about the main rules of beginning and ending CPR, questions from eight to eighteen were the principles of establishing artificial ventilation and management of airway, questions from nineteen to thirty were about principle of external cardiac massage and questions from thirty one to forty studied progressed resuscitation principles. For determining the face and content validity questionnaire the ideas of 25 members of board were used that included: four anesthesia specialists, two anesthesia with M.S. degree and sixteen people with M.S. degree of nursing and three people with midwifery M.S. degree and for determining reliability with doing preliminary survey with 29 people chosen by randomly sampling and by using Alfa Kronbakh formula had been counted (r=0.74). The average score of questionnaire was 20.62 (±7.45). According to these distinctions, acquiring mark was classified like this: from 31 to 40 excellent, from 21 to 30 good and from 11 to 20 moderate and less than 10 weak. About total validity of the questionnaire regarding moral considerations, participating in research was obligatory for staffs and the final results were in the hand of the manager of selected hospitals and deputy of treatment, permission of doing the research has been taken from the manager of paramedics college, deputy of research assistant and manager of educational and treatment centers of research environment and permission for doing he research was taken from deputy of educational and had been communicated to the remedial-hygienic selected centers of Kermanshah.

3. Results

The average age of the samples was 32.76 (±7.35) years, that the most average age was related to Imam Khomeini hospital and the least one was related to Taleghani hospital. The average of job experience was 9.43 (±8.26) years. 22.7 percent was men and 77.3 percent was women. There was no statistical significant difference between awareness level of men and women. %6.5 technician, % 86.6 bachelor and %4 discontinuing bachelor and %2.8 were master. Although the average distinction of awareness level in samples with master degree was higher than other degrees, this finding was not statistically significant(table). %39.9 of nurses was working in intensive unit, %20.6 in internal ward, %19.6 in emergency ward, %7.8 in surgery ward, and %4.4 in CCU. %60.4 of nurses had the experience of passing CPR training period that the most one was related to Imam Reza hospital with %75 and Imam Ali hospital with %66.7 and the least one was in Taleghani hospital with %50.8. %80.1 had the experience of doing CPR that the most one was in Taleghani hospital with %93.8, and %69.9 had the experience of observing CPR completely.

Level of awareness of nurses of the last CPR guidelines was classified to: %20.2 excellent, %65.4 good, %14 moderate and %3 weak. The average of distinction of awareness level was

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Table 2: Questionnaire

No	Questions	Right answer	Wrong answer
1	If the patient needs CPR we must wait for the coming of doctor as the leader of resuscitation team.	90.7	9.3
2	Midrise double is a criterion for not starting CPR.	19.6	80.4
3	Leaving CPR to specialist must be continued until returning of vital signs or assurance of certain death of the patient.	94.7	5.3
4	In the case of the patient's family request CPR can be stopped.	25.2	74.8
5	If rescuer's life is in danger, CPR can be stopped.	51.1	48.9
6	Doing CPR in frozen bodies, neck cutting, peripheral cyanosis and situations that there is no hope for improving the patient, is not necessary.	66.3	33.8
7	According to the neurologic position of patient (decrease level of Consciousness/limbs paralysis) CPR can be stopped.	7.5	92.5
8	Before starting artificial ventilation, opening airway is necessary.	93.1	6.9
9	The first ventilation in CPR is with two repeated respirations to the patient	78.8	21.2
10	In CPR current in the hospital using oxygen with high percent is necessary.	67.2	32.8
11	The chest must come up clearly with every artificial respiration.	86.0	14.0
12	At the beginning of CPR doing hyperventilation is necessary.	29.9	70.1
13	Length of time for artificial respiration is one second in all the ages.	36.8	63.2
14	When the rescuer is one person, doing artificial respiration in mouth to mouth form or from mouth to mask is more effective than ventilation with bag valve mask.	43.0	57.0
15	Kapnograpghy is the most reliable way of assurance of putting endotracheal tube in windpipe.	46.7	53.3
16	There is no need to laryngoscope for preparation of LMA and combitube.	43.0	57.0
17	The most stopping time of cardiac massage for putting endotracheal tube is 10 seconds.	66.7	33.3
18	At the time of controlling of putting endotracheal tube in windpipe, cardiac massage must be stopped.	38.6	61.4
19	In unwitness cardiac arrest, at first cardiac massage and respiratory ventilation must be given in two complete minutes.	78.5	21.5
20	After two minutes of complete cardiac massage and respiratory ventilation is the first time for controlling of existing of pulse in patient.	80.1	19.9
21	The necessary time for existing or not existing of the pulse in patient is 10 seconds.	64.1	35.9
22	In the first minutes of witness cardiac arrest, cardiac massage is more important than respiratory ventilation.	79.4	20.6
23	Cardiac massage must be done tough and fast.	62.6	37.4
24	The least times of cardiac massage are 100 times per minute in all the ages (except infants).	59.8	40.2
25	Ratio of cardiac massage to respiration in all the ages for usual rescuers is 30 to 2.	72.8	27.2
26	Ratio of cardiac massage to respiration in hospital is 3 to 1 in infants.	47.0	53.0
27	Ratio of cardiac massage to respiration in kids when the rescuers are professional and they are two is 15 to 2.	70.7	29.3
28	Adults' chest must be pressed to the extent of 4 to 5 centimeters in every massage.	87.9	12.1
29	For every massage, the place of putting heel of the hand of rescuers is in the middle of chest and between the lines that attached the head of the chest.	82.6	17.4
30	After every massage it must be permitted that chest returns to its first place completely.	80.1	19.9
31	In the case of Ventricular Fibrillation (VF), shock must be given three times.	29.6	70.4
32	Out of hospital, before using automatic electroshock (AED) CPR must be done for complete two minutes.	68.2	31.8
33	If the rescuer doesn't know energy extent for finishing Ventricular Fibrillation (VF), 200 joule in Biphasic machine and 360 joule in Monophasic must be chosen.	26.8	73.2
34	If the pulse did not return after electroshock unloading, CPR must be continued for two minutes.	77.9	22.1
35	In the case of Asystole skin pace maker must be used.	43.3	56.7
36	After failure of being cured with Epinephrine and Defibrillation medicine, vazopresin can be used.	49.2	50.8
37	If you couldn't have venous puncture from the patient, interaoseus injection is recommended.	38.0	62.0
38	The first medicine for controlling Ventricular dysrrhythmias is Amiodaron.	58.6	41.4
39	Dosage of injected interaoseus medicine must be 2-2.5 times of venous dose.	25.0	75.0
40	If CPR was successful in adults induced hypothermia must be used.	36.8	63.2

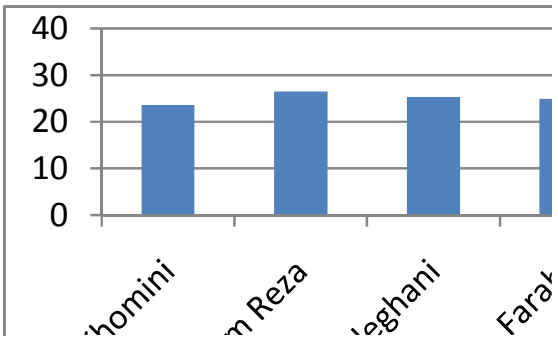
26.08 (±5.14) with domain of 6 to 38. Graph number [1] shows the average of distinction with distinguishing the hospitals in the study. Because the variance is not equal among the

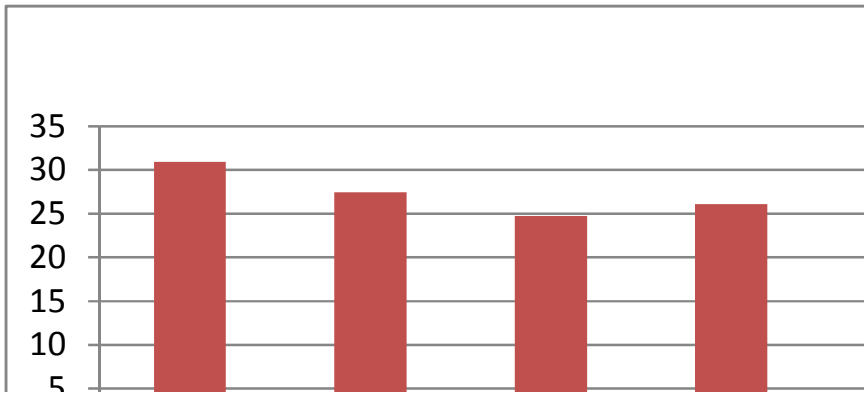
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groups, Valkh test was used instead of F test that shows significant statistical difference between the average of distinction of the hospitals in the study (p=0.001). Piesen Tamhane comparative test showed that distinction of awareness level of Imam Khomeini hospital is less than Imam Reza hospital (p=0.019), Imam Reza Hospital is less than Imam Ali Hospital (p<0.001)and Taleghani and Farabi hospital are less than Imam Ali (p<0.001). There was not any statistical significant correlations between distinction of level of awareness and age , and job experience and graduate degree but level of awareness was more in nurses that had the experience of passing CPR period, doing resuscitation or observing resuscitation (p=0.001).

The relative abundance of excellent distinction was like this: %47 in Imam Ali Hospital, %27.9 in Imam Reza Hospital and %10.7 in Farabi Hospital and the most relative abundance of excellent distinction was in nurses of CCU ward (%57.1). ICU ward (%32) and nurses of internal ward (%12.1). Statistical test of ANOVA showed that the difference of awareness level in different wards is statistically significant (p<0.001) in a way that according to comparative statistical test of Bonferoni, the average of awareness distinction in intensive unit was more than internal ward (p= 0.006) in internal ward was less than CCU (p<0.001). In intensive unit was more than operation room and emergency room (p=0.005). Graph number [2] shows the average of distinctions in the wards of study separately.

The questionnaire studied four compasses in CPR content, that included: questions from one to seven, about main rules of beginning and ending CPR, questions from eight to eighteen, about principles of establishing artificial ventilation and airway managment, questions from nineteen to thirty , about investigating principles of external cardiac massage and questions from thirty one to forty studied main advanced resuscitation. The most average of distinction was the awareness level related to principles of external cardiac massage. In compass of main rules of beginning and ending of CPR, there was not significant statistical





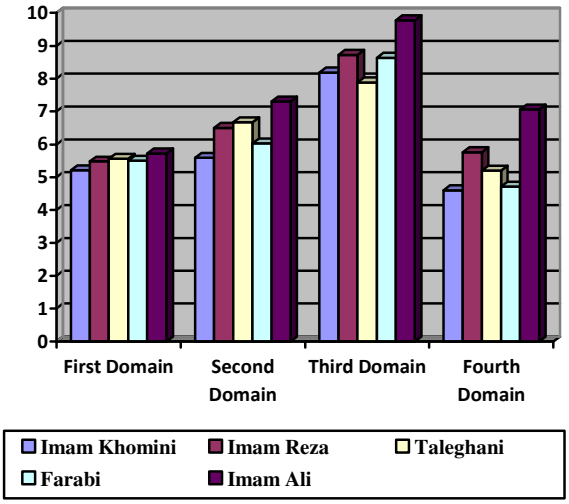
Graph 2: The average of awareness distinction scores from CPR in different unit of the workplace

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difference between treatment centers of the study. In other compasses the average of distinctions of awareness level of nurses in Imam Ali Hospital was statistically significant more than other treatment centers ($p<0.001$) Graph number3 shows the average of distinction of the samples of the study in different treatment centers according to the four-compassed of CPR content. Table number [2] shows the percent of giving answer of the samples of the study to the questions of studying the awareness level of nurses from the last changes of CPR guidelines in 2010.

4. Discussion

In this study level of nurses' awareness from the study from the last changes of resuscitation actions according to the guidelines of 2010 was %20.2 perfect, %65.4 good, %14 moderate and %3 weak. Pasaly and colleagues (2011) reported that nurses and doctors' awareness level of Greece about BLS and ALS principles is not enough [16]. Persh and colleagues (2010) in Hidenburg University of Germany reported



Graph 3: The average of distinctions of the samples in the study in different remedial centers according to four-compassed content of CPR.

lack of knowledge and awareness and necessity of teaching basic resuscitation actions according to 2005 pattern [13]. Nagashima and colleagues (2003) in Japan also reported that many of nurses are not aware of the last CPR guidelines and suggested that there is necessity of more teaching of CPR to nurses [14]. Either in Iran Pouranaraki and colleagues (1998) reported that the awareness of medical staff about CPR principles is not remarkably enough [12]. Lack of knowledge about CPR is not only reported among clinical nurses but also it is among hygiene nurses of China society [17] and investigation of awareness level of 1054 nurses, doctors and nursing students in India show extreme lack of awareness about BLS [18].

In this study there was not statistical significant difference between awareness level of nurses in men and women but Entezari and colleagues (2002) In Ardebil reported that level of CPR practicable skill in men is significantly more than women [11]. There was no significant statistical difference between distinction level of awareness and age, job experience and graduate degree in this study that is similar to the result of Barimnejad and colleagues (2007) about the lack of positive effect of job experience in CPR awareness level of nurses [19] but in Mohsenpour and colleagues' study (2009) in Kerman it is reported that engagement situation and job experience have positive effect on nurses' awareness level and also it is significant [20]. In this survey awareness distinction level in nurses that had experience of passing CPR period, having experience of doing CPR and observing CPR was statistically more significant, but in Barimnejad's study, passing CPR experience had no effect on awareness level [19]. Regarding positive effect of passing CPR

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period in this study, this finding is an emphasis on establishing CPR training workshops at least in every six months for all the nurses that has been emphasized in Karami's study too (2009) [20].

In this study the most awareness level had been seen among the nurses who are working in CCU, ICU and nurses in internal ward that was statistically significant. This finding of research was equal to the finding of Mohsenpour and colleagues' research in Kerman and it can be because of more CPR happenings in intensive unit. In the present study, four compasses were studied in CPR content that the most awareness level was in cardiac external massage principles that confirms findings of Mohsenpour and colleagues' research in Kerman [21]. The least awareness level was in advanced resuscitation principles that emphasized Pasaly and colleagues (2011) [16] and Preston and colleagues (2009) [22]. The most important reason of lack of nurses' awareness in this issue had been introduced lack of enough skill in investigation and knowing needs of patient by Preston and colleagues (2009). In doctors that are graduated recently, this lack of clinical awareness and competence in progressed resuscitation principles can be because of lack of enough training in emergency medicine [23]. Regarding this finding of the research, it is necessary that teaching progressed resuscitation principles exists with more emphasis on postgraduate training of nurses. This research suggestion for increasing progresses CPR quality was given in Perkins and colleagues' study too (2008) [24]. Regarding the importance of progressed CPR quality it is suggested that in the case of lacking doctors, nurses that passed a period in ALS can be used in resuscitation actions current [25].

Awareness level in main principles of beginning and ending CPR and principles of establishing artificial ventilation and air way management was in acceptable extent in this study. It is while lack of awareness about BLS has been reported in different studies [27,26,18,14,13,12]. Regarding the designing of questionnaire that in addition to studying CPR principles, it studies new changes of CPR according to resuscitation guidelines of 2010, this finding is expectable and it studies the new suggestions about 2010 CPR guidelines and awareness level of the samples in the study in continues.

In issues related to electroshock therapy and using AED (questions of 31 to 33), awareness level of samples of the study was not in acceptable extent than confirms results of Barimnejad and colleagues' study [19] and also Bakhsha and Behnampoor's(2006), [28]. It is suggested that in post graduate training programs of CPR, more exact teaching in these issues especially about using AED should be done. The suggestion had been given in Zantes and colleagues' study too (2009) and it has been said that in post graduate training program of nurses in BLS and using AED, teaching to nurses that passed the period is more effective than doctors [29].Question number 16 of the questioner indicated preparation of LMA and Combitube that awareness level of the samples of the study was not at an acceptable extent about them. Regarding emphasis on using these airways of Superaglotic in resuscitation guidelines of 2010, it seems essential that necessary teachings about this issue should be given in nursing postgraduate training. This suggestion of the researchers has been confirmed by Vice and colleague's study (2008) which indicates more effectiveness of using LMA in compare with AMBU bag for

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managing airway by nurses [30]. Questions from 2 to 6 of the questionnaire were about the ending and not starting CPR that the awareness level of the nurses in the study was not in acceptable extent. It is necessary that like Morsen and colleagues' study (2007), nurses be aware of legal aspects and correct examples of beginning or ending of CPR in post graduate training program [31]. Two important questions of the questioner was using interaoseus injection instead of endotracheal injection and induced hypothermia that the awareness level of the study was in weak extent and it is necessary that these two important matters to be thought in postgraduate program of nurses. Regarding the results of this study, teaching postgraduate training of nurses in CPR issues has to be thought according to the last recommended guidelines in scientific associations and continuous teaching program is recommended for increasing awareness level of nurses [32] in a way that in order to have permanent learning time interval of every six months for passing this period is highly recommended [19].

In this study, awareness level of nurses who participate in the study from Imam Ali Hospital was more than other samples from other hospitals. Regarding this issue that Kermanshah's Imam Ali Hospital is an extra special center of treatment of cardiovascular diseases, this finding was expectable.

5. Conclusion

Regarding this study nursing postgraduate training program in CPR issues has to be thought according to the last recommended guidelines in scientific associations and there must be more emphasis on electroshock therapy and AED, LMA, Comitube and causes for ending, not starting CPR, interaoseus injection and induced hypothermia.

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