International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

ISSN:2347-6567

IJAMSCR |Volume 7 | Issue 2 | Apr - Jun - 2019
www.ijamscr.com

Research article *Medical research*

Effect of an in service training program for intensive care nursing staff in their knowledge and practice - khartoum state 2014-2017

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ABSTRACT

Background

Cardiopulmonary resuscitation is the emergency procedure used to salvage victims of cardiac and respiratory arrest. It should be carried out with great urgency to avoid permanent brain damage or even death that would result if the victim stays from 4 to 6 minutes without oxygen.

The aim of study

To assess the effectiveness of structured teaching program on the knowledge and skills of cardio pulmonary resuscitation among the nursing staff in the Khartoum Teaching, Ahmed Gasim, Omdurman Teaching, and the Khartoum North Teaching hospitals.

Methods

A quasi experimental design pretest/posttest for the same group. The study was conducted in the intensive care units in Khartoum hospitals. The study sample consisted of 100 nurses. Data was collected by a questionnaire and an observational checklist. The intervention program was in a form of lectures guidelines book. Data were analyzed using Statistical Packages for Social Sciences (SPSS).

Results

The study showed the knowledge grades before implementation of the program were, poor in 42%; good in 22% and very good in 36% of the participants. Whereas after implementation of the program knowledge grades became, 3% poor; 16% good and 81% very good, (p value 0.001). also the study revealed that, Nurses' skills before implementation program poor (57%) good (31%) very good (12%). Nurses' skills after implementation program poor (4%) good (18%) very good (78%), (P value 0.002).

Conclusion

The study concluded that educational program had a significant impact related to the improvement of the nurses's knowledge and practice post application of the program.

Keywords: Training program, Knowledge, Practice, Nurses, Intensive Care Unit.

INTRODUCTION

Cardio pulmonary resuscitation (CPR) is a combination of mouth to mouth rescue breathing and chest compressions. It helps to keep blood and oxygen circulating to the heart and brain of a person whose heart has stopped beating. The term CPR is used to describe all aspects of basic life support, the initial establishment and/or maintenance of airway, breathing, circulation, defibrillation and related emergency care [1]. Cardiopulmonary resuscitation is the emergency procedure used to salvage victims of cardiac and respiratory arrest. It should be carried out with great urgency to avoid permanent brain damage or even death that would result if the victim stays from 4 to 6 minutes without oxygen [2]. According to the World Health Organization (WHO) in 2008, 17 million people (48% of all deaths) died due to cardiovascular diseases, and mainly because of cardiac arrest [3]. It has been documented that 33% to 40% of cardiac arrests in developed countries occur in the hospital setting, and of the arrests that occur in the hospital setting more than 60% are first recognized by nurses (WHO, 2009). Therefore, in order to ensure patient survival, nurses who are often the first responders in resuscitation should be adequately prepared to provide effective advanced cardiac life support (ACLS) [4]. Nurses must improve their skill with training and repeated practice. For this reason, nurses must learn this skill, especially in their first aid lectures during nursing education. This training must be repeated, as studies have shown that the current level of CPR knowledge and skills is insufficient, and that there is a significant decrease in knowledge and skill retention of skills after a while. The training must be repeated after a specific period of time. If the skills are not used frequently, they can be forgotten over a short amount of time. CPR skills need to be maintained and practiced regularly. Repeating the CPR training will prevent the loss of knowledge and skills. [5]

METHODOLOGY

The methods begin by presenting the research design, followed by setting and duration of the study, sample, sample size, data collection technique and tools, phases of the study, validity and reliability of instruments and ethical consideration.

Study design

A Quasi-experimental study: pretest and posttest for the same group.

Study setting

Four hospitals were (Khartoum Teaching Hospital, Ahmed Gasim Hospital, Omdurman Teaching Hospital and Khartoum North Teaching Hospital chosen for this study, Khartoum state, Sudan.

Sample

Nursing staff providing the patients nursing services in the intensive care unit in Khartoum Teaching hospital, Ahmed Gasim Hospital, Omdurman Teaching Hospital and the Khartoum North Teaching Hospital.

Sample size

The recommended sample size given by the total coverage of nurses. So the total numbers of participants were 100.

Data collection technique and tools

Two tools were used to collect the needed data to achieve the aim of the study, they were: a self-administered questionnaire for this assessment of knowledge and an observational checklist to assess practice.

Data analysis

The collected data as pretest and posttest organized, categorized, tabulated using mean and standard deviation. The statistical package for social sciences (SPSS version 20) was used for analysis.

Phases of the study

Pre intervention phase

Baseline survey was conducted.

Intervention phase

Started from (July-October, 2016), the education was given through Lectures, vides, group discussion, booklets and seminars. The contents of the program were assigned to, include basic knowledge regarding nursing care of CPR.

Post Intervention Monitoring

Posttest was done twice early post interventions and later after three months' post interventions. She was using the same tools to compare between pre and post intervention program which were conducted to evaluate the effect of the program on respondents.

Ethical Consideration

An official letter was taken from the National Al Ribat University to hospitals administrators for permission to carry out the study. Participants provided verbal consent to participate they have also been assured of confidentiality and of freedom to withdraw without conditions.

RESULTS

Total numbers of respondents were 100. The results of the present study are shown in figures and tables respectively:

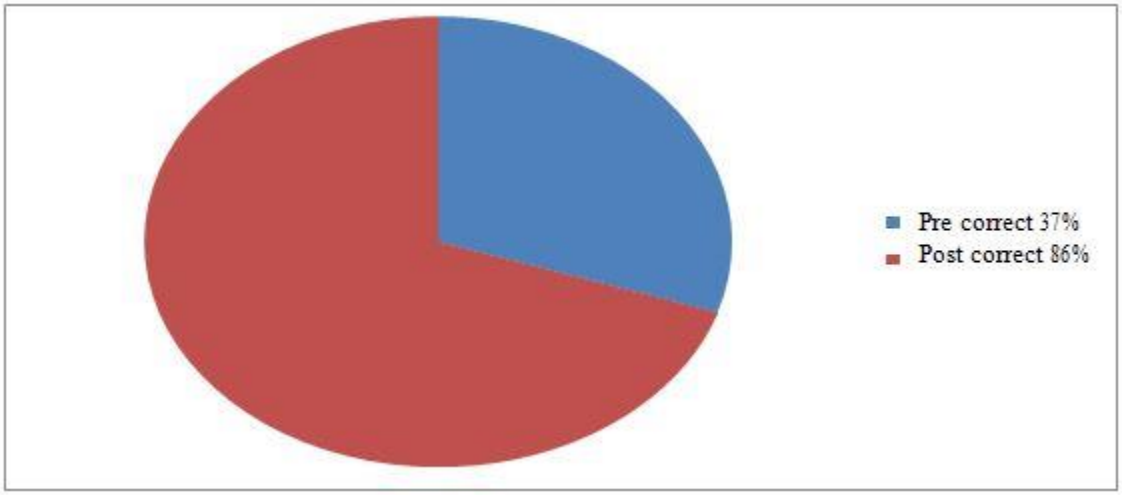

Figure (1) Comparison of overall total knowledge between pre and early after implementation of educational program

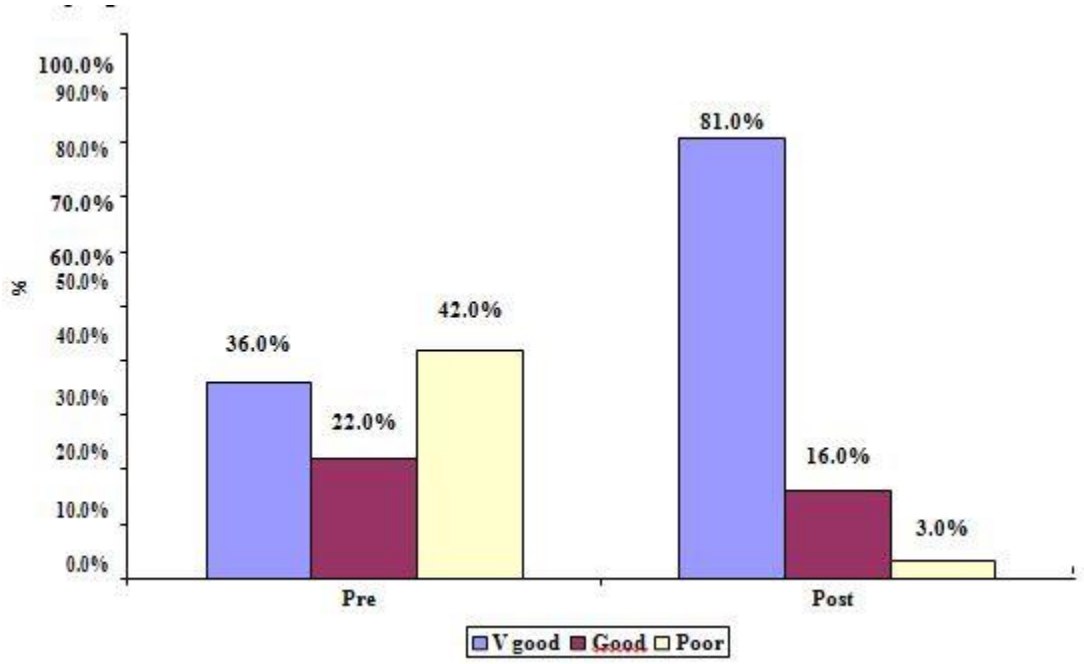

Figure (2) Comparison of grades overall total knowledge between pre and early after implementation of educational program

NURSES' PRACTICE

Table (1) Practice assessment of the participants regarding initial steps in care of patients with cardiac arrest before and early after implementation of the educational program (*n* =100).

Statements	Pre		Post		C/I 95%					
	Correct *n* (%)	Mean±SD	Correct *n* (%)	Mean±SD	SE	Lower	Upper	t	DF	*P*
Verbally asked the patient "are you	50(50.0)	0.50±0.50	91(88.0)	0.91±0.29	0.06	-0.52	-0.30	-	198	0.002
Call for help or activate emergency	51(51.0)	0.51±0.50	92(92.0)	0.92±0.27	0.06	-0.52	-0.30	-	198	0.001
Turn victim on to back while supporting head and	50(50.0)	0.50±0.50	95(95.0)	0.95±0.22	0.05	-0.56	-0.34	-8.2	198	0.003
Use a head tilt and chin lift Maneuver	50(50.0)	0.50±0.50	76(76.0)	0.76±0.43	0.07	-0.39	-0.13	-	198	0.001
Place his/her ear over victim's mouth and observed the	42(42.0)	0.42±0.50	92(92.0)	0.92±0.27	0.06	-0.61	-0.39	-8.8	198	0.005
Listen, look and feel for breathing for 3-5	40(40.0)	0.41±0.49	92(92.0)	0.92±0.27	0.06	-0.63	-0.41	-	198	0.003
Pinch the victim's nostrils with thumb and index finger of	41(41.0)	0.41±0.50	92(92.0)	0.92±0.27	0.06	-0.62	-0.40	-9.0	198	0.002

Take a deep breath and place mouth around the client's	47(47.0)	0.47±0.50	94(94.0)	0.94±0.24	0.06	-0.58	-0.36	-8.5	198	0.006
Ventilate two slow breaths. Each breath took 2 seconds to	50(50.0)	0.50±0.50	94(94.0)	0.94±0.24	0.06	-0.55	-0.33	-7.9	198	0.002
Pause between breaths allow for lung deflation and to	49(49.0)	0.49±0.50	93(93.0)	0.93±0.26	0.06	-0.55	-0.33	-7.8	198	0.003
If the victim is breathing but still unresponsive turn	41(41.0)	0.41±0.49	92(92.0)	0.92±0.27	0.06	-0.62	-0.40	-9.0	198	0.002

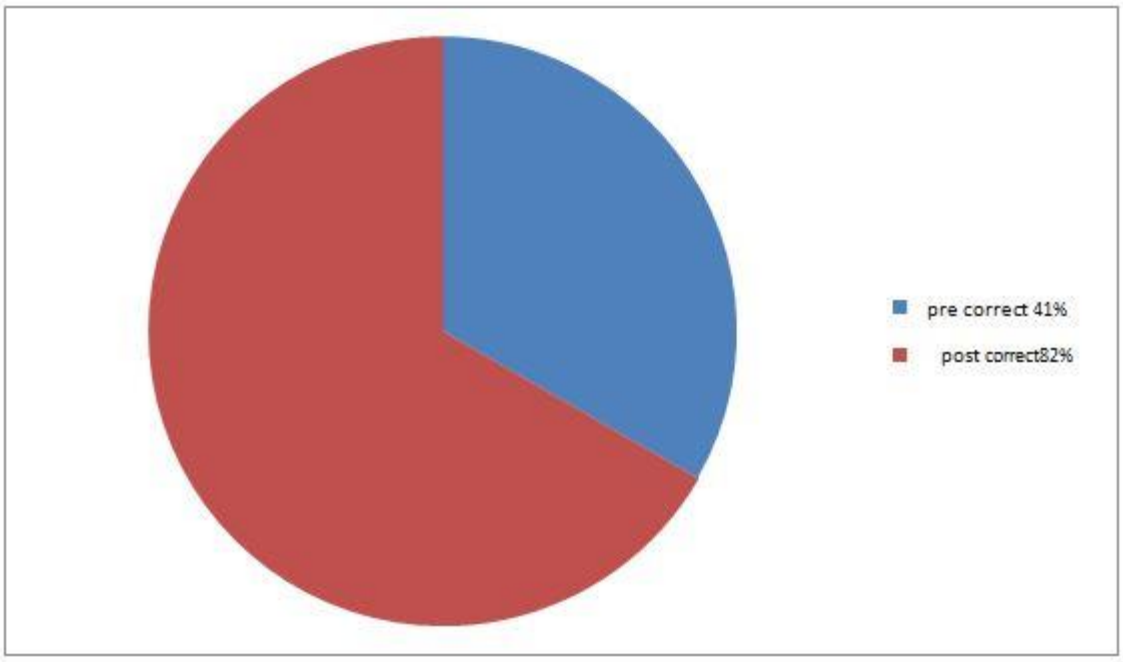

Figure (3) Comparison of overall total practice between pre and early after implementation of educational program (*P* value 0.007)

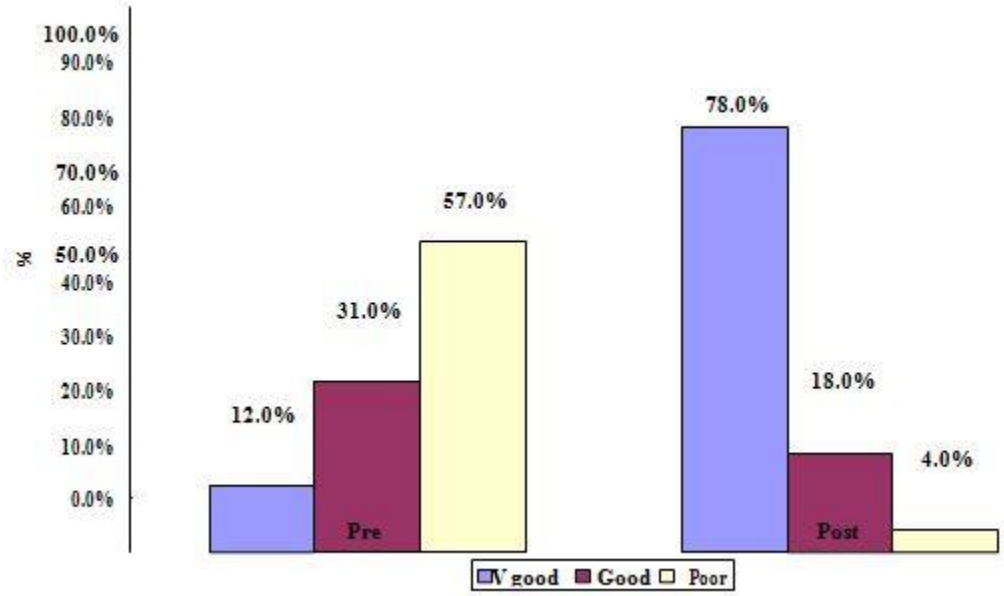

Figure (4) Comparison of overall practice grade between pre and early after implementation of educational program (*P* value 0.007)

Table (2) Grades scores of the participating nurses knowledge late after implementation of the educational program (*n*=100)

Score grades	Frequency	Percent
Poor	18	18 %
Good	10	10 %
Very good	72	72 %
Total	100	100 %

Table (3) Knowledge score of the participants regarding procedures, responsibility and position in airways of the patients at late post implementation of the educational program compare with pre implementation program (*n* =100)

Statements	Pre		Follow up			C/I 95%				
	Correct *n* (%)	Correct *n* (%)	Correct *n*	Mean±SD	SE	Lower	Upper	t	DF	*P*
Method to open airway	32(32.0)	32(32.0)	73(73.0)	0.73±0.44	0.07	0.01	0.23	1.28	198	0.073
The immediate responsibility of the nurse after identifying cardiac arrest	36(36.0)	36(36.0)	76(76.0)	0.76±0.43	0.08	0.03	0.23	1.89	198	0.065

Position of nose while providing mouth to mouth ventilation	39(39.0)	39(39.0)	77(77.0)	0.77±0.39	0.05	0.05	0.25	3.0	198	0.013

Table (4) Knowledge score of the participants regarding monitoring and process of breathing of patients of cardiac arrest at late post implementation of the educational program Compared with pre implementation program (*n* =100)

Statements	**Pre**		**Follow up**		**C/I 95%**					
	Correct *n* **(%)**	**Correct** *n* **(%)**	**Correct** *n* **(%)**	**Mean±SD**	**SE**	**Lower**	**Upper**	**t**	**DF**	***P***
Observations by the nurse while providing mouth to mouth ventilation	46(46.0)	46(46.0)	71(71.0)	0.71±0.42	0.19	0.08	0.30	3.48	198	0.011
The rate of breathing given for a minute during passive ventilation	48(48.0)	48(48.0)	72(90.0)	0.72±0.44	0.18	0.07	0.29	3.32	198	0.021
Content of rescuer's exhaled air	42(42.0)	42(42.0)	68(83.0)	0.68±0.49	0.15	0.03	0.27	2.49	198	0.014
The rate of artificial ventilation to prevent stomach inflations	32(32.0)	32(32.0)	66(89.0)	0.66±0.41	0.23	0.12	0.34	4.03	198	0.011
The indication for pause between breaths	36(36.0)	36(36.0)	74(86.0)	0.74±0.39	0.12	0.01	0.23	2.13	198	0.034

Table (5) Knowledge score of the participants regarding monitoring of the circulation of the patients of cardiac arrest at late post implementation of the educational program compared with pre implementation program (*n* =100)

Statements	Pre		Follow up		SE	C/I 95%		t	DF	*P*
	Correct n (%)	Mean±SD	Correct *n* (%)	Mean±SD		Lower	Upper			
The correct location for placement of hands for chest compression	51(51.0)	0.51±0.50	70(70.0)	0.70±0.48	0.17	0.06	0.28	2.98	198	0.013
The correct position to be maintained for giving prompt chest compression	50(50.0)	0.50±0.50	73(73.0)	0.73±0.45	0.19	0.09	0.29	3.63	198	0.012
The correct site of fingers during performance of external chest compressions	50(50.0)	0.50±0.50	73(73.0)	0.73±0.45	0.19	0.09	0.29	3.63	198	0.023
The pressure applied while performing external chest compression	42(42.0)	0.42±0.50	76(76.0)	0.76±0.40	0.19	0.09	0.29	3.94	198	0.010
The recommended external chest compression for a minute	40(40.0)	0.40±0.48	59(59.0)	0.59±0.50	0.17	0.04	0.30	2.60	198	0.020
The length to which the sternum must be compressed downward during external chest compression in adults	41(41.0)	0.46±0.49	60(60.0)	0.60±0.49	0.23	0.11	0.35	3.71	198	0.014
The ratio of chest compression and passive ventilation for 1 rescuer technique	47(47.0)	0.47±0.50	60(60.0)	0.60±0.49	0.23	0.11	0.35	3.71	198	0.023
The means to perform external chest compression in CPR stimulates or improve of circulation	50(50.0)	0.50±0.50	73(73.0)	0.73±0.42	0.1	-0.02	0.22	1.71	198	0.089
The amount of blood ejected from the heart by external chest compression in CPR	49(49.0)	0.49±0.50	71(71.0)	0.71±0.49	0.16	0.05	0.27	2.82	198	0.015

Table (6) Overall score grade of the practice components of the study participants, compared pre-program and late after program.

Overall score grade	Before program		Late after program		*P* value
	N	%	*N*	%	
Poor	57	57%	8	8%	**0.001**
Good	31	31%	22	22 %	
Very good	12	12%	70	70 %	
Total	100	100%	100	100 %	

DISCUSSION

In this study 100 nurses were selected to participate in the program. At baseline average level of knowledge about CPR of the participants was found to be very low (37%) due to their younger age and recent duration of graduation. This percentage increased to 86% at posttest (Figure 1) with slight decrease at late post program test to 72% (table16). The baseline ―poor‖ grade (42%) at increased posttest by 81% as very good (Figure 2), then the ―very good‖ grade of knowledge slightly declined to (72%) (table 2). This study is similar to study conducted at Botswana in 2014 assessing the cardiopulmonary resuscitation knowledge and skills [6]. The meaning of the overall knowledge score of 0.63 increased to 0.86 indicating significant differences ($p < 0.05$) in the level of knowledge of the participants regarding all items of CPR after the carrying out of the program; this in turn demonstrated that the program had good outcome on the studied nurses. Nevertheless, the slight decrease in the overall knowledge of the participants (86% to 72%) observed at the late post program test was not significant ($p > 0.05$) (Tables 3-5). This finding could be explained by the fact that at an early implementation program the information given to the participants were still fresh and at the late post program test the participants may be engaged in other activities that contribute to this slight decrease in their knowledge regarding the dimensions of CPR. Many of the previous studies proved the effectiveness of conduction of educational programs to provide the nurses with knowledge about many of the medical issues related to critical cases and chronic disease that in turn increased their competence and abilities to know more and more about the cases under their nursing supervision. An Egyptian study [7] by revealed that the mean knowledge scores of nurses are increased immediately after implementation of the program with a significant statistical difference. This increased level slightly decreased post three months of program application. Another study from Basra [8] proved that application of teaching program significantly increased the nurses' knowledge about issues of cardiac arrest. However, a study in Bahrain [9] showed that the cognitive knowledge was not adequately retained. Fifty-eight per cent of respondents perceived recalling CPR information as easy or extremely easy. The last study unlike our study where the program only improved the knowledge of minor proportion of the studies nurse. Concerning Practices: At baseline average level of practices of the participant toward patients with CPR was reported by (42%) of them and their overall grade were poor (57%), which increased at the early post program test to (82%) and (78%) respectively (Figures 3 and 4). Slight decrease in both score and grade of practice were reported by 77% correct practice and 70% very good grade of practice at late post program test (table 6). This study is similar to the study conducted at Al Basra (Iraq) General Hospital [8]. Regarding the practices of the participants on the initial steps in care of the patients with cardiac arrest, the findings of our study detected significant increase ($p < 0.05$) (Tables1) in the level of the practices of the nurses after attendance of the program, that means the program showed positive impact on the participants, which was reflected on the clear improvement in their correct application of the initial steps and procedures of compression for the patients with cardiac arrest. The results of this study were in the same line with other previous studies, one study from India [(10)]. showed that practices of nurses on CPR was significantly improved with training based on educational program. Two other studies in Egypt [7]. Showed significant improvement in our nurses` practices regarding application of initial steps of care of patients with cardiac arrest as well as procedures of compression. Being at the heart of the health care delivery is an enormous challenge for nursing, but it is also a golden opportunity to save the life of the patient. A high level of knowledge and skill of CPR is expected from all participants to save the lives of the unfortunate victims of cardiac arrest.

CONCLUSION

According to the study findings the researcher concluded that: An early evaluating post training program test revealed a significant improvement of both knowledge and practice of the participating nurses. A late (three months) post program assessment to assess the retention of the already

gained knowledge and practice demonstrated a little drop in their level.

Acknowledgements

We thank the administration and staff of the four hospitals, Khartoum Teaching Hospital, Ahmed Gasim Hospital, Omdurman Teaching Hospital and the Khartoum North Teaching Hospital for their enthusiastic support and cooperation throughout this study.

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How to cite this article: Ashraf Abdelrhman Elbashir, Fathia Hassan Ismail, Osama Mohamed Elsanousi, Saida Abdelmajid. Effect of an in service training program for intensive care nursing staff in their knowledge and practice - khartoum state 2014-2017. Int J of Allied Med Sci and Clin Res 2019; 7(2): 417-426.

Source of Support: Nil. **Conflict of Interest:** None declared.