ENHANCEMENT OF KNOWLEDGE AMONG CRITICAL CARE NURSES REGARDING THE IDENTIFICATION OF SHOCKABLE RHYTHMS AND DEFIBRILLATION AT A PRIVATE TERTIARY CARE HOSPITAL IN ISLAMABAD PAKISTAN

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ABSTRACT

OBJECTIVES

To determine the effectiveness of teaching sessions on knowledge, regarding the identification of shockable rhythms and defibrillation among critical care nurses at a private tertiary care hospital, in Islamabad Pakistan.

METHODOLOGY

A quasi-experimental design was used for this study. Fifty-eight nurses working in critical care units were selected through consecutive sampling. A multiple-choice questions tool with a 0.82 Content Validity Index was used for pre posttest with an educational session on electrocardiogram arrhythmias and defibrillation. The differences were measured using the repeated measures ANOVA test.

RESULTS

Only 52 participants appeared in the second post-test of the study. Findings of 12.75 ± 4.42, 16.90 ± 3.48 and 15.94 ± 3.82 in pretest, immediate posttest and follow-up test for shockable arrhythmias; and 4.90 ± 1.56, 6.78 ± 1.41 and 6.00 ± 1.40 in pretest, immediate posttest and follow-up test for defibrillation knowledge were obtained. Pairwise comparisons for knowledge of shockable arrhythmias and pairwise comparisons for knowledge of defibrillation were found statistically significant with a significance value of $p<.01$. .

CONCLUSION

Based on a study finding it may be concluded that teaching sessions had a significant impact on the enhancement of knowledge.

KEYWORDS: *Knowledge, Shockable Rhythms, Defibrillation; Critical Care Nurse*

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INTRODUCTION

A cardiac monitor is known to be the best medical device in critical care areas to diagnose and monitor ECG waveforms, arrhythmias and cardiac arrest at its earliest.[1] Literature suggests the level of skills of nurses is poor regarding life-threatening arrhythmias and their management.[2,3] On the other hand it is estimated that one-third of admitted patients are not appropriately defibrillated within the recommended time.[4] Studies conducted on critical care nurses showed that only (4.7%) of

nurses have a high level of knowledge about specific arrhythmia[5] which clearly shows the need to enhance the knowledge of critical care nurses to identify and manage arrhythmias accordingly.Furthermore, the literature supports that little information is available about the competency of nurses in the identification of shockable rhythms[6], so, it becomes important to assess the ability of critical care nurses to the identification of shockable rhythm and defibrillation because knowledge is the key to identifying shockable rhythm that leads to early defibrillation.[7,8] Numerous studies suggested that nurses must have to improve their knowledge regarding the identification of arrhythmias.[9] Literature has also demonstrated that nurses have poor knowledge regarding cardiopulmonary resuscitation and its management techniques.[10] One way to overcome this shortcoming is through the use of lecture-based teaching sessions to enhance nurses" knowledge of the identification of arrhythmias.[11,12] To the best of the researcher"s knowledge, limited research has been conducted to find the effectiveness of teaching sessions for the identification of shockable arrhythmias and the need for defibrillation among critical care nurses. The purpose of the study was to determine the effectiveness of teaching sessions on knowledge, regarding correctly identification of shockable rhythm and administering of defibrillation, among critical care nurses at Shifa International Hospital (SIH) Islamabad Pakistan.

METHODOLOGY

Quasi-experimental, time series with a single group pre and post-test design was used for this study The time was from September 2016 to September 2017. Non-probability convenience sampling method was used to select the participants from critical care areas of the hospital. Participants were bedside critical care nurses and worked in eight hours shift duties. Ethical approval was obtained from ISRB of Shifa International Hospital Islamabad. Written informed consent was also taken from all the participants. All critical care nurses working in the emergency room, coronary care unit (CCU), and medical and surgical Intensive care unit of Shifa International Hospital Islamabad Pakistan were included in the study. Those who did not complete three months" duration in the critical area were excluded from the study. The sample size was calculated by using the epi tool with SD of 14.6, Alpha of .05, Beta 0.2 and effect size of 5.6. The resultant sample size was 53, in each pre & post group. Self-

administered data collection questionnaire was developed regarding the identification of normal sinus rhythm, atrial arrhythmias, ventricular arrhythmias and defibrillation. The tool was presented to five experts for validity and clarity and obtained a Content Validity Index (CVI) of 82.3%. Each Multiple-choice question carried one mark and the wrong answer was marked as 0. After completion of the pretest of the participants teaching session was conducted by the primary researcher to review the normal conduction system of the heart, cardiac cycle and normal sinus rhythm. After the completion of the teaching session, a questionnaire was given to participants for post-test with the same content as was in the pretest. After the two weeks interval, participants were contacted to check retention of knowledge through the second post-test. Data were analyzed by using SPSS version 21. Descriptive statistics of frequencies and percentages were utilized for gender, experience, education level and working areas. Mean and standard deviation was calculated to assess the level of knowledge. Repeated measures ANOVA test was used to compare the mean results of the pretest, first and second posttest.

RESULTS

The sample consisted of 58 participants as shown in table 1 majority were male. Of the participants 22 (37.9%) participants were from CCU, 14 (24.1%) from ER, 16 (27.6%) from MICU, 5 (8.6%) were from SICU and 1 (1.7%) from Neuro-surgical step-down unit. The majority of participants with nursing experience have less than two years" experience, 10 (17.2%) participants had two to four years of experience and 10 (17.2%) participants had more than four years of experience in critical care areas.

Table 1: Demographics of the Participants (N=58)

Variables		N	%Age
Gender	Male	33	56.9%
	Female	25	43.1%
Area of Placement	Emergency rooms	14	24.1%
	Coronary care unit	22	37.9%
	Medical ICU	16	27.6%
	Surgical ICU	5	8.7%
	Neuro step -down	1	1.7%
Experience	Less than two years	38	65.5%
	Two to four years	10	17.2%
	>Four years	10	17.2%
Education	General Nursing	41	70.7%
	Post RN BScN	07	12.1%
	Generic BScN	10	17.2%
Certification Course	Basic Life Saving (BLS)	58	100%
	Advance Cardiac Life Saving (ACLS)	12	20.7%
	Basic Trauma Life Saving	1	1.7%

As shown in table 2 the mean scores of the knowledge regarding shockable arrhythmias and defibrillation were found to be higher in the immediate post-test and follow-up post-test.

Table 2: Descriptive Statistics of Participant's Knowledge

	Knowledge	Mean	SD
Shockable Arrhythmias	Knowledge of shockable rhythm (Pretest)	12.750	4.427
	Knowledge of shockable rhythm (1st posttest)	16.903	3.488
	Knowledge of shockable rhythm (2nd posttest)	15.346	3.823
Defibrillation	Knowledge of defibrillation (Pretest)	4.9038	1.562
	Knowledge of defibrillation (1st posttest)	6.7885	1.418
	Knowledge of defibrillation (2nd posttest)	6.0000	1.400

Estimated sphericity values (Epsilon) are >0.75 that's why the Huynh-Feldt correction test was used to rectify the degree of freedom. Mauchly's test indicated that the assumption of sphericity had been violated because p = .000 therefore the degree of freedom was corrected by using Huynh - Feldt estimates of sphericity (ε=.77). The results are significant as F (1.54, 78.74) = 56.22, p = .000. This means that there are significant differences in knowledge among three different points of observation.

Table 3: Effect of a Teaching Session on Participants' Knowledge within Three Groups

Knowledge		Sum of Square	Df	Mean Square	F	Sig
Shakable rhythm	Greenhouse Geisser	457.96	1.50	303.67	56.22	.000
	Huynh -Feldt	457.96	1.54	296.59	56.22	.000
	Lower -bound	457.96	1.00	457.96	56.22	.000
Defibrillation	Greenhouse Geisser	93.16	1.74	53.37	48.40	.000
	Huynh -Feldt	93.16	1.80	51.70	48.40	.000
	Lower -bound	93.16	1.00	93.16	48.40	.000
Repeated Measures of ANOVA Test Applied. P-value < 0.05 taken as significant						

Table 4: Pairwise Comparisons for Knowledge

Shockable Arrhythmias					
Knowledge	Knowledge	Mean Difference	Sig.	95% Confidence Interval	
				Lower bound	Upper Bound
Pretest	Posttest	-4.153	.000	-5.316	-2.991
	Follow-up	-2.598	.000	-3.643	-1.549
Posttest	Pretest	4.153	.000	2.991	5.316
	Follow-up	1.557	.000	0.900	2.214
Follow-up	Pretest	2.596	.000	1.549	3.643
	Posttest	-1.557	.000	-2.214	-0.900
Defibrillation					
Pretest	Posttest	-1.885	.000	-2.405	-1.364
	Follow-up	-1.096	.000	-1.615	-.577
Posttest	Pretest	1.885	.000	1.364	2.405
	Follow-up	0.788	.000	.414	1.163
Follow-up	Pretest	1.096	.000	.577	1.615
	Posttest	-.788	.000	-1.163	-.414
Repeated Measures of ANOVA Test Applied. P-value < 0.05 taken as significant					

The findings show that there was a significant difference between the knowledge of participants in pre-intervention and immediate post-intervention tests (p< 0.01). Results also indicate that there was a significant difference between the post-intervention and follow-up tests (p<0.01). A significant difference was also observed in the pre-intervention and follow-up test (p<0.01).
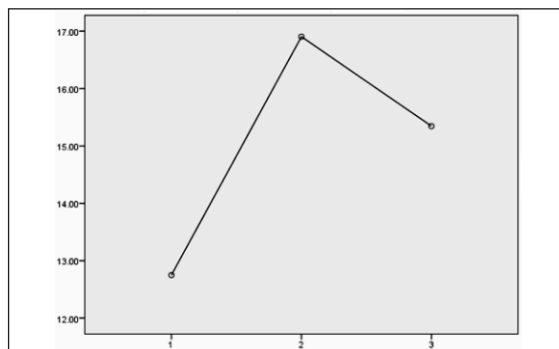

Figure 1: Estimated Margin Means for Knowledge of Shockable Arrhythmias (N=52)
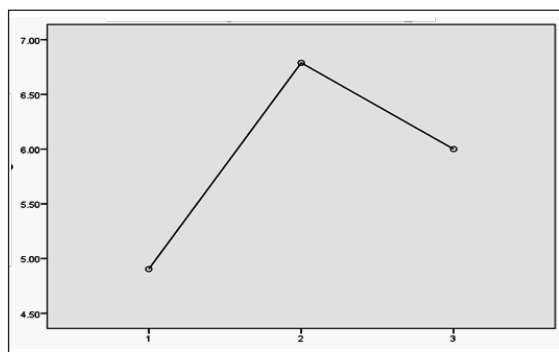

Figure 2: Estimated Margin Means for Knowledge of Defibrillation (N=52)

DISCUSSION

The current findings are affirming the results of many other studies in which teaching sessions as a whole or as a part of the study intervention expands effectiveness in knowledge. Knowledge of shockable rhythms in the current study during pretest (Mean12.750, SD 4.4275), first post-test (Mean 16.903, SD 3.4881) and second post-test (Mean (15.346, SD 3.8239) vary and are congruent with the results of a study conducted by Tubaishat (2015) in which pretest (Mean 5.7, SD 2.43), first post-test (Mean 7.6, SD 2.36) and second posttest (Mean 7.2, SD 2.79) at P<0.01 demonstrated that mean scores at posttest were significantly higher than those of the pretest.[13] This is indicative of the fact that teaching is an effective way to enhance the participants" knowledge regarding arrhythmia identification. The findings also supported the

results of the previous studies which demonstrated that descriptive teaching or structured teaching method was equally effective for enhancing the knowledge regarding cardiac rhythm.[11,14] Similar findings were also shown by Laura (2012) which indicated an overall improvement in post-test scores. The previous findings showed knowledge retention and clinical application in rhythm identification between post-test score and clinical application in simulation testing at a follow-up test by 3 months.[15] A quasi-experimental study conducted in 2013 showed that there were significantly high differences between the study and control group at posttest in all items. There was also a significant difference in nursing practices after identification of any change in ECG rhythms with a significance of p < .01 in the post-test of the study group including all other domains of improvement.[16] The current findings vary with the previous literature[9] which demonstrated pretest = Mean of 8.67±SD 1.267 and posttest Mean 8.88±SD 0.823 indicating that teaching sessions had no statistically significant impact on gaining ECG knowledge. The current findings also vary from the previous study conducted by Laila, (2013) in which neither knowledge acquisition nor knowledge retention showed any significant differences between traditional teaching and high fidelity simulation.[17] The explicit reason is the participants in the current study were registered nurses while in the previous study participants were student nurses. The results of the current study showed that participant"s knowledge regarding defibrillation in the pretest (Mean 4.9038, SD 1.56255) and the first post-test (Mean 6.7885, SD 1.41887) are highly significant in contrast to the study conducted in Hong Kong among emergency department nurses, in which only improvement was noted in defibrillation decision.[9] This shows that teaching session in the current study has a statistically significant impact on gaining knowledge about defibrillation. In the current study, 45 participants (77.6%) stated that they were confident to defibrillate the patient during shockable rhythms which is similar to the findings of the previous study in which 60% of nurses stated they had adequate knowledge and could apply theoretical knowledge into clinical practice, while 84% nurses were in view that they could manage cardiovascular cases in emergency rooms effectively.[18] The findings of the participant"s knowledge regarding defibrillation in the pretest and first post-test were similar to the previous literature showing that pretest (Mean 14.88, SD 1.57) and post-test (Mean 45.7, SD 14.6)

scores, which showed that teaching session had a statistically significant impact on gaining of defibrillation knowledge.[19]

LIMITATIONS

Some limitations of the study need to be considered for the applicability of the findings. The study was carried out by utilizing the convivence sampling technique. The population of the study consisted of participants from the private sector therefore it may not apply to the nurses working in public sectors hospital.

CONCLUSION

In this study, significant improvement in the means and SD in the pretest, immediate post teaching test and the second posttest was noted. Based on these results, it is concluded that teaching sessions had a statistically significant impact on gaining knowledge regarding the identification of shockable arrhythmias and defibrillation over some time.

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