

# Retention of Cardiopulmonary Resuscitation Skills in a Group of Nigerian School Teachers

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**Abstract Introduction:** It is known that retention of cardiopulmonary resuscitation (CPR) skills is vital to effective bystander CPR provision. This study aimed at assessing the retained CPR skills in a group of Nigerian teachers after 15 months of their initial exposure to CPR training. **Methods:** The study was carried out using a quasi-experimental design with initial cohort of forty one (41) teachers. Victims of cardiac arrest were simulated using manikins and the teachers, after their initial trainings on CPR skills, were asked to carry out the CPR skills on the victims. Fifteen (15) months later, thirty one (31) of them who participated in the final re-assessment for retained CPR skills were scored by the same American Heart Association (AHA)-trained instructor, using a modified AHA CPR Skills Evaluation Guide. The AHA conventional CPR training standard was followed and the data analysed using both descriptive statistics and paired samples T-test. **Results:** The retained CPR skills of the participants revealed some losses from their earlier post-training values and were found statistically significant ( $P < 0.05$ ). However, the participants still retained appreciably good CPR skills after the 15 months of their initial training. **Conclusion:** This study has shown that generally the retained CPR skills of the participants after fifteen (15) months of earlier exposure to the CPR training were statistically significantly poorer than their initial post training skills which underscore the need for periodic re-training in CPR skills for the potential bystander CPR providers. **Recommendation:** Nigerian teachers should have annual re-training in CPR techniques.

**Keywords** CPR skills, Retention, Teachers, Nigeria

## 1. Introduction

The globally growing public health burden of out-of-hospital cardiac arrest (OHCA) challenge has called for more attention not only by the developed economies but also by the developing nations [1-7]. In fact, it has been reported that the occurrence of OHCA is quite high in low socioeconomic regions of the world [8-10].

The roles of teachers in training school children as potential bystander cardiopulmonary resuscitation (CPR) providers as well as potential CPR providers themselves in schools and the larger societies have been documented [11-14]. For teachers to effectively carry out these expected roles they do not only need to be trained in the CPR skills but they must be able to retain the skills for some time before being re-trained for re-certification.

Previous reports have justified the need for assessment of cardiopulmonary resuscitation skills retention for effective

bystander CPR provision [15-18].

Hitherto, there is no published data on retention of CPR skills among teachers in Nigeria. The only report on CPR skills retention in Nigeria involved the secondary school children only [19]. In fact, Nigeria is yet to incorporate the teaching of CPR into the secondary school curriculum. Meanwhile, in our effort to increase the advocacy for this and to provide more necessary basic data on the subject, we decided to carry out this study.

This study aimed at assessing the CPR skills retention in a group of Nigerian teachers who had been previously trained on the bystander cardiopulmonary resuscitation skills 15 months earlier. It was hypothesized that the post-training CPR skills of the teachers 15 months earlier would not be statistically significantly better than their retained CPR skills.

## 2. Materials and Methods

### Research Design

The quasi-experimental design was used in this study

### Population of the Study

As previously reported [20], a cohort of forty one (41) Nigerian teachers who came for their Sandwich Programme

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in the Department of Human Kinetics and Health Education of the Faculty of Education at the University of Port Harcourt, Port Harcourt, Nigeria were trained in the conventional cardiopulmonary resuscitation (CPR) skills. The participants came from different public and primary and secondary school in Nigeria. The CPR skills of the same participants were re-assessed in December 2017 (15 months after their initial training and assessment in September 2016). The original research plan was to re-assess their retention of CPR skills a year after the initial training but it was disrupted by a nation-wide industrial action by the Academic Staff Union of Universities (ASUU) in Nigeria as the participants could not return for their studies as scheduled. However, the participants returned 15 months after the initial assessment and were re-assessed accordingly.

At the time of the re-assessment of the CPR skills of the cohort, only thirty one (31) of them were present and participated in this phase of the study. No further teaching on cardiopulmonary resuscitation was given to the cohort before the re-assessment. The same scenario of victims of sudden cardiac arrest was repeated using some manikins, as was done in their earlier post-training CPR skills assessment in September 2016. As was done in 2016, the same investigator (Assessor) scored them as they performed the skills, using the same modified AHA Evaluation Guide involving four components - (1) Scene Safety & Call for Help, (2) Chest Compressions, (3) Airway & Rescue Breaths and (4) Cycle / min & Placement of victim in the correct Recovery Position (see Appendix).

### Determination of Poor and Good CPR Skills Retention

For each of the four (4) domains of the CPR skills, retention of at least 50% of the post-training CPR skills is considered acceptable and any score less than that is considered poor CPR skills retention.

### Data Analysis

In addition to descriptive statistics, the data collated immediately after training 15 months ago and the present CPR skills of the final cohort were analyzed using the paired samples T-test at  $P < 0.05$  level of significance.

## 3. Results

Table 1 shows the cardiopulmonary resuscitation (CPR) post-training and retention skills performance of the participants in the four domains expressed as percentages against the number of participants in each domain. Fifteen members of the cohorts were able to retain CPR skill in the scene safety and call for help domain of up to 60%, nineteen for chest compressions and eighteen for airway and rescue breaths. Eighty percent (80%) of CPR skills was found in 2 participants each for scene safety and call for help and chest compressions, respectively. Five (5) participants retained 80% of the skill for maintaining the airway and rescue breaths. Meanwhile, no participant had 100% retention in any of the CPR skills domains.

**Table 1.** Comparison of the CPR post-training and retention skills performance of the participants in the four domains expressed as percentages against the number of participants in each domain

Percentage of CPR Skills	SSCH(PT)	CC(PT)	ARB(PT)	CPV(PT)	SSCH(R)	CC(R)	ARB(R)	CPV(R)
0(0%)								
1(20%)					2			10
2(40%)					12	10	8	19
3(60%)	9	10	13	21	15	19	18	1
4(80%)	21	15	15	9	2	2	5	1
5(100%)	1	6	3	1	-	-	-	-

SSCH = Scene safety & Call for Help; CC = Chest compressions; ARB = Airway & Rescue Breath; CPV = Cycle/min & Placement of victim. (PT) = Post-training, (R) = Retention

**Table 2.** The mean CPR post-training and retention skills of the teachers compared

Pair		Mean	N	Std. Deviation	Std. Error Mean	Mean Skills Loss	% Mean Skills Loss
Pair 1	SSCH(PT)	3.7419	31	.51431	.09237	1.1935	31.89%
	SSCH(R)	2.5484	31	.72290	.12984		
Pair 2	CC(PT)	3.8710	31	.71842	.12903	1.1291	33.35%
	CC(R)	2.7419	31	.57548	.10336		
Pair 3	ARB(PT)	3.6774	31	.65254	.11720	0.7742	21.05%
	ARB(R)	2.9032	31	.65089	.11690		
Pair 4	CPV(PT)	3.3548	31	.55066	.09890	1.5806	47.11%
	CPV(R)	1.7742	31	.66881	.12012		

**Table 3.** The Paired Samples T-Test analysis of the post-training and retention CPR skills of the teachers

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		T	Df	Sig. (2-tailed)
				Lower	Upper			
				Pair 1 SSCH(PT) -SSCH(R)	1.19355			
Pair 2 - CC(PT) – CC(R)	1.12903	.49946	.08971	.94583	1.31224	12.586	30	.000
Pair 3 ARB(PT) – ARB(R)	.77419	.61696	.11081	.54789	1.00050	6.987	30	.000
Pair 4 CPV(PT) CPV(R)	1.58065	.80723	.14498	1.28455	1.87674	10.902	30	.000

The mean CPR post-training and retained skills, as well as the mean skills loss and percentage skills loss are shown in Table 2 above with the maximum mean percentage skills loss found in cycle /minute and placement of victim in recovery position (47.11%). The overall mean lost in CPR skills was 33.35%.

Table 3 showing the rejection of the null hypothesis as statistically significant differences were found between the CPR skills in the post-training and retention periods in all the four domains.

#### 4. Discussion

The current quasi-experimental cohort Nigerian study has shown statistically significant loss in CPR skills by the participants over a 15-month period. This is consistent with other global reports [15-19].

However, it must be emphasized that the present study has also revealed that none of the participants had up to 50% attrition of their previous post-training CPR knowledge after over one year. This finding is considered encouraging for participants that have had only one exposure to CPR training in their lives. As teachers, this relatively good CPR skills retention found in this study gives hope for the sustainability of the teaching of bystander CPR skills in Nigerian schools being advocated for in line with the current international practice. Behrend et al [16] reported significant loss of CPR skills by medical students despite their training and proximity to health care environment. According to the study, this deterioration in skills occurred regardless of training latency.

In line with some previous reports [4, 6, 7, 15-18], involvement of the lay persons (non-medically trained people) in bystander CPR skills training and the need for their retraining in CPR at intervals for effectiveness has been supported by this Nigerian study. The place of simulation as carried out in this present study in the provision of such training has also been supported severally as such can bridge the gap and reduce the rate of loss of CPR skills for real life situations [16-18, 21].

In the only earlier related Nigerian study among secondary schools by Onyeaso [19], it was reported that after six months of initial exposure to CPR training the participants (secondary school students) lost some of their CPR skills

found to be statistically significant. Onyeaso [19] reported overall mean CPR skills loss of 12.24% in six months while the present study gave 33.35% in 15 months. These two Nigerian studies have shown that though they both revealed significant losses in CPR skills, the participants in both studies retained appreciable good CPR skills. Interestingly, these two Nigerian reports have provided similar ratio in terms of the overall percentage loss in CPR skills over the periods of the respective months before the skills retention assessments.

#### Strength and Limitations of the Study

Although the cohort was drawn from teachers from various states in Nigeria making it a fairly representative sample, the final sample size for the assessment of their CPR skills retention reduced from the initial 41 to 31.

This was partly occasioned by the industrial strike action that affected the timing and duration of the sandwich programme at the study centre in Nigeria. Therefore, the relatively small final sample size makes the generalization of the findings to be done with caution. However, it must be noted that the nature of this study does not encourage too large sample sizes.

#### Significance of the Study

Being the first study from Nigeria that has assessed the retention of CPR skills among teachers, it has provided a very important baseline data necessary for the advocacy for the introduction of bystander CPR teaching and training in the curricula Nigerian schools. This will assist in further related research efforts in our country which is yet to give the needed attention to bystander CPR programme in her schools as in most civilized economies of the world. This study has affirmed the fact that Nigerian teachers can do well in their learning and retention of CPR skills which is very crucial in their expected future roles of teaching and training of students, as well as providing bystander CPR services to the their students, colleagues and the larger communities.

#### 5. Conclusions

The present Nigerian study has shown that generally the retained CPR skills of the participants after fifteen (15) months of earlier exposure to the CPR training was statistically significantly less than their post training skills.

This underscores the need for periodic re-training in CPR skills for the potential bystander CPR providers to ensure effective management of any out-of-hospital cardiac arrest (OHCA) victims.

## 6. Recommendations

The authors call specifically for annual re-training of Nigerian school teachers in cardiopulmonary resuscitation (CPR) techniques, in preparation for the expected incorporation of CPR programme into the Nigerian schools' curricula.

## Appendix

### SKILL EVALUATION GUIDE

Skill	Performed Steps	Obtainable Score	Obtained Score
Scene Safety & Call for help	1. Ensure safety	1	
	2. Check for response	1	
	3. Call for help	1	
	4. Check for breath warm	1	
	5. Check for breath sound & chest movement	1	
	<b>TOTAL</b>	<b>5</b>	
Compression	6. Heal of Hand	1	
	7. Centre of the chest	1	
	8. Push hard	1	
	9. Push fast	1	
	10. Chest Recoil	1	
	<b>TOTAL</b>	<b>5</b>	
Airway & Breathing	11. Head tilt back & Chin lift	1	
	12. Pinch nose	1	
	13. M to M	1	
	14. Lasting 1 sec	1	
	15. Chest rise	1	
	<b>TOTAL</b>	<b>5</b>	
Cycle/min & Recovery Position	16. 30/2	1	
	17. Body turned left	1	
	18. Left hand below head	1	
	19. Left leg straight	1	
	20. Right leg folded backward	1	
	<b>TOTAL</b>	<b>5</b>	
	<b>GRAND TOTAL</b>	<b>20</b>	

NAME / SERIAL NUMBER -----  
 SEX / AGE: -----  
 MATRICULATION NO: -----  
 NAME OF SCHOOL / STATE -----  
 INSTRUCTOR'S REMARK: -----  
 DATE: -----

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