

# ACQUISITION OF NEONATAL BASIC LIFE SUPPORT KNOWLEDGE AND SKILLS VIA NURSE-FACILITATED LEARNING FOR CAREGIVERS IN PRIMARY HEALTHCARE FACILITIES IN ILORIN METROPOLIS

Aluko, Joel O. Adebisi, Falilat Omowumi, Sowumi, Christiana O. Onasoga, Olayinka A. & Ani, Odinaka B.

## Abstract

*This intervention study aimed at helping caregivers working in primary health facilities in Ilorin Metropolis to acquire neonatal basic life support knowledge and skills through nurse-facilitated learning. This is to address the observable limited ability of this set of professionals to carry out NBLS. The study employed one group pretest-posttest quasi experimental design to study 128 primary healthcare workers. A structured NBLS knowledge-based questionnaire and a skill-based structured checklist designed to evaluate participants' skill proficiencies on NBLS, were used to collect data at the pre-intervention, intervention, and post-intervention phases. Descriptive statistics such as frequency/percent, mean, and standard deviation were used to summarize and present the data, while the two stated hypotheses were tested by paired sample t-test at 0.05 significant level. The mean knowledge score rose from  $91.1 \pm 8.9$  pre-intervention to  $100 \pm 0$  post-intervention. The mean proficiency score improved from  $57 \pm 7.8$  pre-intervention to  $80.2 \pm 19.8$  post-intervention. A total of 87.1% of the participants, were willing to have further trainings every six months. There was a significant difference between the pre and post intervention mean knowledge scores ( $p < 0.05$ ); and the pre and post intervention mean proficiency scores of the PHC workers ( $p < 0.05$ ). It is therefore imperative that primary health care workers be knowledgeable and skillful about the use of Neonatal basic life support through adequate education and trainings, in order to reduce to the barest minimum, the number of neonatal mortalities at the grassroots level.*

**Keywords:** Acquisition, Nurse, Neonate, Basic life support, caregivers.

## Introduction

Ability of caregivers in health facilities to implement basic life support (BLS) when clients or colleagues experience cardiopulmonary compromise or distress cannot be over emphasised. More importantly, acquiring knowledge and skill of neonatal basic life



support (NBLs) otherwise known as cardio-pulmonary resuscitation (CPR) of the distressed neonates is mandatory for all professionals who attend to women in labour, because sustaining life of distressed neonates through NBLs from the point of referral to higher healthcare facilities where the distressed could receive advanced paediatric life support (APLS) is crucial to neonatal mortality reduction.

Annually, about 4,000,000 deaths of newborns occur due to birth asphyxia, with developing countries taking the lead (Gebreegziabher, Aregawi & Getinet, 2014; Malekzadeh, Erfanian & Khadivzadeh, 2015). A major factor responsible for neonatal morbidity and mortality in cases of perinatal asphyxia is delay in ensuring the asphyxiated neonate is properly ventilated. Failure to establish ventilation will increase hypoxia and increase need for ventilator support (Wall, Lee, Niermeyer, English, Keenan, Carlo *et al.*, 2013). Draycott, Sibanda, Owen, Akande, Winter, Reading and Whitelaw (2012) went on to state that the newborn may later-on present with hypoxic-ischaemic encephalopathy which leads to cerebral palsy and cognitive disability.

Simple basic and advanced paediatric life support have therefore been established by experts, based on best available evidence, to allow rapid decision making at a time of crisis (American Heart Association, 2015). Neonatal resuscitation, otherwise known as NBLs, is as an emergency procedure focused on supporting the approximately 10% of neonates who do not commence breathing spontaneously, subsequent to the four (4) elements of basic life support which are: Initial assessment, Airway maintenance, Chest compression and ventilation. This is especially important in the primary healthcare facilities as it is usually the first level of healthcare facility encountered by people in the community.

This makes it essential for nurses and community health workers to be able to resuscitate newborns to obtain efficacious results (Cheng & Lin, 2015). This is recommended to be headed by a midwife or paediatric nurse trained in resuscitation, as they are equipped with the needed ability and knowledge to reduce unsafe practices (Opiyo, Newton & English, 2010). However, there have been reported cases of inadequacy of these healthcare professionals especially at the community level. It is therefore imperative to ensure that all healthcare workers at the primary health centres (PHCs) are properly trained in neonatal resuscitation techniques. This training has been proven to have positive effects on knowledge and skill acquisition in resuscitation of newborns and is capable of reducing newborn deaths by an estimated minimum of 30 percent (Conroy, Kaiwo, Barr, Mitchell, Morrissey & Lambert, 2014). Also, it has been revealed that acquiring knowledge and skill during trainings leads to improved clinical results (Opiyo, Were, Govedi, Fegan, Wasunna & English, 2013). Hence the need to carry out a study to determine the result of a nurse-led demonstrative teaching on knowledge and skills acquisition of neonatal basic life support among primary healthcare workers in Ilorin metropolis



## **Research questions**

The following research questions were answered:

1. What are professional bio-data of the health workers?
2. What is the level of participants' knowledge on NBLS pre and post intervention?
3. What is the level of participants' skills in NBLS pre and post intervention?
4. What is the level of satisfaction with the nurse-led NBLS training?

## **Research Hypotheses**

The following direct hypotheses were tested; 0.05 being the level of significance

1. There is no significant difference in the pre and post intervention knowledge mean score of participants on neonatal basic life supports among primary healthcare workers.
2. There is no significant difference in the pre and post intervention skills' mean score of participants on neonatal basic life supports among primary healthcare workers.

## **Methods**

One group pre and post-test quasi experimental design was employed in this study to examine the result of nurse-led training programme on knowledge and skills on neonatal basic life support, among PHC workers in Ilorin West and Ilorin East Local Government, Kwara State. In this one group pre-test and post-test quasi-experiment, the dependent variable was measured once before the intervention (treatment) was implemented and once after it was implemented. This design was preferred to a one-group post-test only design in which an independent variable is manipulated and then a dependent variable is measured once after the intervention (treatment) is implemented (Knapp, 2016). The study population comprised of all certified nurse/midwives, Community Health Officers (CHOs) and Community Extension Health Workers (CHEWs) working in primary health care facilities within Ilorin East and Ilorin West Local Government areas of Kwara State. Out of 238 certified nurses, Midwives, CHEWs and CHOs in both local governments, 128 participants were purposively recruited for the study. A structured questionnaire and a structured checklist served as data collection instruments for this study. The procedure for the study included pretest, training, and posttest sessions. The pretest and the posttest were made up of multiple choice question items. The checklist tested the practical demonstration skills of the participants. Both instruments were validated by research and professional maternal and child health nursing experts. In addition, the reliability coefficient (Cronbach's alpha) of the questionnaire was 0.78.



Conference method was used to bring the participants together for data collection in the respective local government headquarters. The collection of data spanned three days. The first day activities involved obtaining of informed consent from participants, administration of a pre-test to participants to evaluate participant's baseline knowledge and skills on NBLS. A 3-hour lecture on NBLS (intervention) was delivered to participants. Subsequently, another one hour devoted for question and answer session followed. The second day was scheduled for teaching of NBLS with hands-on demonstration jointly facilitated by the researchers, two neonatologists, and six paediatric nurses. Besides, peer-training was facilitated by using few participants who had acquired NBLS skills earlier. The third day activities took place three days after the delivery of the NBLS lecture (intervention). That day being the 'grand finale' was devoted for the posttest. Thus, the participants' knowledge and skills on NBLS were assessed using questionnaire and observation, respectively. Babcock University Health Research Ethical Committee issued ethical clearance for the study, prior to its commencement. In addition, approval for data collection was obtained from the managements of both selected local government areas. Also, participants indicated their willingness to participate in the study via written informed consent. The collected data were inputted into Statistical Package of the Social Sciences (SPSS) spreadsheet to facilitate their analyses. Four research questions were answered and illustrated descriptively using frequency/percent distributions; mean values of numerical variables were reported with respective standard deviations. Paired sample t-test was used to test the two stated research hypotheses; 0.05 being the level of significance.

## Results

### Research Question 1: What are professional bio-data of the health workers?

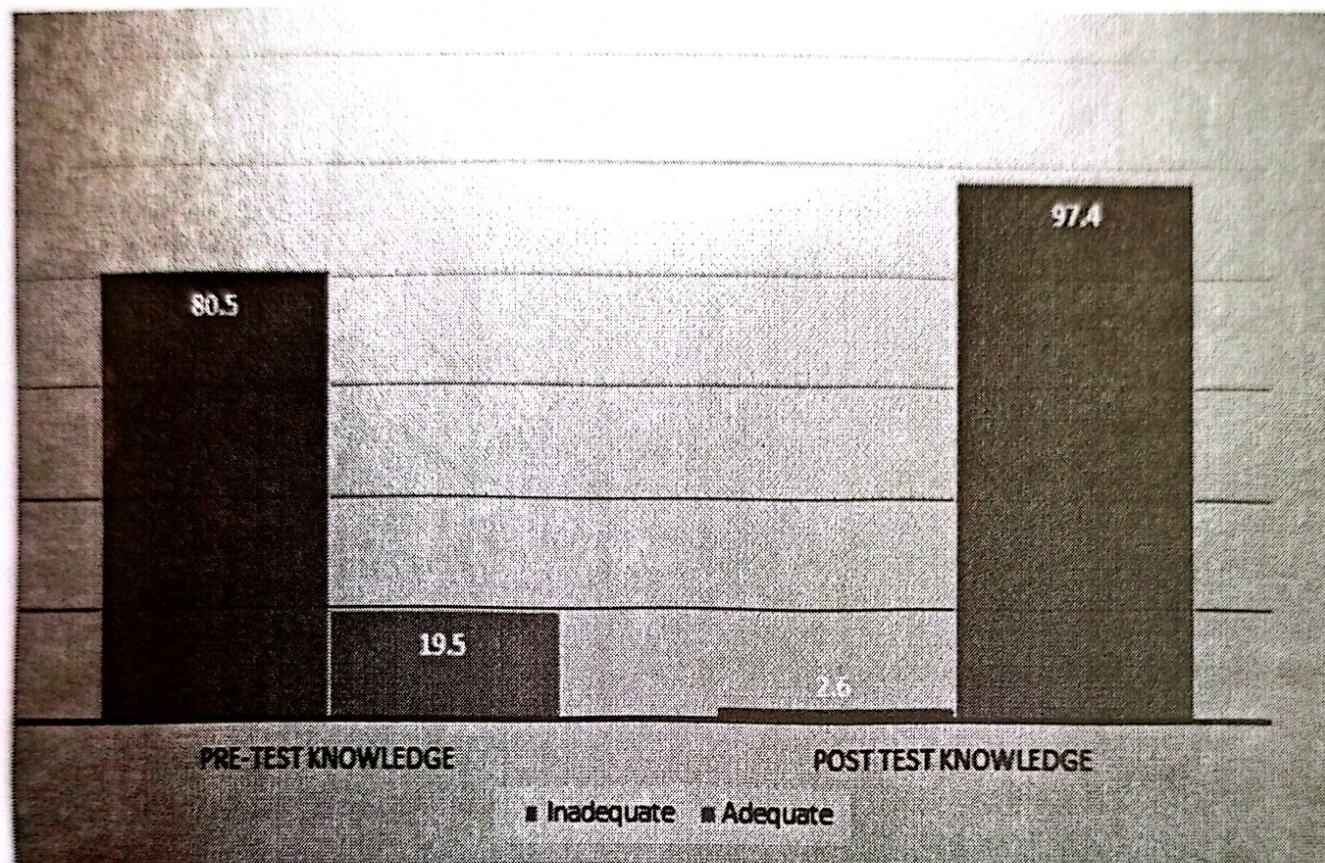
**Table 1: Socio-demographic characteristics of Health Workers (Mean age = 43 ± 10.8).**

Health Workers' Bio-data	Frequency	Percent
<b>Level of education</b>		
Community Health Extension Workers	56	43.8
Community Health Officers	16	12.5
General Nursing	7	5.5
Nursing and midwifery	32	25
Master of Science (M.Sc.) in Nursing	17	13.3
<b>Years of Experience</b>		
1 - 15 years	45	35.2
16 - 30 years	77	60.2
31 - 40 years	6	4.7



Table 1 illustrates the socio-demographic variables of the participants. The mean age of the participants was  $43 \pm 10.8$ . Also, 56 (43.8%), and 16 (12.5%) were CHEWs, and CHOs, respectively.

**Research Question 2:** What is the level of participants' knowledge on NBLS pre and post intervention?

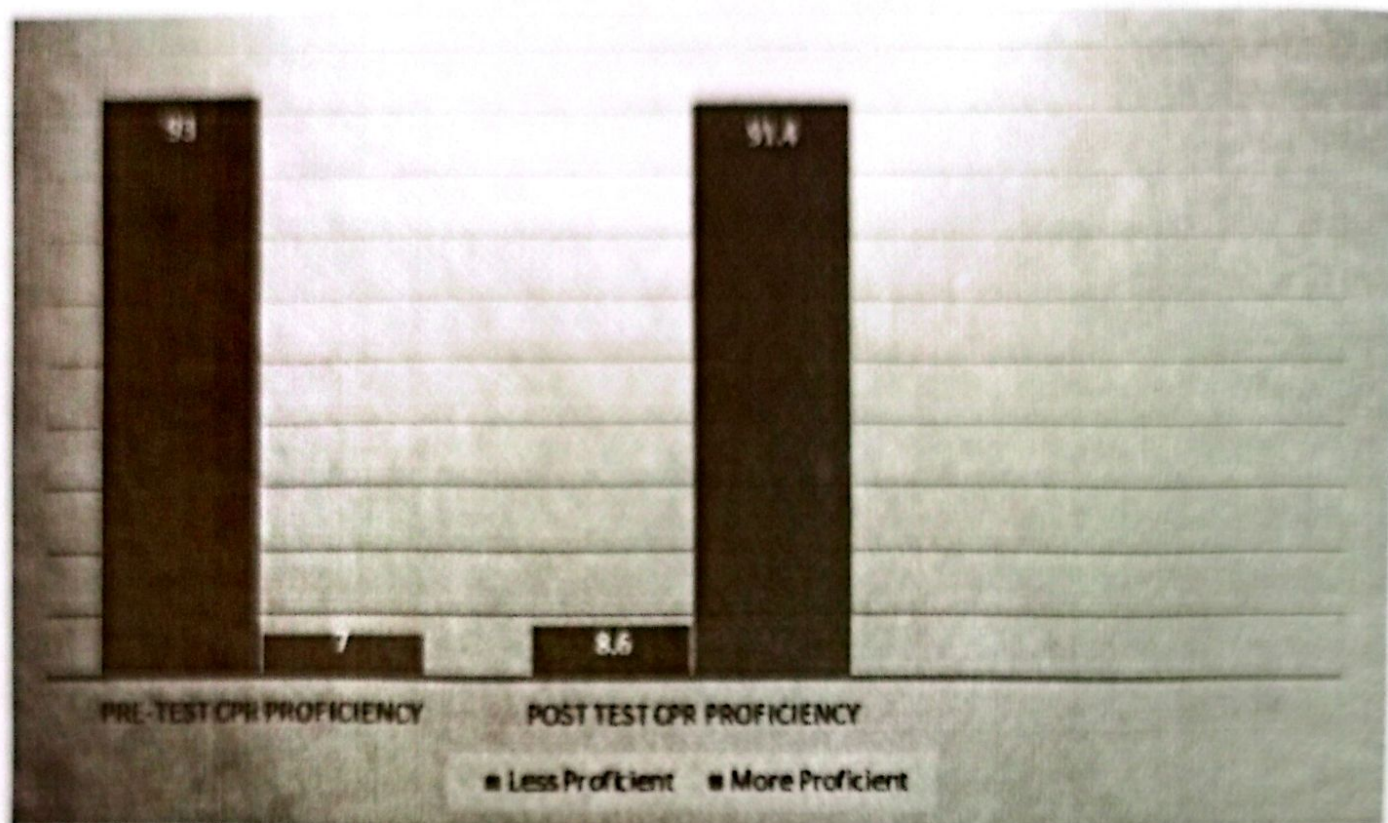


**1: Comparative Description of Participants' Knowledge on Neonatal BLS**

The comparative result of the participants' knowledge of neonatal BLS before and after intervention is illustrated in Table 1. From the result, 80.5% had inadequate knowledge before intervention. This reduced drastically to 2.6% after the intervention.

**Research Question 3:** What is the level of participants' proficiency on NBLS skills pre and post intervention?





**Figure 2: Comparative Results of the Participants' Proficiency on NBLS Skills**

The study reveals a great increase of proficiency from 7% in the pre-intervention phase to 91.4% in the post-intervention phase.

**Research Question 4:** What is the level of satisfaction with the nurse-led NBLS training?

**Table 3: Participants' Level of satisfaction with the Nurse-led NBLS Training (n=116)**

Are you satisfied with the training you received on NBLS?	Frequency	Percent
Very satisfied	112	96.6
Satisfied	4	3.4
Total	116	100.0

Table 3 shows participants' satisfaction with the training on NBLS they received. Findings from the study reveals that 96.6% of them were satisfied were very satisfied with the training.

### Hypotheses

**H<sub>1</sub> 1:** There is no significant difference in the mean score of NBLS Knowledge among the participants pre and post intervention.



**Table 4: Mean Difference in Participants' Knowledge of NBLS between Post and Pre-test**

Tests	Paired Sample Statistics					df	P	Remark
	N	Mean	Std. Dev.	Mean Diff.	T-test			
Post-Test Knowledge	116	80.3	13.9	40.9	19.2	127	0.001	S
Pre-Test Knowledge	128	39.3	17.0					

Table 4 shows a significant difference in mean knowledge score at the pre and post intervention, with a p value ( $p < 0.05$ ), hence, the null hypothesis was rejected.

**H<sub>0</sub> 2:** There is no significant difference in the mean score of BLS Knowledge among the participants pre and post intervention.

**Table 5: Mean Difference in Participants' Proficiency in NBLS between Post and Pre-test**

Tests	Paired Samples Statistics					df	P	Remark
	N	Mean	Std. Dev.	Mean Diff.	T-test			
Post-Test Proficiency	116	76.5	18.0	57.4	26.4	127	0.001	S
Pre-Test Proficiency	128	19.2	16.3					

Table 5 shows a significant difference in mean proficiency score at the pre and post intervention, with a p value ( $p < 0.05$ ), hence, the null hypothesis was rejected.

## Discussion

Preventing neonatal deaths is a paramount issue especially at the primary health care settings where mothers in the communities first take their children before referral can be made to the state and tertiary hospital. Inadequate knowledge of NBLS among health caregivers poses colossal risk to newborn health. If the goal of improving newborn survival rate is to be realized, there is a serious need to train health caregivers in NBLS modalities. It is therefore critical that healthcare workers at this level of care be skillful in NBLS in order to be able to safeguard the lives of neonates. Findings from the study showed that the majority of the health personnel in the communities were either CHEWs, or CHOs, who may not be skilled enough in NBLS. A survey conducted by the American Heart Association (2015), poor knowledge and skills of NBLS among caregivers was implicated as one of the precipitating factors of neonatal morbidity and mortality. Therefore, the need for employment of skilled caregivers by the government on regular basis is established in this study. This also highlights the need for healthcare workers to continually undergo neonatal BLS training and re-training in order to fill the gaps.

Further, findings from this study confirm that the knowledge of NBLS at the pre-intervention phase was lower than that of post intervention phase. This finding is supported by findings from the study of Wyllie, *et al.*, (2015), where lack of training in NBLS resulted



in inadequate knowledge and clinical skills of health care providers working in Primary Healthcare facilities. Knowledge of NBLS (CPR) has been defined as a major determinant in the success of resuscitation and known to play a vital role in the final outcome of acute emergency situations. This BLS knowledge as well as practice simple CPR methods guarantee chance of survival of the newborn, infants, and children for hours till the arrival of skillful medical assistance. In most cases, this is in itself enough for recovery and survival. With the intervention, there was a significant increase in the post intervention knowledge of PHC workers, with majority of the participants knowing the duration it takes to administer regular number of breath per cycle of compression with the idea that completion of chest recoil contributes to CPR success. This implies that sufficient and effective education and training in NBLS, there is certainly going to be increase in knowledge and performances of NBLS. Consequently, there would a reduction in newborn deaths in our villages, towns, and cities. Therefore, it is critical to provide and promote continuing professional education, regular refresher training on NBLS as well as putting in place supportive supervision to improve neonatal care quality.

More so, at the pre-intervention phase, the mean proficiency of the health workers on NBLS was 19.2%, while the mean proficiency increased to 76.5% at the post intervention; thus the mean difference was 57.4%. These findings indicate that the health workers lack training in NBLS prior to the intervention. This finding is supported by findings from Meaney, *et al.* (2010), where NBLS training resulted in significant improvements in the knowledge and skills of newborn resuscitation. However, scores also reveal the need to focus more on the practice of skills, particularly with bag-mask ventilation. Also supporting findings from this study is that of Goudar, *et al.*, (2013), where it was found that the success of NBLS is based on effective training of health professionals in resuscitation skills.

The difference between the mean knowledge scores and mean proficiency score at the pre and post intervention was significant. This shows that the introduction of the training increased participants' knowledge and proficiency in neonatal BLS. This finding agrees with that of Rajaratnam, *et al.* (2010), where it was reported that improvement in newborn resuscitation and consequent reduction in newborn deaths was based on effective training in NBLS.

## **Conclusion**

Nurse-facilitated learning has been observed to improve health workers' NBLS knowledge and skills in the selected PHCs. Therefore, similar life-saving learning be replicated and improved upon by midwives and other stakeholders. It is hoped that such learning will contribute significantly to neonatal mortality reduction.

## **Recommendations**

Educational training on NBLS should be included in in service training for health workers across all levels of healthcare. Moreover, midwives and all other health workers



who are not skilled in NBLIS should be encouraged to undergo similar training to guarantee their proficiency in the life-saving skill.

Replication of this study is recommended for other categories of health workers and other levels of healthcare in Nigeria.

## References

- American Heart Association (2015). Highlight of the 2015 AHA Guidelines Update for CPR and ECC Retrieved from <https://ebooksheart.org/epubreader/heighlights-2015-american-heart-Association>.
- Cheng, A, & Lin, Y (2015). The role of simulation in teaching pediatric resuscitation: current perspectives, *Advances in Medical Education and Practice*, 6, 239-248.
- Conroy, N. Kaiwo, J. Barr, D. A. Mitchell, L., Morrissey, B. & Lambert, S. B. (2015). Skills retention 3 months after neonatal resuscitation training in a cohort of healthcare workers in Sierra Leone. *Acta Paediatr Int J Paediatr*, 104, 1305-7.
- Gebreegziabher, E, Aregawi, A, & Getinet, H, (2014). Knowledge and skills of neonatal resuscitation of health professionals at a university teaching hospital of Northwest Ethiopia. *World Journal of Emergency Medicine*, 5(3), 196-202.
- Goudar, S. S. Somannavar, M. S., Clark, R. Lockyer, J. M. Revankar, A. P. Fidler, H. M. & Singhal, N. (2013). Stillbirth and newborn mortality in India after helping babies breathe training. *Pediatrics*, 131(2), e344-e352.
- Meaney, P. A. Topjian, A. A. Chandler, H. K. Botha, M. Soar, J. Berg, R. A. & Nadkarni, V. M. (2010). Resuscitation training in developing countries: a systematic review. *Resuscitation*, 81(11), 1462-1472.
- Opiyo, N. & English, M. (2010). In-service training for health professionals to improve care of the seriously ill newborn or child in low and middle-income countries. *Cochrane database of systematic reviews*, (4).
- Opiyo, N. Were, F. Govedi, F. Fegan, G. Wasunna, A. & English, M. (2008). Effect of newborn resuscitation training on health worker practices in Pumwani Hospital, Kenya. *PloS one*, 3(2), e1599.
- Rajaratnam, J. K. Marcus, J. R. Flaxman, A. D. Wang, H. Levin-Rector, A. (2010) Neonatal, postneonatal, childhood, and under-5 mortality for 187 countries, 1970–2010: a systematic analysis of progress towards Millennium Development Goal 4. *Lancet* 375: 1988–2008.
- Wall, S. N. Lee, A. C. Niermeyer, S. English, M. Keenan, W. J. Carlo, W. & Lawn, J. E. (2009). Neonatal resuscitation in low-resource settings: what, who, and how to overcome challenges to scale up?. *International Journal of Gynecology & Obstetrics*, 107, S47-S64.