

Basic Life Support Skills Training Among Healthcare Workers in Nigeria: A State-Wide Evaluation in the Niger-Delta Region

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ABSTRACT

Background: Healthcare systems are designed to efficiently minimize morbidity and mortality, especially through employment of diverse skills, including provision of Basic Life Support (BLS). Unfortunately, many healthcare workers (HCWs) lack BLS skills, which are essential for the reduction of preventable sudden deaths resulting from sudden cardiac arrest. **Objective:** A statewide assessment of the proportion of HCWs with BLS training, as well as the number available for such training in public primary and secondary healthcare facilities in Cross River State, Southern Nigeria, a low-middle income country (LMIC) setting. **Methodology:** By total enumeration, public primary and secondary healthcare facilities, in each of the 18 Local Government Areas (LGAs) in Cross River State, Southern Nigeria, were studied using descriptive cross-sectional design. Structured proforma was used to obtain data on number of doctors, nurses, Community health officers (CHOs) and Community Health Extension workers (CHEWs) as well as the number that have been trained on BLS/CPR in each facility. The Cross River State Research Ethics Committee approved the study, which was conducted for eight (8) weeks. The proportion of healthcare facilities with at least 1 doctor, nurse and staff trained on BLS/CPR were determined. Chi-square inferential statistic was used to compare these proportions between the three districts of the state. Also, Analysis of variance (ANOVA) was used to compare the mean number that had been trained on BLS per facility between these districts. P-value was set at 0.05. **Results:** Two hundred and five (205) healthcare facilities within the 18 L.G.A.s were surveyed. Sixteen (16) health facilities (7.8%) had staff that were trained on BLS. Seventy-five (75) staff had training on BLS, yielding average of 0.37 trained staff per facility. Approximately one-tenth of facilities (10.2%) had a doctor, while one-third (34.1%) had a nurse. Less than one-tenth (9.3%) of health facilities had at least a doctor and nurse that may be available for BLS

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training. There were community health officers and community health extension workers in both rural and urban facilities but none was a trained BLS provider. There was also no staff trained on BLS in any health facility located in seven LGAs. A relatively higher proportion of facilities with staff trained on BLS was found in Odukpani (16.7%), Yakurr (20.0%) and Bekwarra (16.7%). In comparison with the southern and northern districts, there was a higher average number of staff trained on BLS per facility in the central district ($p < 0.00$).

Conclusion: There is gross lack of BLS trained HCWs in most healthcare facilities in Cross River State. Considering the high and increasing burden of cardio-metabolic diseases and sudden cardiac arrest events in Nigeria, this largely unmet need for BLS training warrants concerted efforts at institutionalization of the requisite skill acquisition among HCWs in the region.

Keywords: Basic Life Support, Healthcare workers, Training, Nigeria

INTRODUCTION

Across diverse global settings, there is a high and increasing prevalence of cardio-metabolic diseases, including coronary heart disease as key causes of sudden death.¹ In low-middle income countries (LMICs) which have fragile healthcare systems, there is also a rapid increase in the burden of associated risk factors such as obesity, hypertension and diabetes, suggesting the possibility of an overwhelming burden of sudden deaths in the near and remote future.² As cardiac arrest precedes sudden death, prompt initiation of the chain of survival saves lives and is applicable in out-of-hospital(OOH) as well as in-hospital settings for all age groups.^{3,4}

The chain of survival for in-hospital cardiac arrest encompasses: surveillance and prevention, recognition of cardiac emergency and activation of emergency response system, early high quality CPR, early defibrillation, integrated post cardiac arrest care and recovery. Prior training in this foundational skill for health professionals and the quality of its use determines the outcomes of care and survival post-resuscitation.^{5,6} While most developed countries have systems in place for the prevention and management of events of sudden cardiac arrests, this is lacking in most LMICs, with the attendant high burden of preventable deaths occurring even among productive young people.^{7,8} The provision of Basic Life Support (BLS), is one of such cost-effective means of

managing events of sudden cardiac arrests.⁹

Healthcare workers (HCWs) mainly comprising medical doctors and nurses, are at the forefront of providing BLS during in-hospital cardiac arrests, as well as building the capacity of laypersons to provide such services during out-of-hospital events of sudden cardiac arrests. The HCWs level of knowledge, skills and practice regarding BLS is crucial as they form a critical mass of individuals required to ensure effective skilled attendance to needy victims of sudden cardiac arrests, in and out of the hospital settings.^{10,11} In other words, during any event of sudden cardiac arrest, a victim will have a higher chance of being attended to and surviving, if he is in a setting with a high proportion of BLS-trained HCWs and lay persons, compared to where this essential competence is lacking.

The capacity to provide BLS may be hampered by the lack of certain equipment and requisite devices in some LMIC's public health facilities.¹¹ Unfortunately, there is a paucity of literature on the proportion of HCWs with the capacity to provide BLS in many developing countries, including Nigeria. This study was therefore aimed at a statewide assessment of the proportion of HCWs with BLS training, as well as the number available for such training in public health facilities in Cross River State, Southern Nigeria.

METHODOLOGY

Study Design and Settings

By total enumeration, we set out to study all public primary and secondary healthcare facilities, in each of the 18 Local Government Areas (LGAs) in Cross River State, Southern Nigeria, using descriptive cross-sectional design. These LGAs make up the southern, central and northern senatorial districts. Southern district comprises Akamkpa, Akpabuyo, Bakassi, Biase, Calabar Municipality, Calabar South and Odukpani LGAs. Central district comprises Abi, Boki, Etung, Ikom, Obubra and Yakurr LGAs. Northern district comprises Bekwarra, Obanliku, Obudu, Ogoja and Yala LGAs.

Typically, each ward has a Primary Healthcare Center (PHC) overseen by the LGA with oversight from the National Primary Health Care Development Agency (PHCDA), while each LGA had a General Hospital run by the state government. Data were obtained from the PHCDA and State Ministry of Health about the number of PHCs and Secondary health care centres.

Instrument and Data Analysis

Structured proforma was used to obtain data on the number of doctors and nurses, as well as the number that have been trained on BLS/CPR in each facility. The numbers of CHOs and CHEWs per facility, the proportion of health facilities with at least 1 doctor, nurse as well as the total number of nurses and doctors trained on BLS/CPR were determined. Chi-square inferential statistic was used to compare these proportions among the three senatorial districts of the state. Also, Analysis of variance (ANOVA) was used to compare the mean number of trained BLS providers per facility among these districts. *P*-value was set at 0.05. The Cross River State Research Ethics Committee approved the statewide study, which was conducted for Eight (8) weeks in August and September 2021.

RESULT

The State has 196 Primary Health Care Centres and 24 public Secondary Health Facilities. Two hundred and five (93.2%) healthcare facilities having 49 doctors, 612 nurses (senior cadre HCWs), 223 CHOs and 636 CHEWs (junior cadre HCWs) within the 18 L.G.A.s were surveyed.

Fifteen (6.8%) facilities in security challenged areas including Bakassi and other LGAs sharing borders with Cameroun were inaccessible. Sixteen (16) health facilities (7.8%) had some staff that were trained on BLS. Among the senior cadre HCWs as shown in Table 1, a total of seventy-five (11.3%) in all the facilities had received training on BLS, yielding an average of 0.37 trained staff per facility ranging from 0 to 25. Approximately one-tenth of facilities (10.2%) had a doctor, while one-third (34.1%) had a nurse. There were no staff trained on BLS in any of the facilities visited in seven LGAs comprising Akamkpa, Akpabuyo, Bakassi, Boki, Etung, Ogoja and Yala. A relatively higher proportion of facilities with staff trained on BLS were found in Odukpani (16.7%), Yakurr (20.0%) and Bekwarra (16.7%).

There was no significant difference in the proportion of health facilities with at least 1 doctor ($p:0.57$), both doctor and nurse ($p:0.64$), and staff trained on BLS, comparing the three districts ($p:0.88$).

However, compared with central and southern districts, there was a significantly higher proportion of facilities with at least one nurse in the northern district ($p<0.00$). Also, compared with the southern and northern districts, there was a higher average number of doctors and nurses trained on BLS per facility in the central district ($p<0.00$). Among the junior cadre of HCWs as shown in Table 2, there were community health officers and community

health extension workers in all the health facilities but none was trained on BLS.

Table 1. Health facility Doctors/Nurses with BLS/CPR training in each L.G.A of Cross River State

LGA	PHC/ CHC	PHC with at least 1 doctor	PHC with at least 1 nurse	PHC with both doctor and nurse	PHCs with staff trained on BLS	Staff trained on BLS/ CPR	Average number of staff trained on BLS in a facility
Southern District							
Akamkpa	9	1 (11.1)	5 (55.6)	1 (11.1)	0 (0.0)	0	0
Akpabuyo	8	0 (0.0)	2 (25.0)	0 (0.0)	0 (0.0)	0	0
Bakassi	7	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0	0
Biase	11	2 (18.2)	3 (27.3)	2 (18.2)	1 (9.1)	3	0.27 (0-3)
Calabar Municipal*	13	1 (7.7)	3 (23.1)	0 (0.0)	1 (7.7)	2	0.15 (0-2)
Calabar South*	9	2 (22.2)	3 (33.3)	2 (22.2)	1 (11.1)	3	0.33 (0-3)
Odukpani	12	0 (0.0)	1 (8.3)	0 (0.0)	2 (16.7)	4	0.33 (0-2)
<i>Sub-total</i>	<i>69</i>	<i>6 (8.7)</i>	<i>17 (24.6)</i>	<i>5 (7.2)</i>	<i>5 (7.2)</i>	<i>12</i>	<i>0.17 (0-3)</i>
Central District							
Abi	11	2 (18.2)	4 (36.4)	2 (18.2)	1 (9.1)	2	0.18 (0-2)
Boki	13	1 (7.7)	4 (30.8)	1 (7.7)	0 (0.0)	0	0
Etung	10	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0	0
Ikom	13	1 (7.7)	6 (46.2)	1 (7.7)	1 (7.7)	16	1.23 (0-16)
Obubra	11	1 (9.1)	4 (36.4)	1 (9.1)	1 (9.1)	25	2.27 (0-25)
Yakurr	20	2 (10.0)	4 (20.0)	2 (10.0)	4 (20.0)	13	0.65 (0-6)
<i>Sub-total</i>	<i>78</i>	<i>7 (9.0)</i>	<i>22 (28.2)</i>	<i>7 (9.0)</i>	<i>7 (9.0)</i>	<i>56</i>	<i>0.72 (0-25)</i>
Northern District							
Bekwarra	12	2 (16.7)	6 (50.0)	1 (8.3)	2 (16.7)	3	0.25 (0-2)
Obanliku	12	2 (16.7)	6 (50.0)	2 (16.7)	1 (8.3)	2	0.17 (0-2)
Obudu	11	1 (9.1)	9 (81.8)	1 (9.1)	1 (9.1)	2	0.18 (0-2)
Ogoja	10	2 (20.0)	6 (60.0)	2 (20.0)	0 (0.0)	0	0
Yala	13	1 (7.7)	4 (30.8)	1 (7.7)	0 (0.0)	0	0
<i>Sub-total</i>	<i>58</i>	<i>8 (13.8)</i>	<i>31 (53.4)</i>	<i>7 (12.1)</i>	<i>4 (6.9)</i>	<i>7</i>	<i>0.12 (0-2)</i>
TOTAL	205	21 (10.2)	70 (34.1)	19 (9.3)	16 (7.8)	75	0.37 (0-25)
Chi-square comparison of proportions between districts		0.57	0.00	0.64	0.88		0.00 ^{##}

PHC=Primary Healthcare Center; CHC=Comprehensive Healthcare Center; NDA=No Doctor Available; NNA=No Nurse Available; * UCTH and Navy Ref. Hospitals excluded (since they are reference facilities); ##=ANOVA p-value

Table 2. Distribution of Community Health Officers /Community Health Extension Workers in each L.G.A. of Cross River State

LGA	PHC / CHC	CHEWs	CHOs	Total number Trained on BLS
Southern District				
Akamkpa	9	26	12	0
Akpabuyo	8	38	4	0
Bakassi	7	9	5	0
Biase	11	14	11	0
Calabar * Municipal	13*	57	26	0
Calabar South*	9*	41	15	0
Odukpani	12	12	12	0
<i>Sub -Total</i>	<i>69</i>	<i>197</i>	<i>85</i>	<i>0</i>
Central District				
Abi	11	24	11	0
Boki	13	50	8	0
Etung	10	33	5	0
Ikom	13	29	14	0
Obubra	11	52	7	0
Yakurr	20	59	16	0
<i>Sub-Total</i>	<i>78</i>	<i>247</i>	<i>61</i>	<i>0</i>
Northern District				
Bekwarra	12	26	21	0
Obanliku	12	29	13	0
Obudu	11	61	20	0
Ogoja	10	43	7	0
Yala	13	33	16	0
<i>Subtotal</i>	<i>58</i>	<i>192</i>	<i>77</i>	<i>0</i>
TOTAL	205	636	223	0

PHC=Primary Healthcare Centre; CHC=Comprehensive Healthcare Centre; CHEWs= Community health extension workers; CHOs=Community Health Officers * UCTH and Navy Ref. Hospitals excluded (since they are reference facilities)

DISCUSSION

Basic life support training, certification and periodic retraining is a mandatory pre-requisite for license and practice among all frontline medical doctors and nurses in developed countries. 12,13,14 This study found a very low number of BLS-trained doctors, nurses and other HCWs in all facilities across the senatorial districts of Cross River State. This finding indicates that various healthcare regulatory bodies have not made it mandatory to inculcate these trainings regularly into their continuing professional development programmes. It is also not a requirement for career progression of healthcare workers in public healthcare facilities.14,15 Perhaps insufficient awareness, lack of sponsorship or out-of-pocket cost of attendance of BLS training, which is offered only in a few centers, may be significant deterrents that have remained overlooked by the government and employers in the Nigerian healthcare sector. Yet, the lack of prioritization of BLS training may be due to a potentially overwhelming presence of other competing needs for available scarce resources, including the high burden of malaria, tuberculosis and HIV among others.16

The lack of skilled personnel to provide BLS services, may worsen the menace of the high burden of disease and sudden death. This will yield much more disability-adjusted life years (DALY) and years of life lost (YLL), especially among potentially productive teeming youths, who constitute the future adult population.17,18 The implications of a lack of skilled manpower to manage sudden cardiac arrest situations in Nigeria, is being made worse by the ongoing severe brain drain of highly skilled healthcare workers to more advanced countries.19 Also, considering that the general population largely depends on healthcare workers for their eventual knowledge-base and capacity building on BLS, lack of skilled personnel may imply deficiency in provision of out-of-hospital care by laypersons, during events of sudden cardiac arrests.20

In this study, unavailability of at least one doctor and/nurse was identified in most facilities across all senatorial districts of the state. This finding implies that BLS training may only be provided to the lower cadre of healthcare workers, comprising mainly the community health officers (CHOs) and community health extension workers (CHEWS).21-23 Although task-shifting is generally recommended by the WHO, especially as a last resort in the face of scarce healthcare personnel in LMICs, the quality of BLS training, facility-based service delivery and step-down training to laypersons for out-of-hospital service delivery, may be poor and inefficient among such lower cadre compared to higher cadre of healthcare workers.22,23,24 In other words, improvement in staffing of public health facilities with doctors and nurses remains an essential prerequisite for effective training and actualization of efficient attendance to events of sudden cardiac arrest in our settings. Task shifting has however been employed successfully in some developed countries by engaging nurse practitioners who undergo additional training to perform traditional physician roles. This model has been shown to provide high-quality, affordable care, especially for chronic and multi-morbid patients.25 It is unclear if this will be duplicated in emergency care.

The lack of HCWs trained on the provision of BLS in 7 out of the 18 LGAs though similar to findings by other researchers in LMICs,26 should be addressed strategically. In their study, Olusegun-Joseph and colleagues listed the shortage of trained emergency medical personnel among other factors as responsible for the mortality within the first 24 hours in the Emergency Department.27 Studies have shown that regular BLS training and yearly reinforcement improves knowledge and skills for the management of cardiac arrest.4,28,29 A regulated training plan and policy through certification and recertification in BLS should be a compulsory requirement for the renewal of practicing licenses by both the Medical and Dental Council and the Nursing and Midwifery Council of Nigeria. The Life Resuscitation Society of Nigeria

(LIRESON) could be supported by the government to function like the American Heart Association in facilitating this training. This form of training can be organized as train-the-trainer program where those trained will be expected to step down the training to a stipulated catchment area. There is, however, need for periodic evaluation to ensure that the step down training takes place and is effective. The State Ministry of Health can handle this monitoring and evaluation through the instrumentality of her clinical governance department.

In this regard, LIRESON should domesticate the guidelines and advisory statements of the International Liaison Committee on Resuscitation (ILCOR) to suit our local realities. This will entail research to ascertain evidence-based options to guide the production of Local Algorithms. International support and non-governmental organizations sponsored trainings are also encouraged. However, for sustainability, the government at all levels should show commitment by having a training budget and using it for that purpose. Local funds need to be mobilized. This is, however, a big challenge as demonstrated by other beneficiaries of programs involving external funding.³⁰

In this study, CHOs and CHEWs were available in both urban and rural facilities unlike the nurses and doctors. This finding of inequitable distribution of higher cadre of healthcare workers, mainly results from the relative lack of basic amenities required to attract and retain such a workforce to rural settings.^{31,32} The absence of such amenities as good housing, security, supermarkets, schools, road networks, potable water and recreational centers, has remained the key rationale for higher concentration of healthcare workers in urban compared with rural areas. The lack of financial and/or non-financial incentives for rural service delivery, as well as the poorly equipped status of most rural health facilities, also constitute disincentives towards the relocation of doctors and nurses to these settings.^{31,32} This

disparity in the distribution of nurses and doctors has implications for highly skilled healthcare access.

Prompt access to life saving interventions is very essential as demonstrated by a previous investigation in Cross River State, Nigeria where 48.7% of HCWs in various in-hospital units reported a return to spontaneous circulation (ROSC) when CPR was initiated after a witnessed cardiac arrest.³³ Unfortunately, the scenario of deficient staffing in health facilities, contributes to a high burden of quackery and counterproductive management of sudden cardiac arrest situations, especially by traditional and spiritual healers in these settings.³⁴

The limitation of this study is that although total enumeration was planned, 6.8% of the healthcare facilities were inaccessible due to security challenges. We however, do not think that this limitation significantly alters the findings of this study. Another limitation was the lack of a database on deaths attributable to inadequate cardiopulmonary resuscitation in our State and indeed Nigeria.

CONCLUSION

There is a gross lack of BLS training among HCWs in most health facilities in Cross River State. There is therefore an urgent need for training and retraining of health care personnel in primary and secondary health facilities by certified trainers as in-facility first responders in the first instance to maintain the chain of survival until more specialized care is available or the patient is transferred to a more adequately resourced facility. This will improve the health indices in our communities.

We propose sponsorships for BLS training and further research on Modalities and options for cost-effective capacity building on BLS. Considering the high and increasing burden of cardio-metabolic diseases and sudden cardiac arrest in Nigeria, this largely unmet need for BLS skills warrants concerted efforts at institutionalization of the requisite training of all

cadres of HCWs in the region.

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