

## Assessment of Progress in Capacity Building of HIV/AIDS Supply Chain Workforce in Nigeria

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### Abstract

*This study on assessment of progress in capacity building of HIV/AIDS supply chain workforce in Nigeria included research objectives, questions, and hypothesis. A pre-tested self-completion structured questionnaire was administered to participants (422) with a response rate of 396 (93.8%). The reliability statistics showed the questionnaire is less reliable ( $\alpha = 0.237$ ). Notable progress includes donor agencies interventions contributing considerably to capacity building of government personnel and adequate capacity at the national level 396 (100.0), the institutionalization of capacity development at all levels through National Product Supply Chain Management Programme, Procurement and Supply Management Technical Working Groups, and Logistics Management Coordinating Unit 292 (73.7) and demonstrable capacity in key supply chain functions 259 (65.4). The study revealed substantial progress in capacity building of the HIV/AIDS supply chain workforce, evident with the institutionalization of capacity building and demonstrable capacity in the key supply chain functions. More so, master trainers from the government are not always part of the facilitators and involved in capacity building, needs assessment does not always precede capacity building, the inadequate pool of master trainers, fellowship training program is not recognized, and pre-service training has not been institutionalized. Chi-square statistics revealed that the extent of progress in capacity building is a significant factor of HIV/AIDS supply chain workforce capacity ( $p < 0.05$ ). There is a need to develop manuals, policies, and procedures to ensure sustained progress in capacity building, needs assessment precedes capacity building, more training conducted to ensure an adequate pool of master trainers in the public sector and their participation in future capacity building interventions.*

**Keywords:** Capacity building, HIV/AIDS supply chain, Progress, Workforce.

### Introduction

Effective and efficient capacity building supports national health plans and health care system development [1]. Developing countries have rarely had sufficient skilled human resources for health, and competence gaps exist with categories of healthcare practitioners involved in the HIV/AIDS supply chain. This is further strained due to limited training opportunities and resources for capacity building, principally for the supply chain

workforce in the hard-to-reach health facilities. Notwithstanding, the lack of an adequate supply chain workforce to support scale-up of services has been a major constraint to HIV/AIDS program. These underpin the fact that supply chain management systems are weak, yet they are essential for the successful scale-up of treatment programs [2].

Previous study [1] has shown that a lot is still desired to ensure an effective and efficient HIV/AIDS supply chain system that will deliver health products to intended beneficiaries

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on time, return critical information to decision-makers for planning purposes, overcome pressure of increased volumes due to programs scale up and new initiatives, prevent supply chain management challenges and support the achievement of the Nigeria's strategic health objectives. Therefore, ensuring adequate institutional and human resources to meet the challenges of HIV/AIDS in sub-Saharan Africa into the future requires visionary strategic planning and investments in capacity building [1]. Effective capacity building will ensure a well-performing workforce that works in responsive, fair, and efficient ways to provide quality services and achieve the best health outcomes, given available resources and circumstances [3, 4, 5].

Nonetheless, it has been reported that there is usually a direct link between efficient health system governance and promising workforce outputs, with positive effects on overall health outcomes [6]. There are growing concerns that Nigeria's health workforce crisis is linked to the poor states of health governance [6, 7]. Hence tools and guidelines are needed to assist health system decision-makers in monitoring and assessing workforce development using standard definitions, indicators, and measures [8, 9]. Recognizing the diversity of stakeholders and complexity of health systems is crucial to ensure that evidence-based guidelines are tested with requisite humility and without rigid adherence to models dominated by a limited number of disciplines [10, 11]. Health Policy and Systems Research (HPSR) calls for greater involvement of local actors, including policymakers, civil society, and researchers, in decisions that are made around health systems strengthening [12]. A number of health systems have failed typically due to their lack of resilience and capacity to respond to pressing workforce and larger population health needs [13].

Consequently, the present study seeks to assess progress in capacity building of the HIV/AIDS supply chain workforce in Nigeria.

## Methods

### Study Design/Selection of the Area

A Cross-sectional observational design was used for the study. The study was carried out in Abuja, Nigeria's Federal Capital Territory (FCT), North-Central geo-political zone. The Federal Capital Territory was created in 1976 and had a population of 3,564,100 (2016 estimate) and covers about 8000 square kilometers. Abuja is the fastest-growing and wealthiest city on the African continent and one of the fastest-growing cities in the world [14, 15]. The choice of Abuja as the location for data collection to address the research questions is because most of the health supply chain organizations have their offices in Abuja from where they carry out their HIV/AIDS supply chain functions around the country. Abuja is the administrative and political centre of Nigeria and also the location (as the capital of Nigeria and seat of power) for policy development, coordination, and monitoring of implementation.

### Sample Size Determination

Cochran's formula

$$(n_0 = z^2 pq/e^2)$$

was used to determine the sample size for this study [16].

- $n_0$  = sample size
- $z$  = 1.96 (selected critical value of desired confidence level)
- $p$  = 0.5 (assuming the maximum variability, which is equal to 50%)
- $q$  = 1- p
- $e$  = 0.05 ( $\pm 5\%$  desired level of precision at 95% confidence level)
- $n_0 = (1.96)^2(0.5)(0.5)/(0.05)^2$
- $n_0 = 384.16$

An overage (10% of the calculated sample size) was added to the sample size to make provision for drop out, non-response, incomplete response, and late response to enable the realization of the minimum required sample size.

## **Sampling Technique**

This study involved HIV/AIDS supply chain workforce (422) working in the public sector, private sector, faith-based organization, non-governmental organization, and donor agency selected using a random sampling technique. Study participants included those with a minimum of bachelor's degree qualification, and who have spent at least 2 years in their organization, agreed to read and signed the consent form, and did not participate in the pilot. Whereas other supply chain workforce (e.g., Malaria, Tuberculosis, etc.), HIV/AIDS supply chain workforce that have spent less than 2 years in their organization, without at least bachelor's degree qualification, participated in the pilot and declined to sign the consent form were excluded from participating in the study.

## **Data Collection**

Data were collected from the field using a structured self-completion questionnaire. The purpose of the study and questionnaire were explained to the participants. Participation was voluntary, and identity was kept confidential and anonymous. Participants read and signed the consent form before joining the study and free to withdraw at any point without consequences. The questionnaire had fifteen (15) questions; all items were anchored on a Likert scale of 1-5 (5-point scale) with which relevant information in the area of socio-demographic characteristics and progress in capacity building of HIV/AIDS supply chain workforce were obtained. The questionnaire required about 10 minutes to complete. The questionnaire was developed based on relevant literature and empirical studies to ensure construct validity. The questionnaire was amended based on the reviewer's feedback and pilot result to ensure content validity. The offices of the Nigeria HIV/AIDS supply chain organizations in Abuja were visited to administer the questionnaire without identifiers. Participants who could not complete it at the

time of the visit were allowed to complete and return the questionnaire at a later date to eliminate social response bias. Ethical approval was granted by the National Health Research Ethics Committee of Nigeria (NHREC).

## **Data Analysis**

Completed and retrieved questionnaires were reviewed for accuracy, completeness, and consistency. The questionnaires were thereafter numbered serially and coded. Each questionnaire was entered on the excel template. The final entries were rechecked for accuracy, followed by data analysis. Reliability, frequency, descriptive statistics were done using Statistical Package for Social Sciences (SPSS) version 22.0 (SPSS Inc., Chicago, Illinois, USA), and inferential statistics were performed. Students-test, Chi-square, and one-way analysis of variance (ANOVA) were carried out with the aid of Graph Pad In stat version 3.0. P values < 0.05 were considered significant.

## **Results and Discussion**

The survey had a response rate of 396(93.8%). Table 1. Socio-demographic characteristics of participants, table 2. Percentage frequency of progress in capacity building of HIV/AIDS supply chain workforce, table 3. Reliability analysis of progress in capacity building of HIV/AIDS supply chain workforce, table 4. Effect of socio-demographic characteristics on progress in capacity building and table 5. Relationship between progress in capacity building and HIV/AIDS supply chain workforce capacity.

In the present study, the socio-demographic characteristics of the participants showed that the age of most 328(82.9%) of the participants is between 30 and 49 years, majority male 275(69.4%), years of experience in the HIV/AIDS supply chain between 8 and 15 years 241 (60.8%) and more than half with master's degree as highest educational qualification 256 (64.6%). The participants

have considerable experience, knowledge, and understanding of HIV/AIDS supply chain management, thus assuring credibility and quality of the research outcomes. The participants were drawn from all sectors and the majority from non-governmental organizations 207(52.3%). This depicts the involvement of diverse stakeholders, perspectives, expertise, and capacity needed to drive supply chain policy development and implementation for an effective and efficient HIV/AIDS supply chain system.

The study revealed substantial progress in capacity building of the HIV/AIDS supply chain workforce to enable the provision of quality services, and personnel in Nigeria's HIV/AIDS supply chain have demonstrated capacity to some extent in the key supply chain functions. In a previous study, [17] reported adequate capacity at the national level, especially within the private sector.

However, need assessment does not always precede capacity-building interventions. This suggests that capacity building may not be tailored to need or provided to the right personnel and might fail to address competency gaps. This might explain partly the reason various training and capacity building interventions implemented have not translated to improved workforce performance as supply chain management challenges are still inherent in the Nigeria HIV/AIDS system (e.g., stock-outs, wastages due to expiries/damage, unaccounted stock, inaccurate forecast and unimplemented quality control plans). If appropriate trainings and capacity-building programs are not administered to appropriate staff, it may impede the country's progress in capacity building and sustainability.

Similarly, the study revealed that donor agencies interventions have contributed considerably to the capacity building of government personnel across all levels, and there is adequate capacity at the national level, especially within the donor agencies, non-governmental organizations (NGOs), and

private sector. This finding is consistent with the report of a previous study [18] that capacity building in developing countries has been externally driven by implementing partners through donor funding, related to project implementation, and often has resulted in the disempowerment of local organizations rather than promoting local ownership and sustainability. It also agrees with an earlier report [17] that donor-funded programme has built the capacity of Nigerians on supply chain management through in-service and pre-service training and contributed significantly to capacity building for the locals as well as in-country infrastructural upgrades.

The greater proportion of the participants disagreed that there is an adequate pool of master trainers in the HIV/AIDS supply chain system. This suggests that more training is required to ensure the availability of a sufficient pool of resources within the public sector that can drive the country's supply chain functions, as well as develop HIV/AIDS human resources capacity at the health facility, LGA, state, and country-level which is fundamental for progress. An adequate pool of knowledgeable human resources is paramount to obtaining accurate and timely logistics data to ensure health commodity security, effective and sustainable supply chains [19].

An equal number of participants agreed and disagreed on the extent of progress in the fellowship training program to enhance leadership and management. The link indicates that the fellowship training program is not yet recognized as an effective capacity-building strategy in Nigeria. The key objective of the fellowship program is to increase the number of workforces equipped with knowledge and skills of program leadership and management for effective program implementation and sustainability [20]. It is relevant in addressing specific contextual institutional management-related problems and has been implemented with huge success in Uganda [20].

A little above average (56.6%) of the participants disagreed that master trainers from government are always part of the facilitators and involved in the implementation of capacity-building interventions. This finding further suggests that a lot still needs to be done to ensure a sustainable system and prepare for the long-term burden of HIV/AIDS, especially in view of the envisaged decreasing PEPFAR funding and eventual handover of responsibilities to national governments [21]. The present study is in disagreement with a previous study [12] that reported the need for more involvement of local actors in decisions and activities related to the funding of health policy research and health systems strengthening. It has been observed that health systems often fail owing to a lack of capacity and resilience to respond to health workforce needs and larger population health needs [13]. It is believed that additional attention to the principles of ownership and sustainability will ensure effective transfer of capacity building programs to the government.

The study further revealed that HIV/AIDS supply chain capacity development had been institutionalized at national, state, and LGA levels through National Product Supply Chain Management Programme (NPSCMP), Procurement and Supply Management Technical Working Group (PSM TWG), and Logistics Management Coordinating Unit (LMCU). The finding agrees with a previous report [17] on the establishment and functional HIV/AIDS supply chain management-specific coordination structures; National Product Supply Chain Management Programme (NPSCMP) at the national level, Procurement and Supply Management Technical Working Groups (PSM TWGs) at the national, regional and state levels and Logistics Management Coordinating Unit (LMCU) at the state and local government area level with LMCU responsible for data management and activities of the unit said to be improving logistics data

availability, visibility, quality and use for decision.

More than half of the participants disagreed that pre-service training has been institutionalized in the schools of Pharmacy, Laboratory Sciences, and Health Technology to address competency gaps despite past efforts adjudged successful. In Nigeria, Supply Chain Management System (SCMS) implemented a three-pronged approach; pre-service training, in-service training, and e-learning that ensured the availability of the health workforce with critical supply chain management (SCM) skills for continued patient access to life-saving medicines [22]. The program was successful due to stakeholder engagement and buy-in, strategic use of existing educational structures, professional bodies, and the Ministry of Health's commitment. The current study's finding disagrees with earlier work [17] that reported the institutionalization of pre-service training in the schools of Pharmacy, Laboratory Sciences, and Health Technology as a means of addressing the supply chain competencies gap. Pre-service education allows students to develop their competencies in the supply chain, reducing the need for future investments in expensive in-service training [23]. Pre-service training is an effective way of introducing principles and practices of health commodities supply chain management [19].

The reliability analysis revealed an average mean  $\pm$  standard deviation score (3.1753  $\pm$  1.0757) for progress in capacity building, indicating sample progress has been made in the capacity building of the HIV/AIDS supply chain workforce. Factor loading ranged from (0.574-0.865), which is good and entails all mean components are added to the summation. Cronbach's alpha,  $\alpha = 0.237$ , showed the questionnaire is less reliable.

Inferential statistics revealed that socio-demographic characteristics such as age, sex, years of experience, educational qualification, and job title/rank have no effect on the extent of

progress in capacity building of the HIV/AIDS supply chain workforce (P>0.05).

There was a relationship between progress in capacity building and HIV/AIDS supply chain

workforce capacity P<0.05. Also, the extent of progress in capacity building of the supply chain workforce is a significant factor of HIV/AIDS supply chain workforce capacity.

**Table 1.** Socio-demographic Characteristics of Participants

Characteristics	Categorization (N=396)	Number (%)
<b>Age (Years)</b>	30-49	328 (82.9)
	50-≥60	68 (17.1)
<b>Gender</b>	Female	121 (30.6)
	Male	275 (69.4)
<b>Years of Experience</b>	0-7	138 (34.9)
	8-15	241 (60.8)
	≥16	17 (4.3)
<b>Sector of Engagement</b>	Public	103 (26.0)
	Private	52 (13.1)
	Faith-Based Organization	17 (4.3)
	Non-governmental Organization	207 (52.3)
	Donor Agency	17 (4.3)
<b>Highest Educational Qualification</b>	Bachelors/Postgraduate Diploma	133 (33.6)
	Fellowship/Master's Degree	256 (64.6)
	Doctorate	7 (1.8)

**Table 2.** Percentage Frequency of Progress in Capacity Building of HIV/AIDS Supply Chain Workforce (N=396)

Items	Positive Responses
	Frequency N (%)
Training need assessment is always conducted before trainings are conducted	104 (26.3)
Donor Agencies intervention has contributed considerably to capacity building of Government personnel across all levels and there is adequate capacity at the national level especially within the Donor Agencies, NGOs and private sector	396 (100.0)
There is adequate pool of master trainers in HIV/AIDS supply chain system	155 (39.1)
Fellowship training program aimed at enhancing leadership and management capacity	189 (47.7)
Master trainers from government are always part of the facilitators and involved in the implementation of capacity building interventions	103 (26.0)
Personnel in Nigeria HIV/AIDS supply chain have demonstrated capacity to some extent in the key supply chain functions	259 (65.4)
HIV/AIDS supply chain capacity development has been institutionalized at national, state and LGA levels through National Product Supply Chain Management Programme (NPSCMP), Procurement and Supply Management Technical Working Groups (PSM TWGs) and Logistics Management Coordinating Unit (LMCU)	292 (73.7)
Pre-service training has been institutionalized in the schools of Pharmacy, Laboratory Sciences and Health Technology to address competency gaps	190 (48.0)

Positive Responses = Agree/ Strongly Agree

**Table 3.** Reliability Analysis of Progress in Capacity Building of HIV/AIDS Supply Chain Workforce (N= 396)

<b>Items</b>	<b>Mean</b>	<b>SD</b>	<b>Factor Loading</b>	<b>Cronbach's Alpha</b>
Training need assessment is always conducted before trainings are conducted	2.659	1.2044	0.813	0.237
Donor Agencies intervention has contributed considerably to capacity building of Government personnel across all levels and there is adequate capacity at the national level especially within the Donor Agencies, NGOs and private sector	4.437	0.4966	0.618	
There is adequate pool of master trainers in HIV/AIDS supply chain system	2.614	1.2787	0.804	
Fellowship training program aimed at enhancing leadership and management capacity	3.005	1.2180	0.865	
Master trainers from government are always part of the facilitators and involved in the implementation of capacity building interventions	2.596	1.2069	0.830	
Personnel in Nigeria HIV/AIDS supply chain have demonstrated capacity to some extent in the key supply chain functions	3.217	1.1016	0.831	
HIV/AIDS supply chain capacity development has been institutionalized at national, state and LGA levels through National Product Supply Chain Management Programme (NPSCMP), Procurement and Supply Management Technical Working Groups (PSM TWGs) and Logistics Management Coordinating Unit (LMCU)	3.912	0.9781	0.574	
Pre-service training has been institutionalized in the schools of Pharmacy, Laboratory Sciences and Health Technology to address competency gaps	2.962	1.1211	0.831	
<b>Mean of mean <math>\pm</math> SD</b>	<b>3.175</b>	<b>1.0757</b>		

**Table 4.** Effect of Socio-demographic Characteristics on Progress in Capacity Building (N=396)

Variables	N	Progress in Capacity Building
<b>Age</b>		
Below 40	121	3.218±1.0803
Above 40	275	3.156±1.0732
P-value		0.5974
<b>Sex</b>		
Male	275	3.177±1.0668
Female	121	3.171±1.0954
P-value		0.9592
<b>Years of experience</b>		
Below 8	138	3.183±1.0619
Above 8	258	3.171±1.0821
P-value		0.9157
<b>Highest Education</b>		
Bachelor's Degree	119	3.165±1.0827
Postgraduate	277	3.180±1.0729
p-value		0.8517
<b>Job Titles</b>		
Managers/Directors	258	3.170±1.0718
Specialists/Advisors	138	3.185±1.0825
P-value		0.8656

**Table 5.** Relationship between Progress in Capacity Building and HIV/AIDS Supply Chain Workforce Capacity (N= 396)

Progress in Capacity Building	Factors of Supply Chain Workforce Capacity		Total	$\chi^2$	P-value
	High Level Factors (%)	Low Level Factors (%)			
High Level of Progress	201 (72.8)	75 (27.2)	276 (100.0)	95.1	0.001
Low Level of Progress	24 (20.0)	96 (80.0)	120 (100.0)		

**Null Hypothesis (H<sub>0</sub>):** Progress in capacity building is not a significant factor of HIV/AIDS supply chain workforce capacity

**Alternative Hypothesis (H<sub>a</sub>):** Progress in capacity building is a significant factor of HIV/AIDS supply chain workforce capacity

### Conclusion

The study revealed substantial progress in capacity building of HIV/AIDS supply chain workforce and includes adequate supply chain capacity at the national level especially within the donor agencies, non-governmental organizations, and private sector, institutionalization of supply chain capacity

development at all level of the health sector through the creation of supply chain management coordination structures and demonstrable capacity in key supply chain functions among HIV/AIDS supply chain workforce. Also, master trainers from the government are not always part of the facilitators and are involved in the implementation of capacity-building interventions, and training needs assessment does not always precede training, an inadequate pool of master trainers, non-recognition of the fellowship program and pre-service training has not been institutionalized.



## Recommendations

Federal and State Ministries of Health should rise to the responsibility of playing an active and leading role in the HIV/AIDS supply chain workforce capacity development programs, include master trainers from the government in the implementation of capacity building activities, institutionalize pre-service training and make sure need assessment precedes capacity building interventions. More so, conduct more training to ensure a sufficient pool of master trainers within the public sector that can drive the country's HIV/AIDS supply

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chain functions which is fundamental for progress, ownership, and sustainability.

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## Conflicts of Interest

The authors declare no conflicts of interest exist.

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