

# It is not all about salary: a discrete-choice experiment to determine community health workers' motivation for work in Nigeria

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**To cite:** Ajisegiri WS, Peiris D, Abimbola S, *et al*. It is not all about salary: a discrete-choice experiment to determine community health workers' motivation for work in Nigeria. *BMJ Global Health* 2022;**7**:e009718. doi:10.1136/bmjgh-2022-009718

**Handling editor** Lei Si

► Additional supplemental material is published online only. To view, please visit the journal online (<http://dx.doi.org/10.1136/>).

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Received 26 May 2022  
Accepted 3 July 2022



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## ABSTRACT

**Introduction** Community health workers (CHWs) constitute the majority of primary healthcare (PHC) workers in Nigeria, yet little is understood about their motivations or the most effective interventions to meet their needs to ensure quality health coverage across the country. We aimed to identify factors that would motivate CHWs for quality service delivery.

**Methods** A discrete-choice experiment was conducted among 300 CHWs across 44 PHC facilities in the Federal Capital Territory, Abuja Nigeria. Based on the literature review and qualitative research, five attributes, namely: salary, educational opportunities, career progression and in-service training, housing and transportation, were included in the experiment. CHWs were presented with 12 unlabelled choice sets, using tablet devices, and asked to choose which of two hypothetical jobs they would accept if offered to them, or whether they would take neither job. Mixed multinomial logistic models were used to estimate stated preferences for the attributes and the likely uptake of jobs under different policy packages was simulated.

**Results** About 70% of the respondents were women and 39% worked as volunteers. Jobs that offered career progression were the strongest motivators among the formally employed CHWs ( $\beta=0.33$ ) while the 'opportunity to convert from CHW to another cadre of health workers, such as nursing' was the most important motivator among the volunteers' CHWs ( $\beta=0.53$ ). CHWs also strongly preferred jobs that would offer educational opportunities, including scholarship ( $\beta=0.31$ ) and provision of transport allowances ( $\beta=0.26$ ). Policy scenario modelling predicted combined educational opportunities, career progression opportunities and an additional 10% of salary as incentives was the employment package that would be most appealing to CHWs.

**Conclusion** CHWs are motivated by a mix of non-financial and financial incentives. Policy interventions that would improve motivation should be adequate to address various contexts facing different CHWs and be flexible enough to meet their differing needs.

## WHAT IS ALREADY KNOWN?

- ⇒ Health workers at the primary healthcare (PHC) facilities are motivated by financial and non-financial incentives for quality service delivery and retention in rural areas. However, evidence of job preferences and motivator for service delivery peculiar to community health workers (CHWs) is limited.
- ⇒ A large pool of volunteer CHWs plays a major role in maintaining the functionality of the PHC system, even though this is not officially acknowledged.

## WHAT ARE THE NEW FINDINGS?

- ⇒ Educational prospects, provision of transportation allowances and the opportunity to convert to a higher skilled cadre of health worker were the main motivators for CHWs' job preferences.
- ⇒ Volunteer CHWs were more highly motivated to choose jobs with opportunities for professional development and career progression, and not just financial incentives when compared with employed CHWs.
- ⇒ CHWs' preference for conversion to other cadres such as nursing may provide an opportunity for a review of their training curricula, scope of practice and establishment of career progression pathways while remaining in the PHC sector.

## WHAT DO THE NEW FINDINGS IMPLY?

- ⇒ By considering CHWs' preferences (including educational opportunities, career progression opportunities and an additional of salary as incentives) in policy formulation and implementation, feasible interventions to improve their motivation for sustained quality service delivery can be developed.

## INTRODUCTION

Health system performance and the achievement of universal health coverage (UHC) require an adequately skilled and motivated primary healthcare (PHC) staff.<sup>1</sup> A well-motivated health worker is more likely to deliver quality care, promptly respond to

## Box 1 Structure of formal community health worker in Nigeria

The formal community health workers in Nigeria comprise of three cadres, viz.

1. Junior community health extension worker (JCHEW)
  - a. Training: 24-month course in a training institution (colleges/schools of Health Technologies) approved by the CHPRBN. Training comprises (1) theoretical and (2) supervised community-based experience.
  - b. Qualification: certificate in Community Health.
  - c. Work schedule: 10%–40% in the health facility and 60%–90% in the community.
2. Community health extension worker
  - a. Training: 36-month course in a training institution (colleges/schools of Health Technologies) approved by the CHPRBN OR 24-month course for JCHEW with 2 years' postqualification experience—training comprises (1) theoretical, (2) supervised community-based experience and (3) supervised clinical-based experience.
  - b. Qualification: diploma in Community Health.
  - c. Work schedule: 20%–40% in the facility and 60%–80% in the communities.
3. Community health officer
  - a. Training: additional 1-year course of a CHEW in a Teaching Hospitals approved by the CHPRBN.
  - b. Qualification: higher diploma in Community Health.
  - c. Work schedule: spends almost all time at the health facility.

CHWs' Scope of practice: includes administrative functions, community services, maternal and child health services and clinical functions. The degree to which these functions are carried out depend on the CHWs' cadre and years of experience, and this is usually regulated by the National Standing Order. CHWs' grade level: there are 17 grade levels (GL) within the unified civil service of Nigeria. The GLs are on a nominal scale of seniority, and each has a salary range. Rise in GL rank is achieved by years of service, additional academic qualification. The JCHEWs and CHEWs with lower levels of qualification are not able to rise beyond GL 14 while the CHO are able to progress to the peak of GL 17. NB: CHWs' community-health facility time ratio also depends on level of health facility.

\*CHPRBN—Community Health Practitioners Registration Board of Nigeria.

patients' needs and be accessible for service provision.<sup>2</sup> The structure of the health workforce in terms of strength, distribution and skill mix is also important to population health outcomes.<sup>3</sup> Nigeria, however, experiences critical health workforce shortages, with a current health workforce density of 2.2 per 1000 population—far less than the threshold of 4.45 per 1000 population required to achieve the United Nation's Sustainable Development Goals.<sup>4</sup> This workforce shortage is most pronounced in PHC sector of the health system.<sup>3</sup>

In order to improve the coverage of PHC services, formal training in Schools of Health Technology and deployment of community health workers (CHWs) were institutionalised in Nigeria in 1978.<sup>5</sup> This cadre of CHWs comprises of community health officers (CHO), community health extension workers (CHEW) and junior CHEW (JCHEW) and collectively they constitute

the majority of PHC workers<sup>6</sup> (box 1). CHW programmes have been demonstrated to be an acceptable and cost-effective means to expand UHC, especially in low-income and middle-income countries.<sup>7–11</sup> There is substantial evidence within and outside Nigeria of the positive impact of CHWs in performing task-sharing and task-shifting activities,<sup>12 13</sup> and their role in the health systems response to major disease outbreaks such as Ebola in West Africa<sup>14</sup> and the COVID-19 pandemic.<sup>15</sup> However, limited institutional support can lead to low motivation of CHWs to remain in the workforce and this is a major challenge to service delivery at PHC level.<sup>3</sup> This is further compounded by the existence of a large pool of unemployed, formally trained CHWs driven by inadequate employment opportunities and suboptimal implementation of effective human resource policies.<sup>3</sup>

In Nigeria, the employment practices of institutionally trained CHWs that are formally employed by the government are guided by the Public Service Rules.<sup>16</sup> CHWs' remuneration and compensation also depend on the public-sector wage structure<sup>17</sup> in adherence to the Labour Act.<sup>18</sup> However, the Scheme of Service which provides guidance for entry into the civil service completely omits the CHEWs and JCHEWs cadres of CHWs.<sup>19</sup> Furthermore, the Labour Act does not apply to CHWs engaged by individual PHC facilities on a volunteer basis. As a result of this, the government is not responsible for their remuneration and wages. Their terms of engagement, therefore, depend on informal agreements with their 'employers' and their compensation may be arbitrarily determined.

As Nigeria aims to strengthen PHC to achieve UHC and other national health sector goals,<sup>3</sup> effective policies that address the motivation and employment needs of all health workers are the key.<sup>20</sup> The importance of the CHW workforce to the future strengthening and performance of the Nigerian health system has been highlighted in the literature, yet little is known of their specific motivations.<sup>21 22</sup> Motivation is the 'stimulus, incentive or motives for action towards a set goal,<sup>23</sup> such as the delivery of quality health services by CHWs in the context of our study.

A few studies have examined motivation of frontline health workers in Nigeria. One multicountry study that included Nigeria assessed CHWs' motivation for service delivery in the diagnosis and treatment of sick young children found that training opportunities were the major reason why over 70% of CHWs take up the job.<sup>24</sup> In addition to financial and non-financial incentives as a source of motivation, the study also showed that CHWs are motivated by community recognition, including being called a 'nurse'.<sup>24</sup> However, that study only focused on a specific programme, and the group of CHWs included in the Nigerian component of the study were restricted to those whose primary role was community medicine distribution.

A discrete-choice experiment (DCE) conducted in southern Nigeria examined retention and motivation of health workers in remote and rural areas.<sup>25</sup> Participants

of the study included students in schools of nursing, midwifery and health technologies and all cadres of PHC workers. The study revealed salary increment and provision of basic housing or housing allowance as motivators for taking up a rural posting.<sup>25</sup> A similar study conducted in northern Nigeria among a comparable sample identified provision of basic housing, improvement of quality of the facility structures and good school for children's education as the main motivators for taking up or continuing a rural job.<sup>20</sup> Other mainly descriptive studies have identified training opportunities, career progression and availability of social amenities as motivators to be retained in rural jobs.<sup>26</sup> A more in-depth realist evaluation study conducted among nurses, midwives, facility managers and policymakers identified five mechanisms, including 'feeling supported', 'feeling valued', 'companionship', 'confidence to perform tasks' and 'a comfortable work environment' to explain the motivation of PHC workers.<sup>2</sup>

Most of these studies included a team of PHC workers, and not exclusively CHWs. The existing evidence on health worker retention are on PHC teams as a whole and specialists working in secondary or tertiary care.<sup>27 28</sup> Although there are no Nigerian DCE studies focused on CHWs, several studies have been conducted in other countries to inform contextualised policy for CHW programmes to improve motivation, care quality and worker retention.<sup>29 30</sup> Given the importance of CHWs to the Nigerian health system and the difference between these workers and other cadres, we sought to identify the contextual factors that drive CHW job preferences in Nigeria through a discrete choice experiment (DCE) with frontline workers.

This study aimed to identify the factors that motivate CHWs to provide quality healthcare. A secondary aim was to examine how these motivators vary between the CHWs who are formally employed and those who work on a voluntary basis.

## METHODS

We conducted a DCE to assess the preferences of CHWs over job characteristics to increase their motivation. A DCE is suitable for providing understanding on motivators as wide range of attributes can be included in the job descriptions, and the jobs with most preferences can be modelled for policy.<sup>31</sup> More so, as the job descriptions are experimentally designed, the effect of individual attributes can be statistically assessed and the strength (impact) of preferences for changes in attribute levels can be measured.<sup>32</sup>

### Study setting

The study was conducted in 44 purposively selected PHC facilities across all six Area Councils of the Federal Capital Territory, Nigeria. PHC facilities were excluded if, at the time of the study, they had fewer than two paid full-time CHWs, were located in security-compromised

areas or were designated as non-functional based on lack of service provision.<sup>33</sup>

### Attribute development

DCE attributes were developed in a multistage, mixed-methods process as recommended in the literature,<sup>34</sup> which included a literature review and qualitative interviews of CHWs and key informants within the health system. The review explored conditions of service that affect CHWs' motivation and retention at the PHC level. This guided qualitative interviews and focus group discussion (FGD) among CHWs and stakeholders at state and local government levels.<sup>20 25</sup> In total, 13 in-depth interviews and 13 FGDs were conducted with CHWs in the study area, investigating their factors related to their practices and their views on the most important motivators and challenges. On top of this 13 FGDs were carried with other cadre of health workers and key system stakeholders to elicit their views on PHC service delivery and CHWs role in the system. This was part of a larger study that assessed CHWs' practices, and barriers and enablers of organizational structure within which they deliver services. The data were thematically analysed using NVivo software.<sup>35</sup> Attributes for the DCE were informed by themes that emerged from the qualitative data. From these, seven candidate attributes were developed and subsequently presented to stakeholders to validate the relevance and importance of the attributes and their levels. The process honed down the number of attributes to five that were used for the pilot study (table 1).

### Pilot study

The questionnaire was piloted using an Android Operating System application installed on a tablet device for 34 CHWs across eight PHC facilities in the Federal Capital Territory. Participants of the pilot study were subsequently interviewed to obtain feedback on their comprehension of the questions. This also aimed at confirming the appropriateness of the attributes and levels and the wording of the questions. Based on the feedback, there was minimal need for further modification of the attributes, levels or questions posed. The final attributes and levels included in the experiment are outlined in table 2. The pilot study participants were not included in the final study sample.

### The design of DCE

The DCE choice sets were designed using Ngene software V.1.2.1. A d-efficient, fractional factorial design was specified using a multinomial logit model, with no interaction terms stated in the design. The analysed pilot survey data provided the estimated coefficients that were used as prior estimates for generating the final survey instrument (the pilot design used 0 for all prior estimates). The final survey consisted of 24 unlabelled choice sets, in which participants were asked to choose between two hypothetical jobs that varied in levels of the attributes outlined in table 2. The final survey instrument asked respondents to

**Table 1** Candidate attributes included in pilot study and reason for inclusion

Attributes	Reason for inclusion	Proposition
<b>Salary</b>	Some formally employed CHWs are paid lower than colleagues in other states while the volunteers are paid minimal salaries or may not be paid at all	CHWs expected to prefer higher and regular salary. The volunteers also expected that their services would be reasonably remunerated
<b>Educational opportunities</b>	CHWs have the privilege to advance their academic qualification after 2 full years of service but this is not usually granted due to insufficient human resources. Volunteer CHWs may choose to advance their academic qualification with no support from the government	CHWs expected to prefer advancing their academic qualification as it is linked to career promotion and higher salary
<b>Career progression and in-service training</b>	CHWs reported they do most of the jobs at the PHC facility, but nurses are more recognised and get higher salary	CHWs expected to prefer jobs with specialisation or comparable with other professionals like nurses
<b>Housing</b>	CHWs reported that living far away from the community where they work impact on their transportation and their families as they have to travel far or stay within the facilities to take block shift for about 72–96 hours at a stretch.	CHWs expected to prefer housing supports
<b>Transportation</b>	CHWs conduct outreach services within the community, some of which are far away and hard to reach. Non-availability of transportation means or lack of financial support for transportation is a challenge to such outreaches	CHWs expected to prefer provision of means of transportation or transportation allowance to conduct outreach services effectively.

CHWs, community health workers.

choose their preferred job between two unlabelled alternatives, or if they would not accept either job presented, it would be considered that they kept their current position. The option to opt out of accepting presented job

choices (by selecting neither) was included to avoid overestimation of preferences by presenting respondents with a forced choice.<sup>31</sup> If respondents did not select either option, they were asked a follow-up, forced-choice

**Table 2** Attributes and levels used in the discrete choice experiment

Attributes	Levels of attributes		
	Level 1	Level 2	Level 3
<b>Salary</b>	Current salary	Current salary for your cadre+5% of salary as incentives	Current salary for your cadre+10% of salary as incentives
<b>Educational opportunities</b>	No study leaves	Study leave with full basic salary after 2 years	Study leave with full basic salary+25% of government scholarship after 3 years
<b>Career progression and in-service training</b>	Progress along the pathway of CHW to highest achievable grade level	Opportunity to covert from CHW to other cadres of health worker (eg, nursing) and remain at primary health facility level)	Opportunity to undergo specialty training (eg, maternal and child health, reproductive health, etc)
<b>Housing</b>	None	Basic accommodation provided within the community	Housing allowance (20% of basic salary) provided with no accommodation
<b>Transportation</b>	None	Provision of transportation means (eg, bicycle, motorcycle, van) for carrying out official duties	Provision of transportation allowance (10% of basic salary) for official duties

CHWs, community health workers.



**SMARTS health** Discrete Choice Experiments (DCE) for Community Health Workers

1. Consider Job A and Job B described below. The jobs do not differ in any ways not described here.

	Job A	Job B
Salary	Current salary for your cadre + 5% of salary as incentives	Current salary for your cadre + 10% of salary as incentives
Educational opportunities	Study leave with full basic salary + 25% of government scholarship after 3 years	No study leaves
Career progression and in-service training	Opportunity to undergo specialty training (e.g. maternal and child health, reproductive health, etc)	Opportunity to convert from CHW to other cadres of health worker (e.g. Nursing) and remain at primary health facility level)
Housing	Basic accommodation provided within the community	None
Transport	None	Provision of transportation means (e.g. bicycle, motorcycle, van) for carrying out official duties

1a. Which job would you choose?  
 Job A    Job B    None

1b. If you choose "None", which option among "Job A" and "Job B" the 2 would you consider a better one?  
 Job A    Job B

Buttons: Back, Q1 Done

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**Figure 1** Sample of choice set presented to participants.

question as to which option they preferred. The final DCE design was split into two blocks that were answered each by half of the cohort, such that respondents had to answer 12 scenarios each. **Figure 1** shows an example of a choice scenario with an opt-out option.

**Data collection and sample size**

The study was conducted among CHWs currently working at PHC facilities in the Federal Capital Territory from September to November 2021. Prior to data collection, the trained data collectors explained the nature of the study, the introductory statement and the job sets to the participants. DCE and sociodemographic information were obtained using a self-administered questionnaire built on an offline android-based application. Time taken by each respondent to complete the survey questionnaire was approximately 10 minutes. We aimed for a sample of 300, consistent with different methods used to calculate minimum sample sizes for DCEs and other published studies in the field and to allow for comparison across groups within our sample.<sup>36</sup> We sought to examine whether the factors influencing motivation would vary among two groups of CHW: (1) those who were formally employed and (2) those who volunteered as CHW. This is because the former group received regular monthly salary, are entitled to career and educational progression while the latter group has none of these benefits. As such, we hypothesised that the motivations of the two groups would be different and, thus, the policy interventions to improve retention and motivation would differ.

**Data analysis**

DCEs are theoretically based on random utility theory where independent rational actors act to maximise their

individual utility.<sup>37</sup> We assume participants chose the job that maximises their individual benefit or utility, which depends on the attributes included in the experiment<sup>38</sup> such that:

$$U(\text{job A or B}) = b_1 * \text{salary} + b_2 * \text{education} + b_3 * \text{career} + b_4 * \text{housing} + b_5 * \text{transportation}, \text{ where:}$$

Salary—fixed monthly salary.

Education—opportunity to advance academic qualifications.

Career—career progression pathway.

Housing—support for CHWs’ accommodation.

Transportation—transportation support for carrying out official duties.

For the opt-out choice, all attributes were coded as 0. At the end of the study, data from the computer tablets were extracted into an Excel spreadsheet and analysed using NLOGIT software V.6 (7 September 2016. Copyright 1986–2016 Econometric Software). The analysis of the DCE has followed the general approach outlined by the International Society of Pharmacoeconomics and Outcomes Research and published guides to model specification.<sup>32</sup> We conducted an exploratory analysis using a conditional logit model (and the results presented in the appendix {Appendix 1: Result of conditional logit model for full sample2}), but the mixed model was preferred as the base model for this study as it allowed for the relaxation of more restrictive assumptions of the conditional logit model.<sup>32</sup> Specifically, conditional logit models assume homogeneity of preferences and rely on the property of independence of irrelevant alternatives holding, which might not be the case. Mixed models also allow us to model the repeated choices of the same individuals, as was the case in this experiment.<sup>32</sup> Panel mixed multinomial logit models were therefore used to estimate preferences across all participants and for volunteer and formally employed CHWs separately. CHWs on contract employment were excluded from the subgroup analysis for two reasons. First, the proportion of this group was very little (4.7%). Second, this group of volunteer CHWs take up short-term contracts with development partners whenever the opportunity arises. Unforced choice data (with options coded as A, B or neither job) were used for all analysis with the respondents’ choices as the dependent variable.<sup>38</sup> All attribute levels were effects coded and all parameters modelled as random with a normal distribution. Constant terms were included to depict respondent preference to not accept either presented job. Finally, we modelled the potential impact of different policy packages for the entire sample and individual subgroup.<sup>39 40</sup> The aim was to examine the probability of accepting jobs presented under different policy configurations. The simulations were undertaken using the ‘simulate and scenario’ commands in NLOGIT and using the choice data collected to estimate choices under different policy scenarios represented by varying the levels of the attributes. The first simulation included a baseline scenario that represented the typical features currently associated with a CHWs’ job. Then, three other scenarios

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that reflect implementable policies, derived from significant predictors of motivation for CHWs' job in our study, were added. The estimated proportion of choosing each scenario was represented graphically (Figure 2)

### Patient and public involvement statement

This research was done without patient involvement due to the subject area and methods chosen (these were focused on the CHWs' own preferences and choices). Patients were not also invited to comment on the study design, interpret the results or to contribute to the writing or editing of this document for readability or accuracy.

### Author Reflexivity Statement

This study adequately considered measures that promote equitable authorship in the publication of research from international partnerships (online appendix 2: Reflexivity statement).

## RESULTS

### CHWs' sociodemographic characteristics

A total of 300 CHWs across 44 PHC facilities participated (Appendix 3: DCE Data\_CHWs in Nigeria) in the study and their sociodemographic characteristics are summarised in table 3. The mean age of the respondents was 36 years (SD:±9) and the modal age group was 30–39 years (27%). Of the 300 participants, 70.3% were women, 73.7% were married, 80.3% had obtained at least a diploma qualification and 73.75 of them were CHEWs. About half (47.3%) of the CHWs have worked for at least 10 years, 39% worked as volunteer and 85.7% worked at least 8 hours per day.

### Predictors of choice for all CHWs

The result of the mixed multinomial logit model, presented in table 4, showed that the model was a good fit to the data (pseudo R<sup>2</sup> 0.31), and the log likelihood, AIC and BIC indicate that the mixed model represents a better fit to the data than the conditional logit analysis (shown in Appendix 2). The general directions of the coefficients of both models were also similar, and the results of the mixed model indicate heterogeneity in terms of the standard deviations of the parameters. Findings showed that participants' choices were significantly influenced by all attributes and levels except basic salary with additional 5% incentives and provision of housing allowances. Among the significant attributes, the opportunity to convert from CHW to other cadre of health workers, such as nursing was the most preferred attribute (β=0.36), followed by study leave with scholarship (β=0.31) and provision of transport allowances (β=0.26). Of the attributes that were inversely related to CHWs' motivation, the least preferred attribute was the opportunity to undergo a specialty training maternal or reproductive health (β=-0.48), followed by the provision of basic accommodation within the community, where CHWs work (β=-0.27).

**Table 3** Sociodemographic profiles of community health workers who participated in the DCE

Socio-demographic variables	Frequency (n=300)	Percentage
<b>Age (years)</b>		
≤29	75	25.0
30–39	111	37.0
40–49	85	28.3
50–59	29	9.7
<b>Mean age (SD): 36 years (±9)</b>		
<b>Sex</b>		
Male	89	29.7
Female	211	70.3
<b>Marital status</b>		
Single	71	23.7
Married	221	73.7
Divorced	3	1.0
Widowed	5	1.6
<b>Cadre of CHW</b>		
Community health officer	30	10.0
Community health extension workers	221	73.7
Junior community health extension workers	49	16.3
<b>Highest of academic qualification</b>		
Ordinary national diploma (OND)	241	80.3
Higher national diploma (HND)	39	13.0
Bachelor's degree	19	6.3
Master's degree	1	0.4
<b>Length of post-qualification work experiences (years)</b>		
<10 years	157	52.3
≥10 years	143	47.3
<b>Employment type</b>		
Formally employed	169	56.3
Contract engagement	14	4.7
Volunteer	117	39.0
<b>CHWs who work ≥8 hours per day</b>	257	85.7
<b>CHWs who are the main household earners for their families</b>	130	43.3
CHWs who earn an average household income of ≤30 000 per month	77	25.7

Continued

**Table 3** Continued

Socio-demographic variables	Frequency (n=300)	Percentage
<b>CHWs who has additional paid job</b>	14	4.7
<b>Mode of transportation to work</b>		
Public transport (any form)	184	61.3
Private vehicle	20	6.7
Private motorbike	22	7.3
Walking	74	24.7
<b>Estimated distance from home to work ≤5 km</b>	194	64.7
<b>Estimated time from home to work &gt;30 min</b>	83	27.7
CHWs, community health workers; DCE, discrete-choice experiment.		

The constant for accepting neither of the jobs (-2.48) was the largest negative predictor of respondents' choices. This suggests that participants were very reluctant to decline either of the job options.

The random parameters' estimated SD showed significant heterogeneity in preferences for most attributes across the sample, with significant variation for all except the salary attributes, the provision of basic accommodation and the provision of transport allowance.

### Predictors of choice for the formally employed and volunteers' CHWs

Table 5 provides information on the result of the mixed multinomial logit model for both the formally employed and volunteer CHWs. Each model was a good fit for their respective data (pseudo  $R^2=0.34$  for the formally employed, pseudo  $R^2=0.29$  for the volunteer CHWs). Findings showed that participants' choices were significantly influenced by all attributes except 'basic salary with additional 5% incentives', 'basic salary with additional 10% incentives (among the formally employed CHWs)' and 'provision of housing allowances'.

While career progression was the most preferred significant positive attributes among the formally employed CHWs ( $\beta=0.33$ ), the 'opportunity to convert from CHW to another cadre of health workers, such as nursing' was the most significant among the volunteers ( $\beta=0.53$ ).

Almost all significantly positive attributes were higher among the volunteers' CHWs compared with the formally employed. These include the opportunity to convert from CHW to another cadre of health workers, such as 'nursing' (volunteers:  $\beta=0.53$  vs formally employed:  $\beta=0.30$ ); 'study leave with full basic salary after 2 years' (volunteers:  $\beta=0.41$  vs formally employed:  $\beta=0.16$ ); and 'provision of transportation allowance (10% of basic salary) for official duties' (volunteers:  $\beta=0.38$  and formally employed:  $\beta=0.18$ ).

One of the interesting findings is that no salary attribute is of any significance among the formally employed CHWs, but an additional 10% of salary as incentive will significantly motivate the volunteer CHWs.

Among the attributes that were inversely related to CHWs' motivation, the least preferred attributes were the 'opportunity to undergo a specialty training' ( $\beta=-0.77$ ) and the 'provision of basic accommodation within the community' ( $\beta=-0.44$ ) for the formally employed and the volunteers' CHWs respectively.

Formally employed CHWs were less likely to take a job with 'opportunity to undergo a specialty training' compared with the volunteers' CHWs ( $\beta=-0.77$  vs  $\beta=-0.31$ ). However, volunteer CHWs were less likely to take a job that 'provides basic opportunity within the community' ( $\beta=-0.44$  vs  $\beta=-0.26$ ) or 'provides transportation means for official duties' ( $\beta=-0.35$  vs  $\beta=-0.16$ ).

The constant for accepting neither of the jobs (volunteers:  $\beta=-1.82$ ; formally employed:  $\beta=-3.23$ ) was the largest negative predictor of respondent choices (respondents opted out only 1.4% of the time across all choices). This suggests that participants were very reluctant not to take up the jobs, and this was particularly strong for the formally employed CHWs.

The random parameters' estimated SD showed significant heterogeneity in preferences for attributes across the sample except for salary, provision of accommodation within the community (formally employed CHWs only), provision of housing allowance, and provision of transport allowance.

### Policy simulations

Figure 2 provides information on how all CHWs and the subgroups (formally employed and volunteers CHWs) were forecasted to take up different policy packages. With the baseline settings, 88.2% of all CHWs are likely to accept the job offer, a value slightly lower than additional 10% of salary as incentives (89.3%). The policy packages with the highest proportion of uptake were the combination of additional 10% of salary as incentives, educational career progressions, predicted among all CHWs, the formally employed and volunteers' CHWs as 96%, 96.5% and 94.5%, respectively.

### DISCUSSION

Ensuring that CHWs are well motivated to provide quality care and are retained in their posts is fundamental to ensuring a functional and universally accessible PHC system in Nigeria.<sup>41</sup> From this study, educational prospects, provision of transportation allowances and the opportunity to convert to a higher skilled cadre of health worker were the main motivators for CHWs' job preferences. Conversely, provision of basic accommodation within the community and opportunity for specialty training were inversely related to CHWs' motivation. Volunteer CHWs were more highly motivated to choose jobs with opportunities for professional development

**Table 4** Result of mixed multinomial logit model for full sample

Variable	Coefficient ( $\beta$ )	SE	P value
Constant for not accepting either job	-2.84*	0.21	<0.01
No additional incentive†	-0.06		
Additional 5% of salary as incentives	-0.06	0.05	0.19
Additional 10% of salary as incentives	0.12*	0.04	<0.01
No study leave incentive†	-0.55		
Study leave with full basic salary after 2 years	0.24*	0.04	<0.01
Study leave with full basic salary+25% of government scholarship after 3 years	0.31*	0.07	<0.01
No career progression incentives†	0.12		
Opportunity to convert from CHW to other cadres of health worker (eg, nursing)	0.36*	0.04	<0.01
Opportunity to undergo specialty training (eg, maternal and child health, reproductive health, etc)	-0.48*	0.08	<0.01
No housing incentives†	0.28	--	--
Basic accommodation provided within the community	-0.27*	0.04	<0.01
Housing allowance (20% of basic salary) provided with no accommodation	-0.01	0.05	0.76
No transportation incentives†	-0.04	--	--
Provision of transportation means (eg, bicycle, motorcycle, van) for carrying out official duties	-0.22*	0.04	<0.01
Provision of transportation allowance (10% of basic salary) for official duties	0.26*	0.05	<0.01
<b>Estimated SD for random parameters</b>			
Constant for not accepting either job	1.77*	0.17	<0.01
No additional incentive†	-0.10	--	--
Additional 5% of salary as incentives	0.07	0.07	0.31
Additional 10% of salary as incentives	0.03	0.07	0.61
No study leave incentive†	-0.57	--	--
Study leave with full basic salary after 2 years	0.17	0.08	0.03
Study leave with full basic salary+25% of government scholarship after 3 years	0.40*	0.08	<0.01
No career progression incentives†	-1.42	--	--
Opportunity to convert from CHW to other cadres of health worker (eg, nursing)	0.37*	0.06	<0.01
Opportunity to undergo specialty training (eg, maternal and child health, reproductive health, etc)	1.05*	0.07	<0.01
No housing incentives†	-0.19	--	--
Basic accommodation provided within the community	0.04	0.05	0.44
Housing allowance (20% of basic salary) provided with no accommodation	0.15	0.07	0.04
No transportation incentives†	-0.18	--	--
Provision of transportation means (eg, bicycle, motorcycle, van) for carrying out official duties	0.17*	0.06	<0.01
Provision of transportation allowance (10% of basic salary) for official duties	0.01	0.06	0.85
(McFadden pseudo $R^2=0.31$ , log-likelihood function= -2753.77, Inf.Cr.AIC=5551.5).			
*Indicates statistical significance at $p=0.01$ .			
†Omitted category.			
Inf,Cr,.AIC - AKAIKE Information Criterion			
CHWs, community health workers; Inf.Cr.AIC, AKAIKE Information Criterion.			



**Table 5** Result of mixed multinomial logit model for sub-classes of CHWs—formally employed versus volunteers.

Variable	Formally employed CHWs (n=169)			Volunteer CHWs (n=117)		
	Coefficient ( $\beta$ )	SE	P value	Coefficient ( $\beta$ )	SE	P value
Constant for not accepting either job	- 3.23*	0.29	<0.01	- 1.82*	0.21	<0.01
Additional 5% of salary as incentives	- 0.04	0.07	0.58	- 0.10	0.08	0.20
Additional 10% of salary as incentives	0.05	0.05	0.39	0.18*	0.06	<0.01
Study leave with full basic salary after 2 years	0.16*	0.06	<0.01	0.41*	0.09	<0.01
Study leave with full basic salary+25% of government scholarship after 3 years	0.33*	0.10	<0.01	0.36*	0.13	<0.01
Opportunity to convert from CHW to other cadres of health worker (eg, Nursing)	0.30*	0.07	<0.01	0.53*	0.07	<0.01
Opportunity to undergo specialty training (eg, maternal and child health, reproductive health, etc)	- 0.77*	0.09	<0.01	- 0.31*	0.12	<0.01
Basic accommodation provided within the community	- 0.26*	0.05	<0.01	- 0.44*	0.07	<0.01
Housing allowance (20% of basic salary) provided with no accommodation	- 0.05	0.06	0.44	0.11	0.08	0.14
Provision of transportation means (eg, bicycle, motorcycle, van) for carrying out official duties	- 0.16*	0.06	<0.01	- 0.35*	0.07	<0.01
Provision of transportation allowance (10% of basic salary) for official duties	0.18*	0.07	<0.01	0.38*	0.09	<0.01
<b>Estimated SD for random parameters</b>						
Constant for not accepting either job	1.79*	0.22	<0.01	1.52*	0.23	<0.01
Additional 5% of salary as incentives	0.07	0.10	0.44	0.18	0.10	0.09
Additional 10% of salary as incentives	0.13	0.12	0.26	0.05	0.08	0.53
Study leave with full basic salary after 2 years	0.29*	0.08	<0.01	0.33*	0.10	<0.01

Continued

Table 5 Continued

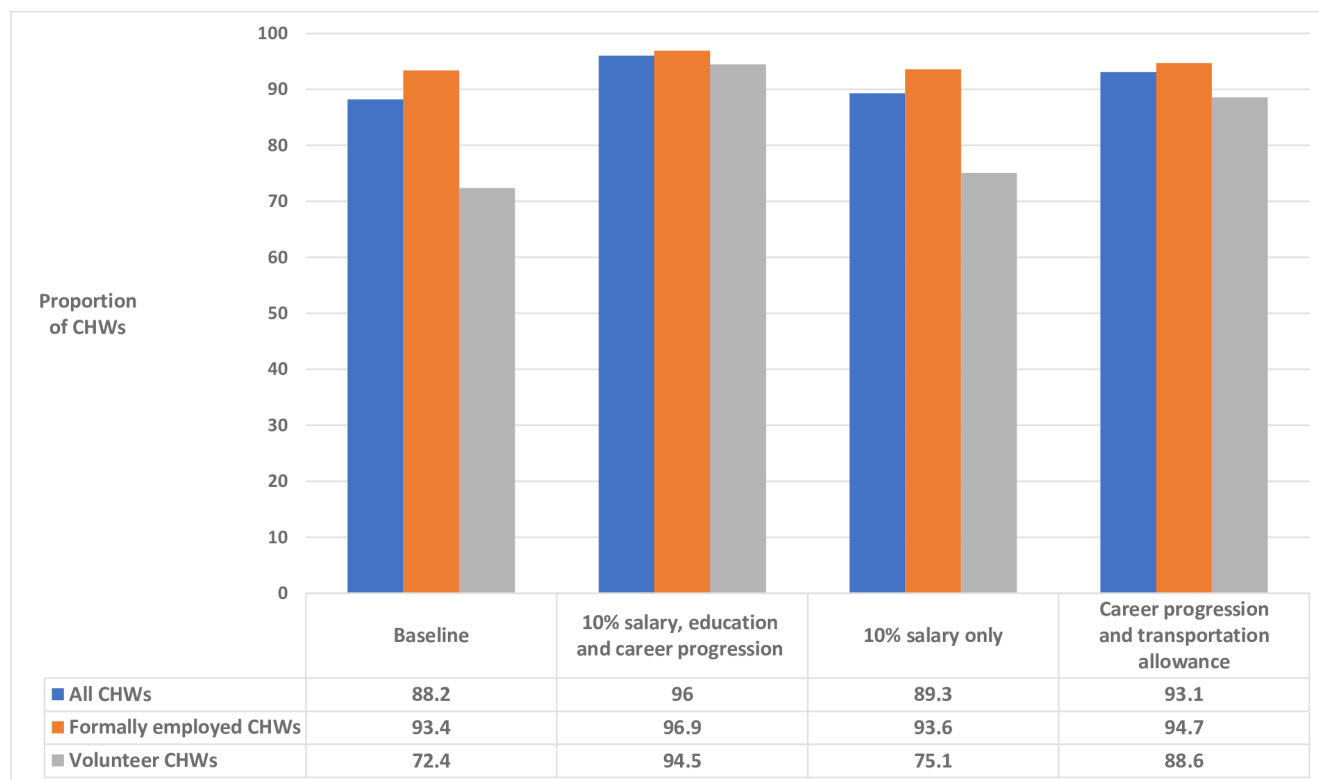
	Formally employed CHWs (n=169)			Volunteer CHWs (n=117)		
Study leave with full basic salary+25% of government scholarship after 3 years	0.29	0.13	0.02	0.42*	0.11	<0.01
Opportunity to convert from CHW to other cadres of health worker (eg, Nursing)	0.49*	0.07	<0.01	0.32*	0.09	<0.01
Opportunity to undergo specialty training (eg, maternal and child health, reproductive health, etc)	0.95*	0.09	<0.01	1.69*	0.18	<0.01
Basic accommodation provided within the community	0.02	0.07	0.74	0.21*	0.07	<0.01
Housing allowance (20% of basic salary) provided with no accommodation	0.08	0.11	0.46	0.09	0.12	0.44
Provision of transportation means (eg, bicycle, motorcycle, van) for carrying out official duties	0.17	0.07	0.01	0.22*	0.07	<0.01
Provision of transportation allowance (10% of basic salary) for official duties	0.08	0.14	0.57	0.09	0.12	0.47
	McFadden pseudo R <sup>2</sup> =0.34, Log-likelihood function= -1463.20, Inf. Cr.AIC=2970.40			McFadden pseudo R <sup>2</sup> =0.29, Log-likelihood function= -1542.45 Inf. Cr.AIC=2242.50		
*Indicates statistical significance at p=0.01. CHWs, community health workers; Inf.Cr.AIC, AKAIKE Information Criterion.						

and career progression, and not just financial incentives when compared with employed CHWs.

Our findings demonstrated that both categories of CHWs would be significantly motivated by the opportunity to convert to other cadres of health workers, such as nursing, at some point of their career. This could be because of the observed prestige accorded to nurses within the community. According to a previous study, CHWs consider it a mark of respect when community members refer to them as nurses or doctors, and this increases their commitment.<sup>24</sup> A higher employability and salary packages among nurses compared with CHWs could also be a reason why CHWs would like to convert to other health worker cadres. There are 92 nurses compared with 64 CHWs in the public sector per 100 000 population.<sup>42</sup> While nurses have broad options of employment, including migration opportunities, and could be employed at any level of the health system,

CHWs are mainly trained for, and employed at the PHC level. These limited employment options, coupled with overproduction of CHWs, are associated with a high rate of CHW unemployment.<sup>3</sup>

Another possible reason for CHW preferences for conversion to other cadres may be rooted in lack of clarity in career pathways and stagnation of career advancement.<sup>43</sup> While career pathways and advancement for nurses appear streamlined in the scheme of service, it is not so for CHWs.<sup>19</sup> CHW preference for job conversion can be an undesirable motivation for the long-term objective of strengthening PHC systems. This is because of the possibility of manpower loss at the PHC level with consequent negative effects on community-level services. It is, therefore, important that policymakers institute improved work conditions and establish clear career pathways comparable to other cadres like nurses.



**Figure 2** Predicted job uptakes under different policy scenario among the CHWs. CHWs, community health workers.

The need for continuous professional development is a desirable but often unmet motivator for CHWs in most African countries such as Mozambique, Ethiopia and Malawi.<sup>11 44</sup> This was also evident in this study where both formally employed and volunteer CHWs would be motivated by jobs that offer educational opportunities to advance their qualification. Additional qualifications through educational advancement are closely linked to accelerated career progression and grade level (GL) promotion.<sup>19</sup> The GL system, which ranges from 1 (entry level) to 17 (a director level), within the civil service determines level of seniority and is proportional to salary income (box 1). Therefore, CHEWs whose highest attainable GL is 14 can become CHO with further training and attain a peak of their career at GL 17. Among the salaried CHWs, the preference for educational opportunities was higher for job options that offer 3 years postemployment study leave with additional scholarship, compared with one with 2 years postemployment without scholarship. This also aligns with findings from a previous DCE conducted among PHC workers in Nigeria.<sup>20</sup>

Apart from a preference for conversion to other cadres of health worker, CHWs would prefer to remain in general roles rather than receive advanced training to become a specialist such as in reproductive or maternal health areas. Broadly, CHWs are distinguished into generalists and specialist groups.<sup>45</sup> The generalist CHWs are involved in a wide range of activities, while specialist CHWs focused mainly on a particular health issues of concern within the programme they are registered in.<sup>46</sup> With specialisation, healthcare workers are expected to

provide a higher quality of care in their niche of operation.<sup>47</sup> For instance, CHWs have been known to specialise in areas such as mental health in Mexico<sup>48</sup> and can specialise in various aspects of healthcare in the USA.<sup>49</sup> In this study, however, the primacy of CHWs' career progression as a generalist appeared to be more desirable than subspecialisation. This may be connected to their unwillingness to continue as a CHW. It may also be that CHWs may consider subspecialisation as constraining their work options and community performance.<sup>46</sup>

As CHWs derive professional satisfaction from both the numerous services they provide within the community and<sup>50</sup> their personal relationship with community members,<sup>51</sup> the concern of losing this connectedness may also explain CHW indifference towards subspecialisation. More so, the fear of misrepresentation or misinterpretation by community members of a CHW's subspecialisation as their only area of skill may reduce the prestige and income for those who are remunerated on a fee for service model. There is insufficient evidence to inform this issue of subspecialisation; however, the findings from our study suggest that this is an important area for further research.<sup>52</sup>

Although provision of accommodation has been identified as retention strategy for PHC workers in Nigeria,<sup>2</sup> especially in rural areas,<sup>53</sup> we found that, for both employed and volunteer CHWs, basic accommodation provision within the community of practice was inversely related to motivation for service delivery. This finding also contradicts studies which identify provision of housing or housing allowances as incentives to

work in rural or remote areas.<sup>20 25</sup> It may be more appropriate to invest in improving PHC facility infrastructure and supporting amenities such as access to high-quality schools to increase CHW's motivation to reside within the community where they serve.<sup>20 54–56</sup>

Modest financial incentives were not a major motivator for CHWs in our study in contrast to many other studies.<sup>20 26 57–59</sup> However, they became more influential as the size of the incentive rose, particularly for the volunteer CHWs. Previous studies have shown that formally employed CHWs were demotivated by their salary level, while volunteer CHWs were motivated by additional financial incentives.<sup>51</sup> The complex attitudes towards remuneration suggest that policy aimed at improving CHW work conditions should not solely focus on salary packages but should consider a mix of financial and non-financial incentives that are tailored to the specific CHW needs. Our study demonstrated that a policy package with educational opportunities and clear career progression, in addition to financial incentives would be the most preferred job option for both cadres of CHWs. We therefore recommend the formulation of policies with the creation of an enabling implementation environment to advance CHWs' education. This should be accompanied by regular review of their training and scope of practice in line with current realities of the health system. Realistic policies that ensure the establishment of clear career progression pathways, similar to other cadres like nurses, while remaining in the PHC sector should be formulated. Lastly, we advocate the development of human resource policy that will enable the absorption of a great proportion of the volunteers and prevent mismatch between production and recruitment. While serving as volunteers, PHC system should also have policy that provide this group of CHWs with educational opportunity to motivate them further.

Our study is not without limitations. First, being a DCE, the results could be biased as real-world scenario may be different from the respondents' stated preference on which our results were based. In order to minimise the impact of this possible bias, we included an opt-out option, ensured a detail attributed development process and reappraised the study design after pilot testing. More so, no dominant choice tasks or other formal tests of internal consistency were included in this experiment. However, we followed an in-depth process to ensure the suitability of included attributes to our target population, piloted them extensively and the understanding of the cohort on what they were being asked to complete was tested during the pilot phase. Lastly, our study was limited to CHWs working in PHC facilities in the Federal Capital Territory only. PHC facilities in security compromised areas were also excluded. As a result, the finding may not be generalisable to the wider CHW population.

Despite these limitations, a key strength of this study is the rich insight it provides on volunteer CHWs. The large pool of volunteer CHWs plays a major role in maintaining the functionality of the PHC system, even though this

is not officially acknowledged. As they are not formally employed, there are no policies that address their professional and career-related needs. As volunteer CHWs are potential government employees who are expected to be prioritised whenever formal employment opportunities arise, our study findings could help inform appropriate policy for this large workforce.

## CONCLUSION

Being an employed, salaried CHW or engaged as a volunteer CHW influences the types and magnitude of incentives for particular job preferences. Policy scenario modelling predicted combined educational opportunities, career progression opportunities and an additional 10% of salary as incentives as the ideal job preference for CHWs. The preference of CHWs' conversion to other cadres such as nursing may provide an opportunity for a review of their training curricula, scope of practice and establishment of career progression pathways while remaining in the PHC sector. Policies also need to recognise the substantial contribution of voluntary CHWs to high-quality PHC service delivery and create an enabling environment to support their professional development and entry into formally employed roles.

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**Acknowledgements** The authors would like to acknowledge the efforts of Miss Nirosha Yeddalapudi and Dr Deversetty Praveen in developing the Android-based application for the DCE. We would also like to acknowledge the operations team of Hypertension Treatment in Nigeria Program, particularly Dr Anthony Orji, Prof Dike Ojji and Dr Mark Huffman who provided the platform for conducting the DCE. Lastly, we acknowledge the data collectors and all the CHWs for their participation.

**Contributors** The study was conceptualised by WSA, RJ and DP. WSA, RJ and BA were involved in study design and pilot study. Data collection was supervised by WSA and OO. WSA and BA led data analysis and all authors provided critical intellectual input during the analysis. Manuscript was drafted by WSA. All authors reviewed the draft manuscript and approved the final version. WSA, as guarantor, is responsible for the overall content.

**Funding** The project was supported by the George Institute for Global Health, Australia through the Seed Grant funds dedicated for under-served populations in LMICs for 2019/2020. The UNSW Scientia Scholarship program supports WSA and AGT. WSA is also supported through the Australian Government Research Training Program Scholarship. SA was supported by the Australian National Health and Medical Research Council (NHMRC) through an Overseas Early Career Fellowship (APP1139631). RJ is supported by the Australian National Heart Foundation (APP 102059) and UNSW Scientia Fellowship. DP is supported by NHMRC Career Development Fellowship, Level 2 and Australian National Heart Foundation Future Leader Fellowship. BA is supported by an NHMRC Emerging Leadership Investigated Grant (GNT2010055). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

**Competing interests** None declared.

**Patient and public involvement** Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

**Patient consent for publication** Not applicable.

**Ethics approval** Ethical approval was granted by the National Health Research Ethics Committee of Nigeria (Approval number: NHREC/01/01/2007) and the University of New South Wales Human Research Ethics Committee (HC: 190051). Participants gave informed consent to participate in the study before taking part.

**Provenance and peer review** Not commissioned, externally peer reviewed.

**Data availability statement** All data relevant to the study are included in the article or uploaded as supplementary information.

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#### REFERENCES

- World Health Organization. *Follow-Up of the Recife political Declaration on human resources for health: renewed commitments towards universal health coverage*. Geneva: World Health Organization, 2014: 1–9.
- Ebenso B, Mbachu C, Etiaba E, *et al*. Which mechanisms explain motivation of the primary health workers? insights from the realist evaluation of a maternal and child health programme in Nigeria. *BMJ Glob Health* 2020;5:e002408 <https://gh.bmj.com/content/5/8/e002408>
- Federal Ministry of Health, Nigeria. *Second National Strategic Health Development Plan 2018 - 2022* [Internet]. Abuja, Nigeria: Federal Ministry of Health Nigeria; 2018 [cited 2020 Jun 25]. 150 p. Available: [https://health.gov.ng/doc/NSHDP\\_II\\_ME\\_Plan.pdf](https://health.gov.ng/doc/NSHDP_II_ME_Plan.pdf)
- World Health Organization. *The state of the health workforce in the WHO African Region, 2021* [Internet]. Brazzaville: WHO Regional Office for Africa, 2021. Available: <https://apps.who.int/iris/bitstream/handle/10665/348855/9789290234555-eng.pdf?sequence=1&isAllowed=y> [Accessed cited 2022 May 2].
- National Primary Health Care Development Agency. *Primary Health Care (PHC) Guideline in Nigeria* [Internet], 2011. Available: <https://nphcdang.com/publications> [Accessed cited 2021 Nov 22].
- World Health Organization. *Primary Health Care Systems (PRIMASYS): Case study from Nigeria*. [Internet]. Geneva: World Health Organization, 2017. Available: [https://www.who.int/alliance-hps/projects/alliancehps\\_nigeriaprimasys.pdf?ua=1](https://www.who.int/alliance-hps/projects/alliancehps_nigeriaprimasys.pdf?ua=1) [Accessed cited 2020 Jul 15].
- Hodgins S, Kok M, Musoke D, *et al*. Community health workers at the dawn of a new era: 1. Introduction: tensions confronting large-scale CHW programmes. *Health Res Policy Syst* 2021;19:109.
- Prinja S, Jeet G, Verma R, *et al*. Economic analysis of delivering primary health care services through community health workers in 3 North Indian states. *PLoS One* 2014;9:e91781.
- Kane S, Kok M, Ormel H, *et al*. Limits and opportunities to community health worker empowerment: a multi-country comparative study. *Soc Sci Med* 2016;164:27–34 <https://www.sciencedirect.com/science/article/pii/S0277953616303732>
- Olaniran A, Madaj B, Bar-Zev S, *et al*. The roles of community health workers who provide maternal and newborn health services: case studies from Africa and Asia. *BMJ Glob Health* 2019;4:e001388 <https://gh.bmj.com/content/4/4/e001388>
- Haile F, Yemane D, Gebreslassie A. Assessment of non-financial incentives for volunteer community health workers - the case of Wukro district, Tigray, Ethiopia. *Hum Resour Health* 2014;12:54.
- Federal Ministry of Health. *Task-Shifting and task-sharing policy for essential health care services in Nigeria*, 2014.
- Joshi R, Thrift AG, Smith C, *et al*. Task-shifting for cardiovascular risk factor management: lessons from the global alliance for chronic diseases. *BMJ Glob Health* 2018;3:e001092 [https://gh.bmj.com/content/3/Suppl\\_3/e001092](https://gh.bmj.com/content/3/Suppl_3/e001092)
- Perry HB, Dhillion RS, Liu A, *et al*. Community health worker programmes after the 2013–2016 Ebola outbreak. *Bull World Health Organ* 2016;94:551–3.
- Ballard M, Bancroft E, Nesbit J, *et al*. Prioritising the role of community health workers in the COVID-19 response. *BMJ Glob Health* 2020;5:e002550.
- Federal Government of Nigeria. *Public service rule*. Federal Republic of Nigeria, 2008.
- Ballard M, Westgate C, Alban R, *et al*. Compensation models for community health workers: comparison of legal frameworks across five countries. *J Glob Health*;11.
- Federal Government of Nigeria. *The Nigerian Labour Act cap L1 LFN 2004*. [Internet], 2004. Available: <https://lawsofnigeria.placng.org/laws/L1.pdf>
- Federal Government of Nigeria. *Federal Republic of Nigeria schemes of service*, 2003.
- Okoroafor SC, Nwachukwu C, Osunbor M. A Discrete Choice Experiment on Factors Influencing Attrition and Motivation of Frontline Health Workers in Remote and Rural Areas in Nigeria ResearchSquare608253e [Preprint], 2022. Available: <https://www.researchsquare.com/article/rs-608253/v1> [Accessed cited 2022 Mar 19].
- Angell B, Sanuade O, Adetifa IMO, *et al*. Population health outcomes in Nigeria compared with other West African countries, 1998–2019: a systematic analysis for the global burden of disease study. *The Lancet* 2022;399:1117–29.
- Abubakar I, Dalgiish SL, Angell B, *et al*. The Lancet Nigeria Commission: investing in health and the future of the nation. *The Lancet* 2022;399:1155–200.
- Borkowski N. *Organizational behavior in health care*. 2nd ed. Sudbury (MA): Jones and Bartlett Publishers, 2009.
- Sanou AK, Jegede AS, Nsungwa-Sabiiti J, *et al*. Motivation of community health workers in diagnosing, treating, and referring sick young children in a multicountry study. *Clinical Infectious Diseases* 2016;63:S270–5.
- Okoroafor SC, Ongom M, Salihu D, *et al*. Retention and motivation of health workers in remote and rural areas in cross river state, Nigeria: a discrete choice experiment. *J Public Health* 2021;43:i46–53.
- Jegede AS, Adejumo P, Ushie BA. Factors influencing motivation and retention of primary healthcare workers in the rural areas of Oyo state, Nigeria. *World Health Popul* 2013;14:23–36.
- Abimbola S, Olanipekun T, Igbokwe U, *et al*. How decentralisation influences the retention of primary health care workers in rural Nigeria. *Glob Health Action* 2015;8:26616.
- Okech M, Okoroafor SC, Ojo O, *et al*. Causes of attrition among frontline health workers in rural areas of Bauchi and cross river states of Nigeria. *J Public Health* 2021;43:i20–6.
- Colvin CJ, Hodgins S, Perry HB. Community health workers at the dawn of a new era: 8. incentives and remuneration. *Health Res Policy Syst* 2021;19:106.
- Gadsden T, Mabunda S, Palagyi A, *et al*. Performance-based incentives and community health workers' outputs, a systematic review. *Bull World Health Organ* 2021;99:805–18.
- Mandeville KL, Lagarde M, Hanson K. The use of discrete choice experiments to inform health workforce policy: a systematic review. *BMC Health Serv Res* 2014;14:367.
- Hauber AB, González JM, Groothuis-Oudshoorn CGM, *et al*. Statistical methods for the analysis of discrete choice experiments: a report of the ISPOR conjoint analysis good research practices Task force. *Value in Health* 2016;19:300–15.
- Orji IA, Baldrige AS, Omitiran K, *et al*. Capacity and site readiness for hypertension control program implementation in the federal Capital Territory of Nigeria: a cross-sectional study. *BMC Health Serv Res* 2021;21:322.
- Coast J, Al-Janabi H, Sutton EJ, *et al*. Using qualitative methods for attribute development for discrete choice experiments: issues and recommendations. *Health Econ* 2012;21:730–41.
- Ajisegiri WS, Abimbola S, Tesema AG, *et al*. The organisation of primary health care service delivery for non-communicable diseases in Nigeria: a case-study analysis. *PLoS Glob Public Health*

- 2022;2:e0000566 <https://journals.plos.org/globalpublichealth/article?id=10.1371/journal.pgph.0000566>
- 36 Zhou M, Thayer WM, Bridges JFP. Using latent class analysis to model preference heterogeneity in health: a systematic review. *Pharmacoeconomics* 2018;36:175–87.
- 37 Hensher DA, Johnson LW. *Applied Discrete-Choice modelling*. London: Routledge, 2018: 484 p.
- 38 Abdel-All M, Angell B, Jan S, *et al*. What do community health workers want? findings of a discrete choice experiment among accredited social health activists (ASHAs) in India. *BMJ Glob Health* 2019;4:e001509 <https://gh.bmj.com/content/4/3/e001509>
- 39 Lagarde M, Pagaiya N, Tangcharoensathian V, *et al*. One size does not fit all: investigating doctors' stated preference heterogeneity for job incentives to inform policy in Thailand. *Health Econ* 2013;22:1452–69.
- 40 Angell B, Khan M, Islam R, *et al*. Incentivising doctor attendance in rural Bangladesh: a latent class analysis of a discrete choice experiment. *BMJ Glob Health* 2021;6:e006001 <https://gh.bmj.com/content/6/7/e006001>
- 41 Chankova S, Nguyen H, Chipanta D, *et al*. Health worker motivation in Africa: the role of non-financial incentives and human resource management tools. *Hum Resour Health* 2006;4:24.
- 42 Mathauer S, Nguyen H, Chipanta D, *et al*. Catalyzing human resources mobilization: a look at the situation in Nigeria. in Washington, D.C, 2007. Available: <https://www.abtassociates.com/insights/publications/presentation/catalyzing-human-resources-mobilization-look-at-the-situation-in> [Accessed cited 2022 Apr 21].
- 43 Federal Ministry Of Health, Nigeria. National Human Resources for Health Strategic Plan 2008 - 2012 [Internet]. Federal Ministry of Health Nigeria, 2007. Available: [https://www.who.int/workforcealliance/countries/Nigeria\\_HRHStrategicPlan\\_2008\\_2012.pdf](https://www.who.int/workforcealliance/countries/Nigeria_HRHStrategicPlan_2008_2012.pdf) [Accessed cited 2021 Nov 12].
- 44 Koning KD, Kok M, Ormel H. A common analytical framework on factors influencing performance of close-to-community providers;78.
- 45 Lehmann U, Sanders D. Community health workers: What do we know about them? [Internet]. Geneva: World Health Organization, Evidence and Information for Policy, Department of Human Resources for Health; 2007 p. 42. Available from. Available: [https://www.who.int/hrh/documents/community\\_health\\_workers.pdf](https://www.who.int/hrh/documents/community_health_workers.pdf)
- 46 Oliver M, Geniets A, Winters N, *et al*. What do community health workers have to say about their work, and how can this inform improved programme design? A case study with CHWs within Kenya. *Glob Health Action* 2015;8:27168.
- 47 Torrens R. Importance of Specialization in Healthcare [Internet]. Study.com. Available: <https://study.com/academy/lesson/importance-of-specialization-in-healthcare.html> [Accessed cited 2022 Apr 24].
- 48 Partners In Health. Community Health Workers [Internet]. Partners In Health, 2022. Available: <https://www.pih.org/programs/community-health-workers> [Accessed cited 2022 Apr 21].
- 49 Cuvelier M. 3 Steps To Advance a CHW Career [Internet]. Community Health Worker Training, 2020. Available: <https://chwtraining.org/3-steps-advance-chw-career/> [Accessed cited 2022 Apr 24].
- 50 Greenspan JA, McMahon SA, Chebet JJ, *et al*. Sources of community health worker motivation: a qualitative study in Morogoro region, Tanzania. *Hum Resour Health* 2013;11:52.
- 51 Ormel H, Kok M, Kane S, *et al*. Salaried and voluntary community health workers: exploring how incentives and expectation gaps influence motivation. *Hum Resour Health* 2019;17:59.
- 52 Koon AD, Goudge J, Norris SA. A review of generalist and specialist community health workers for delivering adolescent health services in sub-Saharan Africa. *Hum Resour Health* 2013;11:54.
- 53 Ebuehi OM, Campbell PC. Attraction and retention of qualified health workers to rural areas in Nigeria: a case study of four LGAs in Ogun state, Nigeria. *Rural Remote Health* 2011;11:1515 <https://www.rrh.org.au/journal/article/1515/>
- 54 Abdulraheem IS. Primary health care services in Nigeria: critical issues and strategies for enhancing the use by the rural communities. *J Public Health Epidemiol [Internet]* 2012;4 <http://www.academicjournals.org/jphe/abstracts/abstracts/abstracts2012/January/Abdulraheem%20et%20al.htm>
- 55 Adeyemi T. Senate probes N400bn abandoned PHC projects initiated by Obasanjo. Tribune Online [Internet], 2022. Available: <https://tribuneonlineng.com/senate-probes-n400bn-abandoned-phc-projects-initiated-by-obasanjo/> [Accessed cited 2022 Apr 30].
- 56 Adebowale N. SPECIAL REPORT: Nigeria's dilapidated PHCs where torchlights are used for birth delivery | Premium Times Nigeria. Premium Time [Internet], 2017. Available: <https://www.premiumtimesng.com/investigationspecial-reports/231186-special-report-nigerias-dilapidated-phcs-where-torchlights-are-used-for-birth-delivery.html> [Accessed cited 2022 Apr 30].
- 57 Olaniran A, Madaj B, Bar-Zeev S, *et al*. Factors influencing motivation and job satisfaction of community health workers in Africa and Asia-A multi-country study. *Int J Health Plann Manage* 2022;37:112–32.
- 58 Onwujekwe O, Dike N, Ojukwu J, *et al*. Consumers stated and revealed preferences for community health workers and other strategies for the provision of timely and appropriate treatment of malaria in southeast Nigeria. *Malar J* 2006;5:117.
- 59 Sarriot E, Davis T, Morrow M. Motivation and performance of community health workers: nothing new under the sun, and Yet.... *Glob Health Sci Pract [Internet]* 2021;9:716–24 <https://www.ghsjournal.org/content/9/4/716>