

A Discrete Choice Experiment on Factors Influencing Attrition and Motivation of Frontline Health Workers in Remote and Rural Areas in Nigeria

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Abstract

Background The current policy thrust in Nigeria is to ensure that there exists qualified, skilled, and adequate health workforce for the achievement of universal health coverage. To achieve this, evidence combination of strategies/interventions on factors influencing attraction, retention, and motivation of the health workforce is needed to ensure the equitable distribution of the health workforce across the country.

Methods We conducted a discrete choice experiment study to determine the combinations of incentives that may increase the retention of frontline health workers in rural and remote areas in Nigeria. The study was undertaken across rural and urban locations in Bauchi State between August and October 2018 amongst 145 students and practicing health workers.

Results Health workers are 14.6 and 14.4 times more likely to take up a rural posting or continue to stay in their present rural posts if there was basic housing and improvement of the quality of the facilities respectively. The preference for rural job location increased by 6.17 times if good schools for children's education were provided. The highest willingness-to-pay was for the provision of basic housing or housing allowance with a high utility of 0.609 followed by improved quality of facility with sufficient staff number and type, equipment, drugs, and medical supplies with a utility value of 0.607.

Conclusion Improving the working conditions of health workers will support retention in rural health posts. Based on the findings, we recommend the introduction of housing incentives in rural and remote areas to support the retention of health workers. This should be accompanied by deliberate interventions to improve the quality of the health facilities ensuring adequate and functional equipment and uninterrupted supplies.

Background

There is a global widespread shortage of health workers, especially in rural and remote areas, and this necessitates the implementation of strategies to increase access of the rural population to people-centered health services[1–3]. Numerous factors influence the choice of health workers to take up or stay in positions. These factors are often due to personal choices or related to the characteristics of the work. Personal choices include responsibilities, motivation, and financial incentives, and the effect of institutional factors on job performance. Factors relating to characteristics of the workplace include access to capacity enhancement interventions, scope of practice, staffing and workload, work environment, and the availability of equipment and medical commodities[4]. These factors have resulted in difficulties for health managers to plan for health workers effectively as in most instances, the health workers do not take up or stay in the positions. In instances where they take them up, they do not stay in the positions for a long time or do not report for duty. Health managers have a very important role in ensuring that qualified, skilled, and motivated health workers are available to provide integrated people-centered health services in all areas if universal health coverage will be achieved[2].

The current policy thrust in Nigeria is to ensure that there exists qualified, skilled, and adequate human resources for health at primary, secondary, and tertiary levels of care towards the achievement of universal health coverage for all Nigerians[5, 6]. To achieve this, the government has established a policy framework to generate evidence and implement strategies aimed at ensuring the availability, equitable distribution, and retention of health workers with a focus on the rural areas [5–7]. The current situation in Nigeria indicates that health workers are not motivated and this is negatively impacting their performance and efficiency. Several factors, including poor remuneration, inadequate staffing levels with resultant high workloads, lack of social amenities, poor working environments, inadequate medical supplies and equipment, and delayed salaries and emoluments payment have been documented [8–17]. Additionally, institutionalized attraction, retention, posting, and motivation mechanisms are absent, especially for primary level facilities often located in rural and remote areas[6, 18]. To improve the attraction, retention, and motivation of health workers, investments have to be made in the work environment, performance management and recognition systems, work environment, infrastructure, career development, and staffing levels with a focus on rural areas are needed[6, 9]. Evidence suggests that attraction and retention are informed by a complex interaction of factors and thus bundles/ sets of strategies/interventions are needed (4).

As Nigeria is on the path of improving the health system towards achieving the national health sector goals and universal health coverage, policymakers need contextual evidence to improve human resources for health (HRH) policy and management. Information on factors influencing attraction, retention, and motivation of the health workforce is key in ensuring the equitable distribution of the health workforce across the nation for quality service delivery, especially at the primary level. There is, however, limited evidence on these factors as well as the combination of strategies/interventions. This informed this study using the discrete choice technique to ascertain the applicable combinations. This technique has been applied in several settings globally with essential evidence generated for policy and planning [11, 19–22].

The objective of this study was to determine the combinations of incentives that may increase the retention of frontline health workers in rural and remote areas.

Methodology

Study Setting

The study was conducted in Bauchi State, one of the seven States in North-Eastern Nigeria. The population is mainly rural and agrarian. With a significant shortage of health workforce, the State relies on lower-level frontline health workers to deliver health services, especially in the vast rural settings. According to the Nigeria Demographic and Health Survey of 2018, while about 51.6% of pregnant women in Bauchi State had their ante-natal care (ANC) attended to by a skilled provider[23, 24] in 2018, only 3% of them were attended to by a physician against the national average of 17.2%. ANCs were mainly

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ared to the national value of 48%. Availability and effective

distribution of these frontline health workers are therefore essential in efforts to lift Bauchi State and indeed much of the North-Eastern region from poor healthcare conditions. Despite the 56% ANC attendance, only 21.8% of the women eventually delivered in a health facility while 78% of the deliveries were at home. The unavailability and inadequacy of health workers especially in rural settings have been suggested to be the reason for this trend[10].

Study Design

This study used the design of discrete choice experiment (DCE) studies. The DCE design aims to elicit favored preferences of individuals based on options. The theoretical underpinning is the random utility theory that is based on the assumption that each individual is an independent rational decision-maker, maximizing utility to his or her choices. Our hypothesis for this study speculates that health workers in Bauchi State will maximize their utility by selecting the working condition and location options that give them the maximum utility.

To establish the attributes and levels for the DCE, we employed qualitative methods. Focus group discussions and key informant interviews were conducted to obtain information about the dimensions of the work conditions in primary health facilities that are important to frontline health workers when choosing to take up posting or stay in their rural work locations. This was undertaken across rural and urban locations in Bauchi State between August and October 2018. We conducted five focus group discussions among students in the School of Nursing and School of Midwifery in the Bauchi State College of Nursing and Midwifery Bauchi and the College of Health Technology Ningi. Key informant interviews were conducted among 16 frontline healthcare providers (nurses, midwives, community health officers, community health extension workers, and junior community health extension workers). Seventeen policymakers and health managers were also interviewed.

Five attributes were identified as recurring from the students and healthcare workers interviewed after analysis of the qualitative findings. Literature and desk reviews were conducted to determine appropriate levels for each of the four ranked attributes (Table 1). The levels of attributes were chosen to reflect the range of situations that respondents might expect to experience.

Table 1
Attributes and levels

Attribute	Levels
Location of Facility	1-Urban 2-Rural
Quality of Facility	1. Insufficient staff number and type, equipment, drugs and medical supplies; lack of electricity 2. Sufficient staff number and type, equipment, drugs and medical supplies; constant power supply
Salary	1. 10% 2. 20% 3. 30%
Housing	1. No housing or allowance provided 2. Housing Allowance or Housing provided
Children's Education	1. No good schools close by 2. Good schools close by
Continuing Education	1. Study leave after 2 year 2. Study leave after 3 years

Table 2
; Sample DCE questions

Attribute	Rural/Remote Health Facility	Urban Health Facility
Salary	1. 10%	1. 0%
Quality of Facility	1. Insufficient staff number and type, equipment, drugs and medical supplies; lack of electricity	2. Sufficient staff number and type, equipment, drugs and medical supplies; constant power supply
Housing	2. Housing Allowance or Housing provided	1. No Housing/allowance provided
Children's Education	2. Good schools close by	2. Good schools close by
Continuing Education	1. Study leave after 2 years	2. Study leave after 3 years
Your Choice	[]	[]

We subsequently designed a structured questionnaire to collect information on the socio-demographic information and work experience of respondents. The questionnaire also had a series of options for two hypothetical post options - rural/remote health facility and urban health facility to healthcare workers meeting eligibility criteria. In all, there were 24 different choice sets in the questionnaire with each containing two choices of established attributes and differing levels. Respondents were asked to select either a rural or urban work location choice based on the attributes and levels presented in each choice set.

Data collection and Analysis

The sample size for the DCE was determined based on a formula postulated by Orme[25] as follows:

$$N > \frac{500c}{(txa)}$$

Where c = largest level of any variable; t = Number of choices; a = Number of alternatives.

The largest level of any attribute was three (3), the total number of choice tasks being five (5), and the number of alternative choices as two (2). The completed 145 questionnaires were entered into CS-Pro and analyzed using STATA 15®. Diagnostic correlation analysis was used to determine the absence of multicollinearity (Orthogonality) which is a basic assumption in fitting logit models in a DCE. Further analysis was explored to ensure the level balance and utility balance of attributes.

Ethical Issues

The National Health Research Ethics Committee of the Federal Ministry of Health reviewed the study protocol with ethical approval issued. Approval for data collection was obtained from the Bauchi State Ministry of Health.

Results

Socio-demographic Characteristics

The characteristics of the DCE survey respondents presented in Table 3 show that the proportion of males and females are 46% and 54% respectively. The respondents were youthful with about 64% of the population less than 35 years of age. Those aged 35 to 44 were 21% and the remaining 15% are 45 years or older. More respondents were married (58%) compared to those who were single (41%). About 61% of the respondents were living in urban areas while 39% were living and working in rural areas. Nurses and Midwives constituted about 40% of the respondents, closely followed by Community Health Extension Workers (CHEW) at 28% and Junior Community Health Extension Workers (JCHEW) at 16%. Sixty-five (45%) of the respondents were students from the healthcare training institutions across the different cadres while 56% were predominantly practicing health workers.

Table 3
Characteristics of Respondents

Characteristics		N	%
Gender	Male	66	46
	Female	79	54
Age	18–24	63	43
	25–34	30	21
	35–44	30	21
	45+	22	15
Marital Status	Single	59	41
	Married	85	59
	Div/Sep/Widowed	1	1
Place of Birth	Rural	73	50
	Urban	72	50
Education	Secondary	65	45
	Diploma/RN/MW	72	50
	Bachelor +	8	6
Cadre	Nurse	18	12
	Midwife	41	28
	CHO	15	10
	CHEW	41	28
	JCHEW	23	16
	Other	7	5
Current Residence	Rural	56	39
	Urban	89	61

Conditional Regression Analysis and Willingness to Pay

Table 4 shows the conditional regression analysis measuring factors or attributes that influences utility as well as determine the willingness-to-pay (WTP) for such attributes for health workers. The WTP was determined by the ratio of the estimated coefficient for each attribute to that of the cost coefficient. The

Loading [MathJax]/jax/output/CommonHTML/jax.js of basic housing or housing allowance for which workers

were willing to for-go about NGN32,233 (About \$90) in monthly wages with a high utility of 0.609 followed by improved quality of facility with sufficient staff number and type, equipment, drugs and medical supplies (WTP: NGN31,107; Utility value: 0.607). There was a preference for a job posting in locations with the availability of good schools for children’s education rather than one with no good schools available at an increased utility of 0.343 and for which workers were willing to for-go NGN18,171 (About \$50) in salary and allowances per month. The least preference for opportunities for career advancement was approval for continuing education was given at an enhanced period of 2 years post-employment rather than the current guideline of 3 years. This had a negative utility of -0.263 and a WTP value of NGN13,894 (about 40%).

Table 4
Conditional Regression & Willingness To Pay Analysis

Attribute	Levels	(β)	Coefficient	P-value	WTP
Salary	1 = 100,000/month	B_1	0.0002	< 0.0001	1
	2 = 110,000/month				
	3 = 120,000/month				
	4 = 130,000/month				
Quality of Facility	1 = Insufficient	B_2	0.6069	< 0.0001	31,107
	2 = Sufficient				
Housing	1 = No housing	B_3	0.6092	0.0007	32,233
	2 = Housing allowance provided				
Children’s Education	1 = No good Schools	B_4	0.3434	0.0004	18,171
	2 = Good Schools Available				
Continuing Education	1 = Study Leave After 2 Years	B_5	-0.2626	0.0031	13,894
	2 = Study Leave After 3 Years				

Choice Probabilities and Covariates

To determine the change in probability of choosing between posting location alternatives due to a change in the levels of the attributes, a logit probability was fitted to the data. Table 5 shows that frontline health workers in Bauchi State were 14.6 and 14.4 times more likely to take up a rural posting or continue to stay in their present rural duty posts against an urban alternative if there was basic housing and improvement of the quality of the facilities respectively. The preference for rural job location increases by 6.17 times if good schools for children's education were provided compared to when such a facility is not available. When offered a salary increment, preference for rural posting increases by 2.72 times; this magnitude of preference remains unchanged regardless of the magnitude of salary increment.

Table 5
Analysis of Uptake of Rural Posting

Attribute	Levels	OR	β Coefficient	P-value	95% CI (β)
Salary	1 = 100,000/month		1		
	2 = 110,000/month	2.72	1.0003	< 0.001	1.0002–1.0005
	3 = 120,000/month	2.72	1.0008	< 0.001	1.0004–1.0011
	4 = 130,000/month	2.72	1.0011	< 0.001	1.0007–0.0016
Quality of Facility	1 = Insufficient		1		
	2 = Sufficient	14.43	2.6692	< 0.001	1.8190–3.5195
Housing	1 = No housing/Allowance		1		
	2 = Housing/Allowance provided	14.56	2.6780	< 0.001	1.0488–4.3072
Children's Education	1 = Normal: Promotion After 3 Years		1		
	2 = Improved: Promotion After 2 Years	6.17	1.8196	< 0.001	1.1554–2.4838
Continuing Education	1 = Study Leave After 2 Years		1		
	2 = Study Leave After 3 Years	1.71	0.5381	0.004	1.8190–3.5195

We explored the possible covariates that may influence directly self-reported preference for rural or urban uptake of job posting by fitting a multiple logistic regression model. It gave an insight into relevant characteristics and the factors to consider when considering individual health workers for posting to rural locations. Table 6 show that females are 25% less likely to prefer rural postings compared to their male counterparts; this is however not statistically significant at a p-value of 0.07 showing that this finding is likely by chance. Data showed that there is a decreasing trend in rural job posting preference with increasing age bands. Compared to health care workers aged 18 to 24 years, those aged 25 to 34 were 69% less likely to prefer rural postings which deepen with a 92% chance of preference for rural posting among those aged 35 years and above. The regression also demonstrated that healthcare workers in Bauchi State with a Diploma, RN, or Midwifery degree are 62% less likely to prefer a rural job posting compared to those with secondary education. This relationship is consistent with those with bachelor's degree or higher (OR = 0.27; P-value = < 0.001). Compared to Nurses, JCHEWs are 16 times, Midwives 4.7 times, and CHEWs 1.5 times more likely to prefer rural postings while Community Health Workers (CHO)

Table 6
Covariates Associated with Self-Reported Rural Preference

Variable		AOR	P-value
Gender	Male	1	
	Female	0.75	0.070
Age Categories	18–24	1	
	25–34	0.31	< 0.001
	35–44	0.08	< 0.001
	45+	0.08	< 0.001
Marital Status	Single	1	
	Married	1.38	< 0.001
Education	Secondary	1	
	Diploma/RN/MW	0.38	< 0.001
	Bachelor +	0.27	< 0.001
Current Residence	Rural	1	
	Urban	0.14	< 0.001
Professional Cadre	Nurse	1	
	Midwife	4.72	< 0.001
	CHO	0.82	0.342
	CHEW	1.49	0.036
	JCHEW	16.2	< 0.001
GoF: P-value = < 0.001			

Discussion

This study demonstrates the use of discrete choice experiments (DCE) to explore and estimate the factors that influence attrition and motivation of frontline health workers to take up rural posting or stay in their rural posting locations in Bauchi State, Northern Nigeria. The DCE technique is relatively new in determining HRH utilities but particularly useful for HRH retention guidelines and policy. It provides guidance in developing optimal packages of incentives or policy options to healthcare providers with a note of caution that the responses used in the DCE model are hypothetical job scenarios. Outcomes should therefore be weighed against actual possibilities peculiar to the government or setting.

About 145 frontline healthcare providers in rural and urban centers as well as students of training institutions in Bauchi State responded to the DCE questionnaire. There is a near equal proportion of males (46%) and females (54%) respondents which show the usual higher proportion of male health workers especially Nurses and CHEWs in Northern Nigeria. With the respondents of this study being young health workers, there is potential to groom new sets of health workers with appropriate incentives to start life in desired locations and commit to a prolonged stay if the findings are used to inform policy[26–29]. The outcome of the study will therefore be well targeted at the appropriate age bracket and demographics who may have longer working years to spend in rural postings if policy changes are considered for implementation from trends shown in this study.

The study suggests that the provision of basic housing is the most essential job attribute with the highest willingness-to-pay for health workers in Bauchi State. Bauchi State is largely rural and agrarian with sparse communities, hamlets, and villages. It is therefore plausible that the availability of housing will be a priority incentive for workers in this setting. Second to housing, quality of facility was identified as an important factor increasing utility for a job location choice. The reasons will not be far from the same one adduced for housing need. With the shortage of health workforce and low government expenditure on health infrastructure, health facilities located in remote areas are likely to be short-staffed, poorly equipped, and poorly supplied with materials for patient care. These will form a major disincentive for the retention of health workers. A Zambian study[30]found that technical quality of care, represented by the thoroughness of the examination, avoiding rude staff, and drug availability are the most highly valued attributes influencing the demand for hospital care among hospital attendees. This report presents client satisfaction opinions and points to the level of motivation of workers to provide adequate and respectful services as well as healthcare management changes that will support improved healthcare services. Even though that the geography and settings may differ, this supports the notion that improving the quality of the facility and providing incentives like housing are likely to improve client satisfaction in these settings. Our findings were corroborated by DCE studies conducted amongst health care workers which identified the provision of basic government housing as having the greatest impact on the probability of choosing a job [19, 31]. Also, a study amongst healthcare students identified improved facility infrastructure as important attributes to health worker retention[21, 26]. The findings of our study place a low utility on salary despite the literature indicating that an increase in salaries is important[32] and it often causes strike actions in Nigeria's health sector[16]. Studies have also shown that salaries and other factors including those bothering on working conditions are often implied in instances of unrest[11].

The probability of choosing a rural post with the changing levels of attributes in the presence of an urban alternative as shown in the logit model is in accord with the results of the willingness to pay analysis. The high odds of choosing a rural posting with the provision of basic housing or housing allowance and improvement of quality of the facility was demonstrated in other studies conducted within the West African sub-continent [21, 26]. These significantly demonstrate that the state and functionality of the health facilities are important when health workers are considering offers for job postings, whether in rural or urban locations [9]. They however represent better incentives for rural preference when other rural opportunities for farming for extra income are considered.

Studies on retention of health workers in Nigeria have suggested that the poor level of infrastructure in facilities as well as accommodation, where available, in rural areas impact negatively on the choice of health workers to take up or stay in postings. Thus, government investment in the provision of accommodation and face-lift of facilities would enhance retention in rural areas. This should be augmented by improvements in working conditions in rural areas in relation to ensuring that appropriate staff and equipment are in place, and investments to ensure improved career advancement [9].

Our study had some limitations. DCEs are known to suffer from limitations of offering hypothetical preferences that may not be correlated with real-life options [20, 31]. In generating the job attributes and its dimensions, we ensured that it was informed by the qualitative perspectives of the study participants and a literature review. To ensure that the respondents understood the trading-off options, we thoroughly reviewed the questionnaire and explained the content and implications before their completion. This was done to reduce the likelihood of the respondents not understanding the implications of the trade-offs to the study findings.

Conclusion

This study applied the principles of a discrete choice experiment (DCE) to explore important factors responsible for the retention and motivation of frontline health workers to take up posting or continue to stay in rural locations. Of more importance is the establishment of utility values placed on certain job attributes with the willingness to pay demonstrated across attributes and levels. It is now evident that improving the working conditions of frontline health workers in terms of adequate staff strength, good skills mix, equipment, etc as well as improved opportunities for career advancement will support retention in rural health posts. Based on these findings, we recommend the introduction of housing incentives in rural and remote areas of Bauchi State to support the retention of health workers. This should go alongside deliberate effort and strategy to improve the quality of the health facilities ensuring adequate and functional equipment and uninterrupted supplies. By focusing on the analysis of locally relevant, actionable incentives, generated through the involvement of policy-makers at the design stage, this study provides an example of research directly linked to policy action to address a vitally important issue in global health. The findings presented in this study provide important evidence for input into policy formulation and guidelines for retaining frontline health workers in Nigeria as efforts are geared towards the achievement of universal health coverage and sustainable development goals.

Declarations

AVAILABILITY OF DATA AND MATERIALS

The tools and data related to this study are available from the corresponding author on reasonable request.

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CONTRIBUTIONS

All authors meet the ICMJE authorship criteria – SCO and MO conceived the study. SCO designed the protocol. SCO and CO designed the tools, conducted data collection and conducted data analysis. SCO and CO drafted the initial manuscript. SCO, CO and MO reviewed and approved the final manuscript.

ETHICS DECLARATION

Ethics approval and consent to participate

Research ethical clearance for this study was obtained from the National Health Research Ethics Committee (NHREC Approval Number NHREC/01/01/2007-12/07/2018) of the Federal Ministry of Health and approval for data collection obtained from the Bauchi State Ministry of Health.

Consent for publication

Study participants provided consent for the results to be published. The findings were disseminated to study participants and other stakeholders in 2020.

CONFLICT OF INTEREST

The authors declare no conflict of interest

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