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Armed Banditry and Human Capital Development from a Health Perspective: An Explication of Affected Rural Communities of Katsina State, Nigeria

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Abstract

This study investigates the effect of armed banditry on human capital development in affected rural communities in three Local Government Areas of Katsina State: Jibia, Batsari, and Danmusa. Using access to health services as a proxy of human capital development, and three indicators of armed banditry (armed attacks, kidnapping and forceful displacement), cross-sectional data were obtained from 300 respondents comprising parents and school administrators in the affected communities. Deploying a mixed research method, armed attacks and forceful displacement were found to exert a statistically significant negative effect on access to health services, while kidnapping was found to be negative but not significant. Other factors having a significant positive effect on access to health services in the study area are income, education, and employment. The effect of age on access to health facilities was found to be negative and significant. It is recommended that armed banditry should be addressed through a layered approach involving security agencies, vigilante outfits and community stakeholders, in order to improve human capital development in the affected rural communities of Katsina State.

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Background to the Study

Development of any society is determined by two main factors among others; development of material resources and human resources. Among these two resources, human resources development otherwise called human capital development plays a vital role in enhancing the development of a society given the fact that human resource manages material resources. Human capital development refers to the process of improving people's knowledge, skills, and abilities to enhance their productive capacity and contribute to economic growth. It encompasses investments in education, training, healthcare, and other factors that enable individuals to reach their full potential as productive members of society. However, developing education and human capital is hinged on relative security and absence of armed violence. Thus, armed banditry is detrimental to the realization of effective education and access to good healthcare services, that are capable of producing the skills set and sound health fits needed for human capital development.

The effect of armed banditry on development generally cannot be overemphasized given that it puts the socio-economic and political development on a perpetual decline. Suffice to add that where there is fear, anxiety and suspicion of the unknown, people tend to withdraw from any activity that would expose them to danger. This creates a serious disconnect between the people and their daily socio-economic cum political engagements, thereby ushering a regime of underdevelopment that affects virtually every sphere of the society.

Nigeria has experienced preponderance of armed banditry on the rural communities. Rural community's world over are the host of agricultural activities and other social and economic engagements. Katsina state has recorded destruction of school infrastructure and prevent people from accessing necessary primary health services needed for their physical fitness to engage in any economic activities to support their living and societal development because of incessant banditry attacks. The situation is worsening in the Northeast and Northwest regions of the country especially in Zamfara amd Katsina State. From January to December 2019, 1,058 people were killed in Zamfara, Kaduna, Katsina, Sokoto and Niger States, while over 10,000 cattle were rustled, 2,688 hectares of arable farming land lost as people were forcefully displaced, leading to forced migration. (West Africa Network for Peace building, 2020).

Additionally, 4,000 people were internally displaced in Katsina State with scores of thousands of deaths recorded between November 2019 and March, 2023. The spate of banditry took an even more dangerous turn in 2023. In March, 2023, more than 210,000 people were internally displaced and over 35,000 refugees crossed Nigeria's communal borders into Niger Republic (ACAPS Nigeria, 2023), with the most affected states being, Zamfara and Katsina State. Muhammad AbdullahI (2024) reported that between April and June, 2023, armed bandits executed over 50 major attacks in Northwest Nigeria in Kaduna, Zamfara, Katsina and Sokoto states.

Armed banditry in Nigeria is attributed to several factors including the relative ease of entry by foreign rebels, the thick and often impenetrable forested strip bordering Nigeria and neighboring Franco-phone countries (Onah, 2010), easy availability and acquisition of weapons, and importantly rising incidences of poverty, unemployment and the collapse of traditional social control mechanisms and ethos (Defending Human Rights Worldwide, 2005).

Flowing from the above, there seems to exist a telling effect of the precarious situation on the healthcare services in the rural populace like Jibia, Batsari and Danmusa local government area of Katsina state. The noticeable consequence is the lack of access to the healthcare centres/services in the affected communities as a result of their displacement and in most cases the health officers are also involved. This also include destruction of hospital or healthcare centres and equipment which affect the physical fitness of the people in the affected communities. There incessant attacks also result into death of many people in the affected area as most of the healthcare centres in this communities have been abandoned or destroyed. Given the above background, the study addresses the following objectives;

i. To investigate the effect of armed banditry on access to health facilities in affected rural communities in Katsina State.
ii. To examine the effect of disengagement of health workers on health status of people in the affected communities in Katsina State.

Conceptual Literature

Concept of Armed Banditry and Human Capital Development

Banditry in modern usage relates to armed robbery which usually involves theft with violence or threat of violence by a person or a group of persons, with whom the victim has had no previous contact, and it is usually unprovoked and unpredictable (Conklin, 1992, p. 103). It can thus be considered as the criminal act of taking or attempting to take something of value by a person or group of persons either forcefully or instilling fear in the victim. Banditry according to Slatta (1987, p. 22) is "the taking away of property by force or the threat of force, often by a group, usually of men. Of necessity, bandits usually operate in the shadows, often on the fringes of society, in geographically isolated areas. Banditry means occurrence or prevalence of armed robbery or violent crime."

A typical feature associated with banditry is the use of force, or threat, with a view to intimidating a person, in order to dispossess them of their belonging. It can also involve the intent to rob, kill or rape. A bandit primarily commits crimes including extortion, robbery and murder, kidnapping, cattle rustling and the like either as an individual or in the form of a group. From the foregoing, Armed banditry is actual or threatened use of arms to dispossess people of their material belongings (Okoli & Okpaleke, 2014). As a gang phenomenon, armed banditry can be appropriately situated within the analytical ambit of organized crimes' discourse. The essence of armed banditry is (illicit) capital acquisition for personal or group aggrandizement. In light of this, armed banditry is described in this study as criminal tendencies exemplified by kidnapping, armed robbery,

cattle rustling, arson, rape and gruesome slaughter of people in predominantly rural communities using sophisticated weapons.

Human capital has been defined by Crook (2008) as the stock of competences, knowledge, social and personality attributes, including creativity, embodied in the ability to perform labour so as to produce economic value. This definition presents an aggregate economic view of the human being acting within economies. It also demonstrates man's social, biological, cultural and psychological components in his transactions in the process of social reproduction. In its technical financial analysis, the term 'balanced growth' refers to the goal of equal growth of both aggregate human capabilities and physical assets that produce goods and services. This is different from the dual economic paradigm which had shaped the way most social scientists viewed the economic problems of less developed countries (Daron & James, 2013).

Schultz (1961) sees human capital as those resources that are inherent in each human being, which can be traded between the users and the owners to improve their respective living conditions. He outlined these inherent resources in human being to include knowledge (knowing what to do), skills (knowing how to do what is to be done), and attitude (behavioural demonstration of a favourable inclination while doing that which is to be done). Aigbokhan et al (2007) regard education and good health to be basic process through which skills, knowledge and attitude are acquired for carrying out socio-economic responsibilities, social integration, improving personal competence, and seeking better opportunities.

Igun (2006) defines human capital as 'the total stock of knowledge, skills, competencies, innovative abilities possessed by the population'. These are certainly driven by the quality of tertiary education acquired. Human capital refers to the abilities and skills of human resources of a country. This suggests that human capital is a form of resources that can be acquired, built up and developed. In essence, the development of human capital is to ensure that they acquire meaningful and productive skills that enhance their capabilities to engage in productive activities that lead to earning of livelihood.

Thus, human capital development according to this study is defined as the deliberate and continuous process of acquiring and increasing the number of people with requisite knowledge, education, and health that are critical to a country's development. It is thus the development of education and health to nurture and develop human beings in society. Thus, improved educational and health access and opportunities would imply the improvement in the potential stock of human capital in society and any threat due to armed banditry and its associated violence is capable of truncating its development.

Empirical Review

Armed Banditry and Human Capital Development in Nigeria

Unlike armed Banditry and Educational Development in Nigeria, this area of study has a very scanty or has attracts little attention in this area of study. Applying negative binomial

regression models with health facility fixed effects on data spanning from 2013 to 2021, Amberg, et al. (2025) assessed the impact of nearby armed conflict events (within 25 km of primary healthcare centres) on access to six essential maternal and child health services. The study also investigated effect heterogeneity by varying conflict intensity and duration, and facility characteristics. The findings show a significant disruption of health services due to contemporaneous conflict in Burkina Faso. However, child curative care services seem to exhibit a stabilization trend in prolonged conflicts, and the mitigating effects of existing fee removal policies were evident. The study recommends that there is the need for nuanced policy interventions that consider varying conflict intensities, service types and financing schemes and highlights the importance of detailed, fine-scale analyses during conflict scenarios.

Muhammad AbdullahI (2024) examine the impact of armed banditry and human displacement on sustainable human development in Zamfara state, using qualitative method through which in- depth interview was also employed. The finding of the study indicate that armed banditry has caused a lot of myriads of problem to the displaced persons in Zamfara State; and that, these defects have generally affected the general wellbeing as well as development of the displaced person in the state causing a lot of hardship and sometimes even death to the victims of displacement. The study concludes that, until governments both state and central rise to the very occasion, banditry will continue to manifest and people will continue to be displaced from their original place of abode and this will in turn, negatively affects the sustainable development of people and the state.

Ajiboye, Adefisoye and Bamidele (2024) examine the effect of armed banditry on human capital development in north-west Nigeria, using qualitative method of data collection through questionnaire and interview. The study found out that, among other things, the presence of hardly controlled places, a high degree of unemployment with attendant poverty, a poor security system, the porousness of Nigeria's borders, and the proliferation of guns are the driving forces that are escalating banditry in Nigeria. It was therefore recommended that the government take more proactive techniques and tactics in waging the battle against banditry; and establish meaningful work possibilities for youngsters with the purpose of resolving the country's pervasive and chronic poverty. Besides, the government should actively monitor and control borders with neigh-boring nations in order to prevent the illicit movement of people and the spread of armaments.

In a study conducted by Obinna (2021) on the relationship between Human Capital Development, National Security and Agricultural Sector Growth in Nigeria using time series data from 1981-2017, sourced from central Bank of Nigeria Statistical bulletin 2018 and world development indicator. Using ARDL econometric technique of analysis, the study finds no long run relationship between National security and human capital development which implies that National insecurity could negatively impacted on Human capital development. It was therefore recommended that government should develop health care system and education and improve on insecurity so that human capital could be developed.

Methodology

Research Design

The study uses the mixed method comprising both qualitative and quantitative research. Under the mixed method, the concurrent embedded strategy was utilized, in which there is a primary method (probit regression) that guides the study and a secondary method (analysis of qualitative data) which is embedded (or nested) within the primary method. According to Creswell (2007, p. 214), there is an important aspect of this approach, that of mixing of the data that can "reside side by side as two different pictures that provide a composite assessment of the problem".

Population and Scope of the Study

The population of the study encompasses all parents and school administrators in primary and post-primary schools in three LGAs in Katsina State, Nigeria, namely Safana, Batsari, and Danmusa, where banditry is endemic.

Samples and Sample Size

A total of 300 persons were systematically selected as respondents for the study, as follows:

Table 1: Respondents

Respondent	No. of Local government area covered	No. per local government area	Total
Parents	3	50	150
School Administrators	3	50	150
Total			**300**

Source: Field Survey (2025)

Instrumentation

Structured questionnaires (for quantitative data) were used in collecting data from two groups, namely parents and school administrators (including teachers). For the qualitative data, interview (based on a semi-structured questionnaire) was designed. In order to ascertain their reliability and validity, the instruments were pre-tested in Dutsin-Ma LGA, located outside the study area, which had had similar incidences of armed banditry. Face validity was implemented through peer reviewers, educational and conflict experts. 30 participants (i.e. 10% of the sample) were selected for the pilot study, in line with Connelly (2008) and Perneger *et al.* (2015). The result of the Cronbach alpha reliability method showed a score of 0.83, implying high internal consistency. Shuttleworth (2009) considered a re-test correlation of 0.75 and over as signifying good reliability.

Model Specification and Technique of Data Analysis

To examine the effect of armed banditry on human capital development, the following functional model is specified:

Access to health services = f(armed banditry, education, income, employment, age, marital status)
(1)

Equation (1) is transformed into the following econometric form:

$$Y_i = \beta_0 + \beta_1 AB_i + \beta_i X' + \varepsilon_i \quad (2)$$

Where Y is access to health services (a proxy for human capital development), AB denotes a vector of armed banditry indicators and X is a vector of other explanatory variables. The β's are parameters to be estimated, *i* represents cross section, and ε_i is the white noise error term.

This study deploys the binary probit technique of the following form:

$$LnY = \frac{Pi}{1-Pi} = \beta_0 + \sum \beta K_i Xk_i + \mu_i \quad (3)$$

Where:

LnY	=	Natural log of Y (1 = access to health services, 0 = otherwise)
Bo	=	Intercept or constant term
B_{ki}	=	Parameters to be estimated
X_{ki}	=	A set of demographic characteristics
U_i	=	The disturbance term

The dependent variable is categorical (binary) and where this is the case, the maximum likelihood (ML) estimation method is used, in contrast to the Ordinary Least Squares (OLS) which utilizes the methods of moment. Consequently, a requirement of the ML method is that an assumption is made about the probability distribution functions. In light of this, the assumption of the errors of the probit model is that they follow the standard normal distribution namely,

$$\phi(\varepsilon) = \frac{1}{\sqrt{2\pi}} e^{-\frac{\varepsilon^2}{2}} \quad \text{and a variance equal to 1}$$

From the foregoing, it follows that in order to complete the specification of a model; a choice is made about the probability distribution of the error term. Thus, given a standard normal distribution with zero mean ($\mu = 0$) and variance ($\sigma^2 = 1$), the standard normal variable (Z_i) is normally distributed with zero mean and variance 1, where $Z_i = (X_i - \mu)/\sigma$. The standard normal probability density function is given by:

$$\phi(Z_i) = (2\pi)^{-\frac{1}{2}} \exp\left(-\frac{Z_i^2}{2}\right)$$ and the standard normal cumulative density function is

$$\phi(Z_i) = \Pr(z \le Z_i) = \int_{-\infty}^{Z_i} \phi(z)dz = \int_{-\infty}^{Z_i} (2\pi)^{-\frac{1}{2}} \exp\left(-\frac{Z^2}{2}\right) dz$$

It should be noted that in the probit regression, the coefficients give the change in the probit index or z-score for a one unit increase in the explanatory variable. On the measurement of variables, the dependent variable, constructed from the questionnaire is binary where access to health services is equal to 1, and zero otherwise. Armed banditry was measured by three proxies namely, armed attacks, kidnapping and forced displacement. Each of the variables was measured as a dummy (1 if it occurred and 0 otherwise). Consequently, three models are estimated, reflective of each of the indicators of armed banditry. Other explanatory variables (demographic characteristics) are education (measured by the average length of years at school), employment (a categorical variable encompassing farming, teaching, business and civil servant). Income and age were measured as averages of the income and age range in each case, while gender (Male or Female) and marital status (Married, Single, Widowed or Divorced) are categorical variables respectively.

Results and Discussion

The summary statistics are presented in Table 2.

Table 2: Distribution of Socio-economic Characteristics of Respondents (n = 300)

Parameter	No. of respondents (%)	Mean (Mode)
Gender		(Male)
Male	193 (64)	
Female	107 (36)	
Age		36.4 (40-54)
18-24 21	87 (29)	
25-39 32	75 (25)	
40-54 47	125 (42)	
55 and above 62.5	13 (4)	
Marital status		(Married)
Married	211 (47)	
Single	26 (9)	
Widowed	28 (6)	
Divorced	35 (8)	
Education (years spend at school)		(Diploma, NCE)
Attended primary school (4 years)	7 (2)	
Obtained primary school certificate (6 years)	33 (11)	
Attended secondary school (10 years)	21 (7)	
Obtained secondary school certificate (12 years)	53 (18)	
Diploma, NCE (14 years)	138 (46)	
First degree (15-20 years)	42 (14)	
Masters (21-23 years)	6 (2)	
Doctorate (24-30 years)	0 (0)	
Employment		(Teaching)
Farming	64 (22)	
Teaching	150 (50)	
Business	61 (20)	
Civil Servant	25 (8)	
Average income (annual, in thousand naira)		654.48 (800.5)
50-150 (100)	12 (4)	
151-300 (275.5)	9 (3)	
301-450 (375.5)	33 (11)	
451-600 (575.5)	74 (25)	
601 and over (800.5)	172 (57)	
Armed banditry (No of respondents)		(Armed attacks)
Armed attacks	274 (91)	
Kidnapping	202 (67)	
Forced displacement	198 (66)	
Accessibility to health services during armed banditry		(Not Accessible)
Accessible	12 (4)	
Not accessible	288 (96)	
Length of armed banditry (in years)		(7-9 years)
1-3	16 (5)	
4-6	58 (19)	
7-9	201 (67)	
Over 10	33 (8)	

Source: Authors' computations from survey data (2025)

From table 2, it can be observed that the respondents comprised 193 males (64%) and 107 females (46%) respectively. The mean age is 36.4 years, with the highest number of respondents coming between the 40 and 54 age range, representing 42%. Of the sample of 300 persons, 47% are married, followed by the single (26 respondents representing 9%), the widowed 28 (6%) and divorced 35 (8%) respectively.

In terms of education, it can be observed that 138 respondents (46%) have either the National Diploma (ND) or National Certificate of Education (NCE) certificates respectively. 18% (53 of the respondents) obtained secondary school certificate. First and Master's degree holders are 42 (14%) and 6 (2%) respectively. The relatively high number of respondents with the sub-degree qualifications such as ND and NCE is attributed to the targeted population where half (150 representing 50%) are school administrators (including teachers). The employment demographics indicate that 22% of the respondents are farmers, while for teaching, business and civil service, the proportion are 50%, 20% and 8% respectively.

The mean income in the study area is N654,480 with highest number of the respondents (172 representing 57%) earning between N600,000 and a million naira annually. A small fraction earns between N151, 000 and N300, 000, as can be observed for 9 respondents (3%), while 12 (4%) have an average annual income of N100,000 (between N50,000 - N150,000). While the average annual income of 11% of the sample (33 respondents) is N375,500 (i.e. between N301,000 - N450,000), 25% of the respondents (74) has an average annual income of N575,500 (N451, 000 - N600, 000).

Of the various dimensions of armed banditry, 274 respondents (91%) reported armed attacks, while 202 respondents (67%) and 198 respondents (66%) reported cases of kidnapping and forced displacement respectively. Thus, over half of the incidents of armed banditry were in the form of armed attacks in the affected rural communities. Majority of the respondents, i.e. 288 (96%) reported that they did not have access to health services during armed banditry, with 12 (4%) reporting access to health services.

Finally, armed banditry has had a fairly long history in the affected communities. As shown in table 2, most of the respondents (67%) reported that they had witnessed the incidence for about 7-9 years, compared to 16 respondents (5%) who reported 1-3 years. This suggests that armed banditry is not a recent phenomenon in the communities studied.

The results of the estimated binary probit models on the effect of armed banditry access to health services are presented in table 3.

Table 3: Estimated Coefficients
Dependent variable (Access to health services)

Variable	Model 1	Model 2	Model 3
Armed attacks	-0.6812**		
	(0.3136)		
	[-2.17]		
Kidnapping		-0.1405	
		(0.3322)	
		- [0.42]	
Forced displacement			-0.6418**
			(0.3162)
			[-2.03]
Income	0.4426*	0.5831**	0.6436*
	(0.1208	(0.2106)	(0.2012)
	[3.67]	[2.77]	[3.20]
Education	0.7364***	0.6288***	0.6443**
	(0.4295	(0.3299)	(0.2311)
	[1.71]	[1.91]	[2.79]
Employment (Base: Business)	0.4340*	0.5220**	0.3777**
	(0.1336)	(0.2302)	(0.1342)
	[3.25]	[2.27]	[2.81]
Age	-1.1511	-1.2318**	-1.1810**
	(0.4780)	(0.4720)	(0.4758)
	[-2.41]	[-2.61]	[-2.48]
Marital status (Base: married)	0.3729	0.3598	-0.3482
	(0.2567)	(0.3067)	(0.3127)
	[1.45]	[1.17]	[-1.11]
Armed attacks*Income	0.1385		
	(0.2514)		
	[0.55]		
Kidnapping*Income		0.3285	
		(0.0851)	
		[3.86]	
Forced displacement* Income			0.1025
			(0.0682)
			[1.50]
Income*Age	0.3587***	0.2289*	0.3758***
	(0.2091)	(0.0473)	(0.2131)
	[1.72]	[4.84]	[1.76]
Income*Marital status	0.1542*	0.1052*	0.2063***
	(0.0434)	(0.0321)	(0.1140)
	[3.55]	[3.28]	[1.81]
Constant term	-0.2464**	-0.6144**	0.3388***
	(0.1081)	(0.3047)	(0.1888)
	[-2.28]	[-2.02]	[1.79]
Number of observations	300	300	300
Number of 'correctly predicted' cases	278 (93%)	293 (98%)	286 (95%)
Pseudo R^2	0.1338	0.1032	0.1390
Likelihood Ratio $\chi 2$ Statistic	13.48	10.40	14.01
Prob. (Likelihood Ratio χ^2 Statistic)	0.036	0.089	0.0296

Note: *, ** and *** denote rejection of the null hypothesis at 1%, 5% and 10% level of significance respectively. Standard errors are in parenthesis, Z-Statistics (scores) are in square bracket.

Source: Authors' computations from survey data (2025)

Results in table 3 show that the coefficients of all the armed banditry indicators are negative. This indicates that armed banditry has a negative effect on access to health services. Consequently, a one unit increase in armed attacks, kidnapping and forced displacement is associated with a decrease in the z-score or probit index by 0.68, 0.14 and 0.64 respectively. Moreover, the effect of armed banditry is statistically significant for armed attacks and forced displacement, but not significant for kidnapping. Oral interview report from the respondents shows that due to the attacks, the ability of the people to access healthcare services is constrained. One of the respondents said:

There is a very serious problem on our hands. One is simply tired in this community. We hardly can sleep comfortably. This was not the case in the past. This place used to be one of peace and harmony. The same cannot be said these days. We need help and the help has to come very fast. How can you talk about access to anything when people are afraid for their lives?

Another responded remarked that it was simply insensitive to expect health personnel to make themselves available at work during crises moments such as those occasioned by armed banditry. This is consistent with the literature which shows that in some cases, care givers are kidnapped, leading to worsening cases of unavailability of needed medical personnel to deliver health services (Okoli *et al.*, 2014). The results are in line with previous findings linking armed crises to forced displacement Mohammed and Jibril (2016), leading to severe disruption to social services (Omole et al., 2015), including destruction of healthcare centres (Abdullahi et al., 2017), resulting in inaccessibility to health services (World Health Organization, 2016). One of the respondents interviewed had this to say:

In one of the incidents, all the health care workers simply ran away from their duty post. No one wants to be affected. You hardly can predict when the bandits might strike. We are used to the bandits coming in the night. But with the way things are now, no one would be surprised if they strike in broad day light. The results suggest that armed banditry threatens not only the health needs in affected communities but a bottleneck in accessing health facilities. The results are consistent with prior findings of Che Chi et al. (2015) and Abdulaziz and Mustapha (2021). This reinforces the view in the literature linking violent crisis to the amount of health care delivery (Amber et al., 2020; Médecins Sans Frontiers, 2008; Woodward et al., 2017; Chukwuma & Ekhator-Mobayode, 2019; Bou-Karroum et al., 2020; Amberg et al., 2025). It is acknowledged that when a community is exposed to armed conflict such as the one brought about by banditry, displacement and disruptions of health service delivery, among others often result (Munezero & Manoukian, 2021).

One of the elderly respondents reported that due to lack of access to health services, the health challenges of many of the elderly in their community had worsened. This is not surprising, given that banditry affects all and sundry where it happens and in the case of primary health centres, health workers often seek safety, while not available to offer services to patients (Sharara & Kanj, 2014; Chi et al., 2015; Chukwuma & Ekhator-

Mobayode, 2019; Ojeleke et al., 2022). Another respondent (a farmer) and in his middle age concluded that armed banditry has worsened the vulnerability of individuals in his community. Beyond difficulties in going to farm, the fear and trauma left by the phenomenon has had a huge toll on the people. This is consistent with the literature linking armed conflict to significant risks to means of livelihood including access to electricity, water and other amenities (Collier et al., 2023). Previous studies including Bendavid et al. (2021) and Goli et al. (2022) have shown that the intensity of conflict adversely affects health. Consequently, health services are adversely affected in rural communities bedeviled by armed banditry, while dislodging many from their sources of livelihoods, further exposing them to various forms of vulnerability including poverty and diseases. There is evidence in past studies which indicate that armed conflict poses a significant threat to healthcare services and socioeconomic conditions of people (Mueller & Techasunthornwat, 2020).

Results from the individual covariates point to the positive effect of education, income and employment on access to health services. Across the specifications, a unit increase in the income (N1,000) and in years of schooling (i.e. an extra year of education) is associated with a rise in the z-score. Thus, income and education are significant predictors of access to health services. There was an overwhelming positive belief among the respondents about the necessity of income when accessing health care services. One of the female respondents concluded that:

> *Money is very important in the whole matter of accessing health facilities. We need money to buy quality drugs, do proper test and even improve our nutrition. However, many people in the community are poor and therefore depend on the Primary Health Care Unit. Some people could hardly afford common pain relief drugs and have to depend on local herbs*.

It is known that individuals who are educated have less likelihood of indulging in behaviours that are considered unhealthy (Goldberg & Smith, 2007); and because education predicts positive labour market or employment outcomes and thus income, it can be said that the educated have better access to health care, compared to non-educated persons (Zakir & Wunnava, 1999; Van Doorslaer & Masseria, 2004). The results are in consonance with prior findings on the positive impact of expenditure on health outcomes (Heijink et al., 2013; Mohapatra, 2017). This inference is corroborated by the employment coefficients which are positive and significant. From the results, it can be observed that engagement in business (compared to farming, teaching and being in the civil service) increases the z-score by 0.43 (model 1), 0.52 (model 2) and 0.38 (model 3) respectively.

One interesting finding is that age has a negative effect on access to health facilities. This may be due to the difficulties experienced by individuals to protect themselves physically and run away from places to which they have been accustomed over time, when armed banditry occurs. However, it can be said that this can be mitigated by income. To test this, an interaction term (Income*Age) was included in the models. The coefficients of the

interaction term are positive and significant, implying that the problem associated with age is mitigated by increasing income, thus improving access to health services. This is corroborated by one elderly respondent as follows:

> *As an old man, my health needs have increased over the years. I find it physically difficult to walk for even a short distance. My son has to be invited each time I need to go to the local health facility. We are a poor household. Assuming my income is anything to go by or that my son has a viable paid employment, the difficulty would certainly be reduced. Sometimes, I have to ask for help from my siblings, most of whose conditions are not far better than mine.*

Similarly, the study found that marital status affects access to health services positively, although not statistically significant. Being married tends to improve the chances of accessing health services, compared to other states such as being widowed, divorced or single. This may be due to the influence of spouses who provide the needs of their partners such as husbands to wives. To test whether such needs (such as income) have any effect, the study deployed the interaction term (Income*Marital status). The results show that being married and having income significantly increases the probability of accessing health services. Most of the responses to the interview question on the issue of spouse support are consistent. For example, one married woman remarked that:

My husband is responsible for my health bills. My age-mates who are yet to marry sort of envy me, as they are unable to access health care facilities the way I do. It is only those who happened to be either in the teaching profession or who are employed in the civil service that are able to access health care more readily, even though many of them wish to be married, so that the responsibility can shift to their husbands.

Because of the role of income in health care access as documented in the literature, the study further tested if this could still hold, given the incidence of armed banditry. Consequently, income was interacted with each of the armed banditry indicators (i.e. Armed attacks*Income, Kidnapping*Income and Forced displacement*Income) respectively. As shown in table 3, the coefficients are positive, with the Kidnapping*Income coefficient being statistically significant. Thus, controlling for armed banditry, income is critical to access to health services. On the diagnostic statistics, it can be observed that the likelihood ratio chi-square in each of the models (i.e. 13.48, 10.40 and 14.01) and their associated p-values (0.036, 0.089 and 0.0296) suggest that the models are statistically significant at 5%, 10% and 5% respectively. In other words, each model fits significantly better compared to one that has no predictors. The number of 'correctly predicted' cases is also adequate, given that the least case is 93%, an indication of high predictive capacity.

Conclusion and Recommendation

This study investigates the effect of armed banditry on human capital development, using access to health services as a proxy for the latter. Deploying a mixed method which combined quantitative and qualitative research and involving probit regression, augmented by qualitative analysis, cross-sectional data was obtained from parents and school administrators in rural communities affected by armed banditry in Katsina State, Nigeria. Structured questionnaire was administered on a sample of three hundred (300) respondents for the quantitative data, complemented by an interview (based on a semi-structured questionnaire) for the qualitative data.

Findings from the study indicate a negative effect of armed banditry (proxied by armed attacks, kidnapping and forced displacement) on human capital development, with armed attacks and forced displacement being statistically significant. Factors including education, income and employment were found to have a significant positive effect on access to health services and consequently on human capital development. While age was found to exert a significant negative effect, marital status (being married in this case) was found to have a positive but not a significant effect. The results from the interaction terms show that being married and having income (Income*Marital status) significantly increases the chances of accessing health services. The coefficients of the interaction term between income and each of the indicators of armed banditry are generally positive, and this is significant for kidnapping (i.e. Kidnapping*Income), thus underscoring the critical role of income to heath care access in the midst of armed banditry.

The policy implication of the empirical findings is that if armed banditry is not addressed, human capital development will become worse in affected rural communities where they occur. Thus, a broad-based approach is recommended aimed at addressing armed banditry. This necessitates the involvement of governments at all levels, including the citizenry.

The study recommends the following implementation trajectory. In the first place, higher budgetary allocation, approval and disbursement of funding are required for security agencies. This will enable them procure equipment for fighting modern crimes, including armed banditry. The agencies can leverage on their improved funding situation to engage in training and retraining on the deployment of modern techniques of crime fighting. Second, local vigilantes have shown capacity to be helpful as a mechanism for dealing with armed banditry. In this context, the need for adequate training in areas such as communication and intelligence gathering is recommended. Importantly, improved synergy between vigilante groups and law enforcement agencies is needed. Finally, the role of the populace, in terms of response measures before, during and after armed banditry should be stressed through mass orientation. This could be in the form of oral, electronic and print platforms, with increasing involvement of traditional and religious leaders. This way, people's knowledge regarding their role in the entire response spectrum can be enhanced.

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