



Geographic and Socioeconomic difference in the Sources of Healthcare by Households in Edo State and its Implication on Disease Surveillance

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Abstract

The source of health care by households influences the growth and development and overall health outcomes of a population. This mixed cross-sectional descriptive study among 495 eligible respondents in Edo State, Nigeria found chemists were the major source of healthcare patronized by households in both geographic and socioeconomic groups. This was followed by private and teaching hospitals in the urban areas but health centers and herbalists in the rural areas. Although there was no statistically significant difference between the healthcare seeking behavior of households of different socioeconomic groups, the major reason given by the poorest households for initial choice of a health provider was cost while those in the rich and richest households was quality.

Rural households reported more illnesses than the urban households. There was a statistically significant difference in the distribution of the reported illness between rural and urban households. This significant finding shows that diseases need to be identified at the community level. In reality, only a minority number of diseases turn up at health facilities buttressing the 'tip of the iceberg phenomenon' for disease detection at health facilities. This affects the true picture of disease prevalence and its surveillance. With one-health approach in mind, human and animal surveillance needs to be integrated and innovative solutions found to address some challenges. The importance of an innovative events-based surveillance as an important mechanism for early warning, risk assessment, disease predictions and responses, starting from the community level cannot, but be overemphasized.

Keywords: Sources of Healthcare; Socioeconomic; Geographic Location

Introduction

Health is vital for the growth and development of individuals and the country. This is attained by optimal access to healthcare services. Barriers/determinants between patients and health services are generally classified into social, cultural, economic, geographical and organizational factors. Socio-economic factors include sex, age, occupation, economic status, type and severity of illness, access to service provider as well as perceived quality of care [1]. When access to health services is limited, it has an effect on surveillance of diseases, in both rural and urban areas.

Research Questions

- What are the geographic and socioeconomic differences in the sources of healthcare by households in Edo State?
- What is the implication of sources of healthcare by households in Edo State on disease surveillance

Objectives of this study include

- To identify the sources of healthcare utilized by households in urban and rural areas in Edo state
- To determine the sources of healthcare utilized by households of different socioeconomic groups (SEC) in Edo state.
- To discuss the implications of these findings on disease surveillance in Nigeria

Materials and Methods

Study area

The study was carried out in selected urban and rural communities in Edo state. The geographical area presently recognized as Edo State was created on the 27th of August, 1991 when the defunct Bendel State was split into Edo and Delta States. The major towns in the state include Benin City (the State Capital), Abudu, Ekpoma, Uromi, Auchi, and Sabongida-Ora. Edo state is administratively divided into eighteen LGAs and politically divided into three

senatorial districts. There are seven LGAs in Edo South senatorial district, six LGAs in Edo North senatorial district and five LGAs in Edo Central Senatorial District. The 2006 census puts the population of Edo State at 3,218,332⁵. Currently, the projected population using the 2006 census at a growth rate of 2.83, is 4,119,464.96 people⁵. However, the public facilities are poorly equipped or maintained and the private facilities are inadequately regulated. There are currently 926 health facilities in Edo State which are as follows: 8 tertiary health facilities, 246 secondary hospitals, and 672 primary health centres or 289 public and 637 private hospitals. The per capita expenditure on health is about \$4. The capital budget on health for 2009 was 3.97% of the total budget of Edo State. About 70% of health expenditure in Edo State is from out-of-pocket.

Study design

A cross-sectional study design involving quantitative and qualitative data collection methods.

Study population

The study participants were household heads, or their spouses or an adult representative of that household in the study area.

Inclusion criteria

Quantitative Survey

Adult male or female household heads who have been resident in that community for at least one year.

When a household head is not available as at the time of the study, any adult belonging to that household who was knowledgeable about the household health expenditures was interviewed.

Exclusion criteria

Quantitative Survey

Non-consenting household heads.

Sample size determination

The minimum sample size 495 was calculated using the sample size formula for comparison groups (in this case urban and rural subgroups), where p is the prevalence of respondents who made an out-of-pocket expenditure in a study in South-South Nigeria set at 78%.

approximate ratio of 1:1.

Sampling technique

Multi-stage sampling technique was used to select study participants.

Study instruments

The study instruments include

- An interviewer administered semi-structured questionnaire (Appendix 3) adapted from a study conducted in South-Eastern Nigeria.

Measurement of variables and data analysis

The variables of interest (outcome variables) include the sources of health care. Illness were measured/defined as self-reported ailments warranting medical care or diagnosis given by a professional healthcare provider (medical doctors, nurses, laboratory scientists). The sources of healthcare were expressed in frequencies and proportions. Data were coded, entered, cleaned and analyzed by IBM Statistical Package for Social Science (SPSS) version 21.0 for Windows (SPSS, Chicago, Illinois, USA) and Excel 2007. Results are presented in text, tables and figures. Continuous variables were described using mean and standard deviation. Categorical variables were described using frequencies and proportions. Chi-square and Fisher's exact were used to test associations and differences where appropriate. Variables were cross-tabulated by SES and geographic location. Bivariate and Multivariate analysis were used to determine statistical significant differences. A p -value less than 0.05 was considered significant.

Ethical Considerations

- Ethical approval (Appendix 9) for this study was obtained from the Research and Ethics Committee of the Irrua Specialist Teaching Hospital Edo State.
- Permission to carry out the study was obtained from the leaders of each community as well as from the Medical officer of health in Esan west LGA.
- Written informed consents were obtained from each research participants before they were enrolled into the study.

Results

A total of 495 eligible and consenting household heads or their representatives participated. A total of 246 household heads or their representatives were interviewed in the urban community while a total of 249 household heads/representatives were interviewed in the rural community.

Table 1 shows that majority of the respondents in the urban, 160 (65%) and rural, 167 (67.3%) locations were in the age group 31-64 years. There were more female respondents in the urban area, 133 (54.1%) and male respondents in the rural area, 123 (50.6%). Most of the respondents were married in both the urban 193 (78.5%) and rural, 206 (82.7%) areas. Close to half of the respondents in the urban area, 116 (47.2%) had tertiary level of education while in the rural area only 26 (10.4%) had tertiary level of education.

Variables	Urban (n = 246)	Rural (n = 249)	X ²	p-value
	Frequency (%)	Frequency (%)		
Age group in years				
≤30	74 (30.1)	42 (16.9)	23.64	*0.0001
31 – 64	160 (65.0)	167 (67.3)		
≥65	12 (4.9)	39 (15.7)		
Sex				
Male	113 (45.9)	126 (50.6)	1.080	0.299
Female	133 (54.1)	123 (49.4)		
Marital status				
Married	193 (78.5)	206 (82.7)	29.24	*0.0001
Single	47 (19.1)	20 (8.0)		
Separated	4 (1.6)	5 (2.0)		
Divorced	0 (0.0)	1 (0.4)		
Widow(er)	2 (0.8)	17 (6.8)		
Level of Education				
None	9 (3.7)	43 (17.3)	1.030	*0.0001
Primary	48 (19.5)	109 (43.8)		
Secondary	73 (29.7)	71 (28.5)		
Tertiary	116 (47.2)	26 (10.4)		

Table 1: Socio-demographic characteristics of respondents.

*Statistically significant at p < 0.05. The mean age of the respondents was 43.91(SD ± 16.1).

Variables	Urban (N = 246)	Rural (N = 249)	X ²	P
	Frequency (%)	Frequency (%)		
Primary source of household income				
Farmers	12 (4.9)	107 (43.0)	170.0	*0.0001
Traders	76 (30.9)	45 (18.1)		
Professionals	66 (26.9)	14 (5.6)		
Artisans	79 (32.1)	68 (27.3)		
Pension	7 (2.8)	8 (3.2)		
Unemployed	6 (2.4)	7 (2.8)		
Secondary source of household income				
Farmers	28 (11.4)	70 (28.1)	35.551	*0.0001
Traders	38 (15.4)	43 (17.3)		
Professionals	0 (0.0)	2 (0.8)		
Artisans	26 (10.5)	11 (4.4)		
Pension	0 (0.0)	1 (0.4)		
None	154 (62.6)	122 (49.0)		
Household income (in Naira) monthly				
<50000	137 (55.7)	225 (90.4)	75.764	*0.0001
50000 – 100000	55 (22.4)	13 (5.2)		
≥100000	54 (22.0)	11 (4.4)		
Household size				
Less than 5	136 (55.3)	123 (49.4)	1.719	0.190
Greater than 5	110 (44.7)	126 (50.6)		

Socioeconomic groups of households				
Q1 (Poorest)	12 (4.9)	86 (34.5)	202.5	*0.0001
Q2 (Poor)	19 (7.7)	81 (32.5)		
Q3 (Average)	44 (17.9)	56 (22.5)		
Q4 (Rich)	84 (34.1)	13 (5.2)		
Q5 (Richest)	87 (35.4)	13 (5.2)		

Table 2: Socio-economic characteristics of households.

*Statistically significant at p < 0.05

Mean household income was N59,391.38 ± 17,890.78.

The mean household size was 5.77 (SD ± 3.31).

Table 2 shows that in the urban area, artisans were the primary source of household income, 79 (32.1%) while in the rural area farming was the primary source of household income, 107 (43%). Trading, 38 (15.4%), was the major source of secondary income in the urban area. Close to two-thirds of the households in the urban area, 154 (62.6%) and about half of those in the rural area, 122 (49%) had no secondary source of income. Over half of households in the urban, 137 (55.7%) and majority in the rural 225 (90.4%) area had a household monthly income of less than fifty thousand naira. Across the five socioeconomic groups, the rich, 84 (34.1%) and richest, 87 (35.4%) households accounted for the largest proportion of households in the urban location while the poor, 81(32.5%) and poorest, 86(34.5%) households accounted for the largest proportion in the rural location.

The mean number of days spent on admission in the urban area was 9 days and 7.4 days in the rural area.

More than half of households in the urban 153, (62.2%) and majority of households in the rural, 179 (71.9%) areas had at least one ill household member. About half of the households in both urban (50%) and rural (51%) areas had at least one outpatient visit in the last one month. The proportion of households with a hospitalized household member was higher in the rural area, 52 (20.9%) than in the urban area, 30 (12.3%) and this difference was statistically significant.

Variables	Urban (246) Frequency (%)	Rural (249) Frequency (%)	X ²	p-value
Households with sick person(s)				
Yes	153(62.2)	179(71.9)	5.264	0.022*
No	93(37.8)	70(28.1)		
Households with outpatient visits in the last one month				
Yes	123(50.0)	127(51.0)	3.955	0.047
No	123(50.0)	122(49.0)		
Households with a hospitalized member in the last 12 months				
Yes	30 (12.3)	52(20.9)	9.194	0.010*
No	216(81.7)	197(79.1)		

Table 3: Household morbidity data.

*Statistically significant at p < 0.05.

Variables	Area			χ^2	p-value
	Urban	Rural	Total		
Sources					
Traditional medicine	3 (2.0)	20 (11.2)	23 (6.9)	44.649	*0.001
Chemist	57 (37.3)	75 (41.9)	132 (39.8)		
Health center	14 (9.2)	44 (24.6)	58 (17.5)		
General hospital	14 (9.2)	11 (6.1)	25 (7.5)		
Private hospital	36 (23.5)	16 (8.9)	52 (15.7)		
ISTH	18 (11.8)	5 (2.8)	23 (6.9)		
Others	11 (7.2)	8 (4.5)	19 (5.7)		
Reason for opting first for the place treatment was received					
Distance	31 (20.3)	43 (24.0)	74 (22.3)	7.829	0.098
Less cost	47 (30.7)	69 (38.5)	116 (34.9)		
Recommended	18 (11.8)	16 (8.9)	34 (10.2)		
Quality service	51 (33.3)	50 (27.9)	101 (30.4)		
Others	6 (3.9)	1 (0.6)	7 (2.1)		
Form of transportation did you use					
Personal vehicle	47 (31.1)	9 (5.1)	56 (17.2)	41.461	*0.001
Public vehicle	24 (15.9)	26 (14.9)	50 (15.3)		
Okada	39 (25.8)	68 (38.9)	107 (32.8)		
Walked	39 (25.8)	65 (37.1)	104 (31.9)		
Others	2 (1.3)	7 (4.0)	9 (2.8)		
Time taken to location of treatment					
<15 min	84 (55.6)	126 (71.2)	210 (64.0)	10.354	*0.0158
15-30 min	52 (34.4)	34 (19.2)	34 (19.2)		
>30min-1hr	12 (7.9)	13 (7.3)	25 (7.6)		
>1hr	3 (2.0)	4 (2.3)	7 (2.1)		

Table 4: Sources of health care utilized by households in urban and rural areas.

*Statistically significant at p <0.05.

Others (under Sources): home remedies, religious centers.

Table 4 shows that chemists were the major source of healthcare patronized by households in both geographic and socioeconomic groups. This was followed by private and teaching hospitals in the urban areas but health centers and herbalists in the rural areas. There was a statistically significant geographic difference (p = 0.0001) and socioeconomic difference (p = 0.0001) in the sources of healthcare used.

The poorest and poor (table 2 showed their correspondence with the rural location) sought healthcare at the chemist; so did the rich and richest (located mostly at urban areas). Form of transportation used by the rural populace was mostly either ‘okada’ or ‘walking’, while the rich and richest urban populace utilized personal vehicles or ‘okada’. Across the socioeconomic groups, households in the first quintile (poorest) had the highest patronage of herbalists, households in the fourth quintile (rich) had the highest

patronage of private hospitals while richest households had the highest patronage of the teaching hospital.

Sources of healthcare used by participants of the FGD

Majority of the respondents in the urban communities said when a household member is sick, they prefer to go to the hospital first, because they wanted quality health services and felt other sources of healthcare were of lower quality and were more commonly associated with misdiagnosis and prescription of inappropriate medications. However, a few said they preferred to go to the chemist shop first because the chemist was less expensive compared to the hospital and that the treatment they receive at the chemist is similar to that obtainable at the hospital yet cheaper. Some other reasons given for the preference of chemists include time saving (no delays and no queues), proximity to their home and accessibility to the healthcare provider. Other sources of healthcare used

Variables	Socio-economic group					χ^2	p-value
	Poorest	Poor	Average	Rich	Richest		
Sources							
Traditional medicine	11 (15.7)	7 (9.7)	5 (7.5)	0 (0.0)	0 (0.0)	66.571	*0.001
Chemist	31 (44.3)	31 (43.1)	29 (43.3)	17 (29.3)	24 (36.9)		
Health center	9 (12.9)	22 (30.6)	13 (19.4)	8 (13.8)	6 (9.2)		
General hospital	4 (5.7)	4 (5.6)	8 (11.8)	2 (3.4)	7 (10.8)		
Private hospital	11 (15.7)	5 (6.9)	5 (7.5)	16 (27.6)	15 (23.1)		
ISTH	2 (2.9)	1 (1.4)	4 (6.0)	10 (17.2)	6 (9.2)		
Others	2 (2.9)	2 (2.8)	3 (4.5)	5 (8.5)	7 (10.8)		
Form of transportation did you use							
Personal vehicle	2 (2.9)	5 (7.0)	11 (16.9)	20 (35.1)	18 (27.7)	39.287	*0.001
Public vehicle	14 (20.6)	9 (12.7)	9 (13.8)	7 (12.3)	11 (16.9)		
Okada	22 (32.4)	31 (43.7)	21 (32.3)	14 (24.6)	19 (29.2)		
Walked	27 (39.7)	24 (33.8)	21 (32.3)	15 (26.3)	17 (26.2)		
Others	3 (4.4)	2 (2.8)	3 (4.6)	1 (1.8)	0 (0.0)		

Table 5: Sources of health care utilized by households of different socio-economic group.

*Statistically significant at $p < 0.05$.

by respondents in the urban communities include seeking prayers from clergy men, laboratory tests, use of herbs (self-medication), getting prescription from family friends who are doctors over the phone. Majority of participants in the rural communities said they first go into the bush to look for herbs and if they do not feel better they go to the chemist to buy drugs.

“In this community we rush first to the bush to look for herbs. If it does not work, then we go to the chemist”. (Male, rural).

For the rural dwellers who said they get herbs from the bush first, this was due to lack of money to seek quality care. *“Although I prefer hospital since they have good doctors but the problems is after the treatment the bill is high”.* (Female, rural).

Illnesses experienced by households								
Variables	Diarrhoea	Hypertension	Malaria	Osteoarthritis	Typhoid	URTI	*Others	Total (%)
Urban	18 (11.8)	14 (9.2)	92 (60.1)	4 (2.6)	10 (6.5)	12 (7.8)	3 (2.0)	153 (100.0)
Rural	6 (3.4)	7 (3.9)	89 (49.7)	17 (9.5)	28 (15.6)	8 (4.5)	24 (13.4)	179 (100.0)

$X^2 = 40.6, P\text{-value} = 0.001$

Table 6: Illnesses experienced by households in different geographic and socioeconomic groups.

*Acute kidney injury, appendicitis, liver disease, road traffic accident.

Table 4 shows that there was a statistically significant difference between illness experienced by households in urban and rural settings, $p = 0.001$. Also, there was a statistically significant difference between illness experienced by households in the different socio-economic groups, $p=0.001$. Malaria was the major illness reported in both geographic groups and across all the socioeconomic groups. This was followed distantly by diarrhea in the urban area and typhoid in the rural area. Non-communicable diseases were also reported with hypertension higher in the urban area and osteoarthritis higher in the rural area.

Discussion

Healthcare delivery services have changed over time, place and person, and so has the access to them, changed. Utilization of health-

care services has been shown to be limited especially amongst the poor in countries where user charges are a prerequisite to accessing healthcare or where there is low health insurance coverage [2]. New, faster and improved procedures, drugs, tools, and tests have changed health seeking behavior and attitudes. This has resulted in ‘access to healthcare’ being a complex concept. One way to define it, is ‘as having timely use of personal health services to achieve the best possible health outcome’ [3]. Equity of access recognizes that everyone has a right to healthcare and requires that all people benefit equally from healthcare services, regardless of their socioeconomic status (SES) and place of residence [4].

A larger proportion of respondents in the urban areas were better educated than those in the rural communities. This is in keep-

ing with the findings of NDHS 2018 where urban residents were found to attain higher levels of education compared to their rural counterparts [5]. Also the proportion of residents without any formal education was higher among those who reside in the rural area. Findings from a study in Ogun state concluded that majority of respondents in the urban area were educated and this could have informed their healthcare choices [6]. The major source of income of the households in the rural area was farming. This is similar to the findings of the Food and Agriculture Organization which found that over 70% of those in the rural community in Nigeria engage in the agriculture sector [7]. The World Bank Poverty Assessment report for Nigeria, similar to findings in this study, shows poverty was more concentrated in rural areas, where 84.1 percent of poor Nigerians lived in rural areas. In 2018/19, around 40.1 percent of Nigerians lived on less than the national poverty line of 137,430 naira per person per year [8].

Similar to the results in this study, in South Western Nigeria (Ogun State), majority (40.5%) of the rural households lived 5 to 9 km to a public health center with 21% having access to healthcare facilities and 85.7% utilizing the facilities [6].

In this study, chemist (patent medicine vendors) shops were the most patronized healthcare providers by households in both rural and urban areas as well as households in all the socioeconomic groups. This was followed by the private hospitals in the urban area and the use of health centers in the rural areas. Similar findings were reported in a study done in Anambra, Nigeria which showed that two-thirds of the respondents' first choice of a healthcare provider was the chemist [9].

In a survey conducted in Gambia [10], and South Africa [11,12], a wider range of sources of healthcare was explored including self-medication and use of pharmacy shops which are commoner options of sources of healthcare documented in literature. The findings of the study in Gambia revealed that both the urban and rural dwellers used more of public health clinics and less of private clinics when seeking healthcare [10]. While in South Africa, the health seeking behavior of 206 rural and urban household members explored in a study showed that urban and rural participants differed significantly ($p = 0.001$) with regards to their preferred healthcare provider. While 50.4% of urban households preferred private medical doctors, 71.8% of the rural households preferred to utilize health clinics. The preference of urban dwellers for private clinics was because they considered care provided by private doctors for which they must pay more superior to that from other sources. The rural dwellers, on the other hand, preferred health clinic because of the free health services they were offered [11].

In contrast to the above findings, a survey conducted in North-Western Nigeria revealed that the predominant source of health-

care was private clinics (34.8%). Other sources were PHC facility (33.5%), self-medication (16.1%) and traditional healers (9.3%) [12,13]. This dissimilarity may be attributed to the respondents having a better healthcare seeking behavior than those of this study. Although there was no statistically significant difference between the healthcare seeking behavior of households of different socioeconomic groups, the major reason given by the poorest households for initial choice of a health provider was cost while those in the rich and richest households was quality. Sadly, a recent paper suggests, Primary Health Centers (PHC) in Nigeria where most of the rural populace assesses healthcare, suffer critical shortages of health workers, aggravated by chronic absenteeism, poor commitment with minimal enforcement of laws and regulations, and powerful and political connections to avoid sanctions. Health workers use public resources like medical tools to offer private health services at clients' homes [14].

Individuals who are ill may rely on herbal remedies and/or self-prescription with orthodox drugs and where no improvement in health is seen patients are compelled to seek and pay for expensive outpatient services from traditional healers, private practitioners and pharmacists [15,16]. This can result in a large health expenditure among families seeking treatment for seriously ill relatives [17].

A concern is as expressed that almost all essential medicines could be found within PHC rural slum sites with the exception of those for chronic illness, including salbutamol (asthma), glibenclamide (diabetes mellitus type 2), atenolol and captopril (hypertension), which were not available. Many of the chemist facilities for example, patent medicine vendors are not legally permitted to sell certain medications and highly restricted in what drugs they could sell [18].

This implies that the goal of the National Health Policy to provide equitable and quality health for all citizens of Nigeria using the primary healthcare center as a framework is still far from being achieved. The results of the focus group discussions provide more insight to why most households prefer patent medicine vendors. Majority of the participants of the focus group discussion conducted in the urban community said they prefer the chemist because it was closer to them, faster and cheaper for them. It is noteworthy that households in the first quintile (poorest) had the highest patronage of herbalists and chemists while there was no household in the fourth and fifth (rich and richest) quintile who patronized the herbalists. This goes to show that there is an unequal access to quality healthcare services between the rich and the poor.

Universal Health Coverage means everyone has access to the health care services where and when they need them without fi-

financial difficulty. The National Health Insurance Scheme Strategic Plan (2020-2030) stated that only about 4.2 per cent of Nigerians are covered under the Social Health Insurance. UHC has been recognized as a major determinant of improved health outcomes for all citizens, especially the poorest [19]. It aims to ensure access to good quality health services based on need and not on the ability to pay or other social attributes [20].

All the findings in this study indicate the existence of a disparity in access to quality healthcare services between households in the urban and rural areas due to most likely, the availability of more modern and sophisticated health facilities, presence of more skilled health care providers in the urban areas and more financial resources for clients to pay for these services [21]. This disparity is further widened across socioeconomic and geographic groups due to poverty [22]. While the households higher up the social ladder have access to better quality of care regardless of their geographical location, the poor on the other may have no choice but to utilize the lower quality of healthcare services due to their lean resources especially in countries where user fees are a prerequisite to accessing healthcare services [23].

Disease surveillance as defined by World Health Organization (WHO) is the 'ongoing systematic collection, collation, analysis, and interpretation of data on disease occurrence and health related events and dissemination of the information obtained from such data for prompt public health action' [24]. Sentinel and indicator-based surveillance of diseases are done at the level of health facilities mostly in developing countries, and till recently, the major source of data for disease surveillance.

Malaria accounted for the highest reported illness both in urban and rural communities and among different socioeconomic groups. This finding is in tandem with the findings of a study done in Ebonyi, Nigeria, where malaria was the highest reported illness (66% and 79%) in both the rural and urban areas respectively [25]. Although the high proportion of households with malaria is due to the fact that these studies were done in malaria endemic areas, the study findings equally show that there is a great need to intensify efforts to control malaria which is a major cause of morbidity and mortality especially among under-fives.

Rural households reported more illnesses than the urban households. There was a statistically significant difference in the distribution of the reported illness between rural and urban households. This significant finding shows that diseases need to be identified at the community level. In reality, only a minority number of diseases turn up at health facilities buttressing the 'tip of the iceberg phenomenon' for disease detection at health facilities. This affects the true picture of disease prevalence and its surveillance. Case defini-

tions of diseases for disease detection, were hitherto made for use mainly at the health facility level.

Conclusion

This study has seen that geographic and socioeconomic differences exist in urban and rural areas in Nigeria and they influence the choice of source of health care by households. There is an increasing role of automated-based medical intelligence and surveillance systems such as those in western and European countries, in addition to the traditional manual pattern of document retrieval in advanced medical setting. It is high time we also play an important role in transiting to automated-based medical intelligence and surveillance systems.

With one-health approach in mind, human and animal surveillance needs to be integrated and innovative solutions found to address some challenges.

The importance of an innovative events-based surveillance as an important mechanism for early warning, risk assessment, disease predictions and responses, starting from the community level cannot, but be overemphasized.

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Conflicts of Interest

There are no conflicts of interest.

Bibliography

1. Abaerei AA, *et al.* "Health-care utilization and associated factors in Gauteng province, South Africa". *Global Health Action* 10.01 (2017).
2. Binnendijk E., *et al.* "Hardship financing of healthcare among rural poor in Orissa, India". *BMC Health Services Research* 12.1 (2012): 23.
3. IOM (Institute of Medicine). *Access to Health Care in America*. Washington, DC: National Academy Press (1993).
4. Mooney G. "Equity in healthcare: confronting the confusion". *EFF Health Care* 1.4 (1993): 179-184.
5. National Population Commission (NPC) [Nigeria] and ICF. 2019. *Nigeria Demographic and Health Survey 2018*. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF (2019).
6. Omonona BT, *et al.* "Health-care access and utilization among rural households in Nigeria". *Journal of Development and Agricultural Economics* 7.5 (2015): 195-203.

7. Food and Agriculture Organization (FAO). Nigeria at a glance. FAO in Nigeria (2022).
8. World Bank. Nigeria Poverty Assessment 2022 Report. A better future for all Nigerians (2022).
9. Ewelukwa O., *et al.* "Viewing health expenditures , payment and coping mechanisms with an equity lens in Nigeria". *BMC Health Services Research* 13.87 (2013): 1-9.
10. Gambia T. "Health Seeking Behaviour and Out-of-Pocket Expenditure on Maternal, Child and Adolescent Health (2014).
11. Van der Hoeven M., *et al.* "Differences in health care seeking behaviour between rural and urban communities in South Africa". *International Journal for Equity in Health* 11.31 (2012): 1-9.
12. Govender K., *et al.* "Primary healthcare seeking behaviour of low-income patients across the public and private health sectors in South Africa". *BMC Public Health* 21 (2021): 1649.
13. Sambo MN. "Financial Hardship in Settling Medical Bills among Households in a Semi-Urban Community in Northwest Nigeria". *West African Journal of Medicine* 32.1 (2013): 14-18.
14. Odii A., *et al.* "Absenteeism in primary health centers in Nigeria: leveraging power, politics, and kinship". *BMJ Global Health* 7 (2022): e010542.
15. Inem AV., *et al.* "A short history of rural health service development in Nigeria. A tribute to Dr C Andrew Pearson". *Nigerian Medical Practitioner* 43 (2003): 90-95.
16. Akande TM and Ogunrinola EO. "Health care financing among inpatients of a tertiary health facility in Ilorin, Nigeria". *Nigerian Journal of Clinical Practice* 2.1 (2000): 1-4.
17. Russel S. "Ability to pay for health care: concepts and evidence". *Health Policy and Planning* 11.3 (1996): 219-237.e.
18. Watson S. "Improving Health in Slums Collaborative., Pharmacies in informal settlements: a retrospective, cross-sectional household and health facility survey in four countries". *BMC Health Services Research* 21 (2021): 945.
19. Dutta A and Hongoro C. "Scaling up national health insurance in Nigeria: Learning from case studies of India, Colombia, and Thailand. Washington, DC: Futures Group, Health Policy Project (2013).
20. Guinness L and Wiseman V. "Introduction to Health Economics. 2nd edition. London. Open University Press (2011): 173-184.
21. Audu DT, *et al.* "Inequality and Class Difference in Access to Healthcare in Nigeria" 3.16 (2013): 45-52.
22. Filmer D. "Fever and its treatment among the more and less poor in sub-Saharan Africa". *Health Policy Plan* 20.6 (2005): 337-346.
23. Onwujekwe O., *et al.* "Inequalities in household expenditures to prevent and treat endemic tropical diseases in Southeast Nigeria: harnessing the information to improve equity in primary healthcare". *Journal of Medical Engineering and Technology* 1.2 (2004): 28-38.
24. World Health Organization (WHO). Protocol for the evaluation of epidemiological surveillance systems [monograph on the Internet]. Geneva: World Health Organization (2006).
25. Maduboko G., *et al.* "Burden of endemic diseases and health-seeking behaviour in Ebonyi state: socioeconomic status and geographic differences" 11.2 (2009): 98-112.