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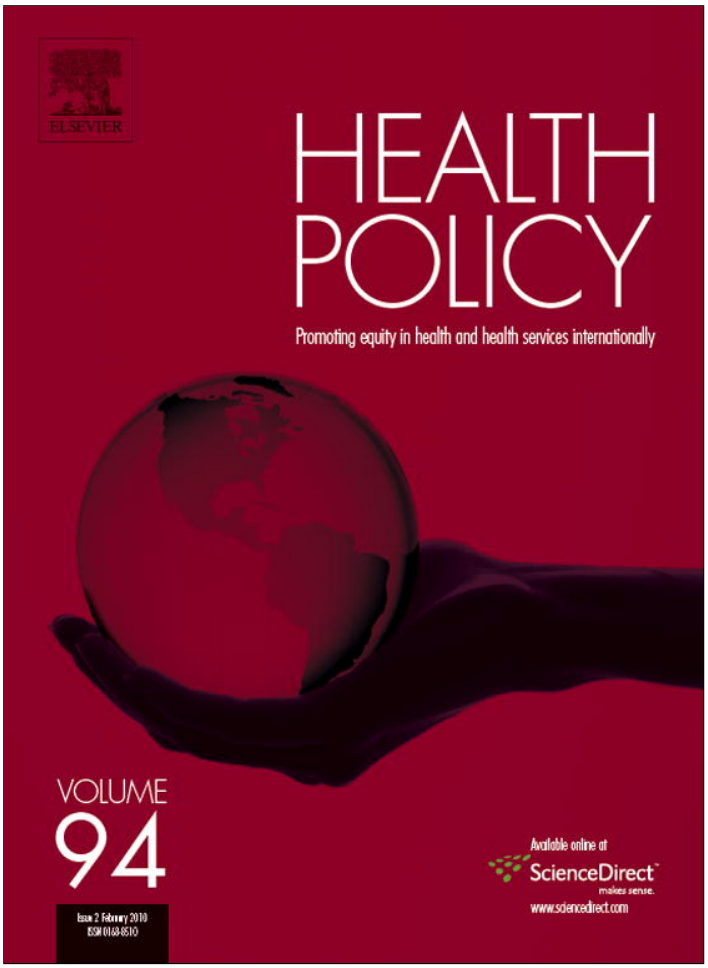

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Geographic inequities in provision and utilization of malaria treatment services in southeast Nigeria: Diagnosis, providers and drugs

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ABSTRACT

Objectives: To examine the levels of geographic inequities in households' choice of providers, mode of diagnosis and drugs for the treatment of malaria.
Methods: Interviewer-administered questionnaire was used to collect information from 2250 randomly selected respondents from six malaria-endemic communities in southeast Nigeria. A comparison of data between urban and rural areas was used to examine geographic inequities in treatment seeking.
Findings: There were geographic inequities in the use of different providers and drugs for the treatment of malaria. The urbanites used more of private hospitals/clinics and specialist hospital, while the rural dwellers used more of drug sellers (patent medicine dealers (PMD) and pharmacy shops (PS)). The rural dwellers were prescribed the cheaper drugs whilst the urbanites were prescribed the more costly drugs.
Conclusion: The geographic inequities in malaria treatment are skewed against the rural people. Everybody is seeking care from the private sector for treatment of malaria but the rural dwellers are using mostly the informal healthcare providers.

1. Introduction

Malaria treatment imposes a serious challenge in Nigeria [1], especially with regards to equity. Malaria is the number one cause of mortality and morbidity in Nigeria, as in most sub-Saharan African (SSA) countries, and is responsible for 30% of childhood mortality, 11% of maternal mortality and more than 60% of outpatient visits [1,2]. There is widespread problem of low levels access to appropriate treatment, because people have to pay mostly through out-of-pocket for available treatment services that may be of questionable quality from a broad spectrum of public and private healthcare providers. The problem of low-level of access is compounded by the limited number of trained providers and the proliferation of low-level untrained providers in both urban and rural areas [3]. Hence, there is the possibility that the poor and rural dwellers have little financial and geographic access to appropriate malaria treatment services, especially since price and wealth are significant determinants of choice of treatment source [4].

The difficulties in treating malaria in Nigeria may be, in part, a result of geographic inequity in access to appropriate services. Studies have shown that patent medicine vendors, which are part of the private sector, are the major sources of

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Table 1
Rural–urban differences in methods of diagnosis of malaria from household survey.

	Blood tests *n* (%)	History (health worker) *n* (%)	Self-diagnosis *n* (%)	CHW *n* (%)	Family member *n* (%)	Others *n* (%)	Total *N*
Adults							
Rural	59 (9.5)	2 (0.32)	555 (89.7)	2 (0.32)	0 (0)	1 (0.2)	619
Urban	89 (13.1)	13 (1.9)	564 (83.3)	1 (0.1)	9 (1.3)	1 (0.2)	677
Equity (R:U ratio)	0.73	0.17	1.08	1.60 (3.2)	0	0.42	
Chi-square (*p*-value)	4.0 (0.045)*	7.1 (0.008)*	12.9 (<0.0001)*	0.43 (0.51)	8.2 (0.004)*	0.01 (0.95)	
Children							
Rural *n*	20 (9.4)	9 (4.2)	183 (85.9)	0	0 (0)	1 (0.5)	213
Urban *n*	46 (13.9)	11 (3.3)	263 (79.2)	0	8 (2.4)	4 (1.2)	332
Equity (R:U ratio)	0.68	1.24 (1.27)	1.07 (1.08)	na	0	0.42	
Chi-square (*p*-value)	2.4 (0.077)	0.31 (0.37)	3.0 (0.053)	na	5.2 (0.018)*	0.77 (0.35)	

Note: CHW, community health workers. *$p < 0.05$.

treatment for malaria and other illnesses in Nigeria [5–7]. Nonetheless, it has been argued that the informal providers, especially patent medicine vendors have the drawback of generally providing low quality services [8]. More information is needed about the determinants of access to effective treatment in Nigeria and in many SSA countries and the role played by residing in rural an urban area.

The relationship between the utilization of different types of providers with geographic location of the consumers is not well established. This area must be studied if equity in appropriate treatment of malaria is to be addressed as a policy and programmatic issue. There is also little evidence about the connection between geographic location of the consumers with drugs prescribing pattern and use in Nigeria and in many SSA countries. Equitable improvement of treatment seeking for malaria will depend on ensuring that all malaria patients have equitable access to appropriate malaria diagnostic and treatment services irrespective of geographic location of abode, socio-economic status, sex, creed and other considerations. Such information is important for improving access to malaria treatment especially in light of change of first line drug to artemisinin-based combination therapy (ACT).

The paper examines the levels of geographic inequities in households' choice of providers for diagnosis and treatment of malaria, as well as inequities in prescribed and consumed drugs for the treatment of the disease. Better information about patterns of care-seeking among the rural areas where the poor mostly reside is needed to identify the loci for intervention that will improve equity in treatment provision and use [9]. Hence, such information is required to inform evidence-based policy making and development of strategies for ensuring that there is equitable provision and use of malaria treatment services in malaria-endemic countries such as Nigeria and many parts of SSA.

2. Methods

2.1. Study area

Anambra State, Southeast Nigeria was the study area. The state has a high malaria transmission rate all year and the annual incidence rate is 10–35%. Six towns were chosen for the study. These were the three largest urban centres (Awka (state capital), Nnewi and Onitsha) from each of the three senatorial zones and one rural local government area (LGA) randomly selected from each senatorial zone (Njikoka, Aguata and Ogbaru). Then, one community from each of the three rural LGAs: Enugwu-Ukwu (Njikoka LGA), Ekwulobia (Aguata LGA) and Okpoko (Ogbaru LGA) was selected using two-stage sampling. Each site area has a full complement of providers from hospitals to itinerant drug providers and herbalists.

2.2. Data collection

Interviewer-administered structured questionnaire was the data collection tool from householders. Each interviewer had at least post-primary education. The calculated minimum sample sizes for the household survey was 400 per urban site (total of 1200) and 350 per rural site (total of 1050) and the overall sample size was 2250. Two-stage sampling was used to select households. The respondent was a female primary care giver, or in her absence, male head of household and in his absence an adult representative of the household.

The questionnaire was used to collect data on the socio-demographic characteristics of the respondents and their households. In addition, information was collected on household responses to fevers and malaria especially with respect to methods of diagnosis, the type of healthcare facility where treatment was sought, the type of healthcare worker that actually provided treatment and the drugs that were consumed for treatment. Information was also collected on preferences of the respondents for different types of providers for treating malaria after a brief scenario of the different types of providers were provided to the respondents.

2.3. Data analysis

Tabulations, non-parametric tests and means tests were used to compare the utilization of malaria treatment from different providers by urban and rural dwellers. The variables of interest were divided along rural–urban lines for the exploration of geographic inequity. The variables

were the mode of diagnosis of malaria, the health care provider sought for treatment, the class of healthcare worker that actually provided treatment and the drugs that were prescribed for treatment. The rural–urban ratio of the variables was used as the equity ratio. Chi-square test was used to determine the statistically significant differences in the data between the rural and urban areas. Statistic significance was tested at the 0.95 confidence level.

3. Results

3.1. Socio-economic and demographic characteristics of the respondents

Most of the respondents were the wives, followed by male household heads. Hence, most respondents were females, married and middle-aged. The number of household residents ranged from 4.2 in Enugwu-Ukwu (rural) to 6.3 in Nnewi (urban), but was 5.3 from the combined data from the communities. Most of the respondents had some formal education and the average number of years that they spent in school was 10 years. The predominant occupation of the household heads was petty trading.

3.2. Rural–urban differences in methods of diagnosis of malaria

1303 of the respondents claimed that there were episodes of adult fever/presumptive malaria and 1271 (97.4%) sought treatment from various providers, some from multiple providers. There were 545 cases of childhood fever/presumptive malaria in the households and 540 (98%) were treated. Table 1 shows that self-diagnosis was the most common diagnostic method in both rural and urban for adult and child diagnosis. Higher proportion in rural, self-diagnose than in urban for both adults and children. Urbanites are more likely to have blood test than rural dwellers. In line with the new policy of using artemisinin-based combination therapy as the first line drug for malaria treatment in Nigeria, blood diagnosis becomes more appropriate than self-diagnosis/presumptive treatment. Children in both rural and urban areas seem more likely to be diagnosed by health worker (history) than adults. These differences were statistically significantly different ($p < 0.05$).

3.3. Rural–urban differences in providers sought for treatment of malaria from household survey

The most common sources of treatment for adult and childhood malaria in both urban and rural area were patent medicine dealers and private hospitals. The public hospitals were used for the treatment of malaria in 11.4% and 10% cases of adult and childhood malaria respectively in both urban and rural areas Table 2 shows that urbanites used more of hospitals (public and private) compared to rural dwellers that used primary healthcare (PHC) centres and drug sellers more. These differences were statistically significantly different ($p < 0.05$). The incidence of not seeking for care at all was more in the rural area ($p < 0.05$).

Table 2
Rural–urban differences in providers sought for treatment of malaria.

	Home *n* (%)	Private hospital *n* (%)	Public hospital *n* (%)	PHC *n* (%)	PMD *n* (%)	Pharmacy *n* (%)	Traditional *n* (%)	No care *n* (%)	Others *n* (%)	Total
Adults										
Rural	38 (6.1)	130 (21.0)	54 (8.7)	39 (6.3)	203 (32.8)	70 (11.3)	53 (8.6)	19 (3.1)	13 (2.1)	619
Urban	55 (8.3)	169 (25.4)	93 (14.0)	14 (2.1)	195 (29.3)	75 (11.3)	48 (7.2)	9 (1.4)	8 (1.2)	666
Equity (R:U ratio	0.73	0.85	0.83	0	2	1.00	1.19	2.21	1.75	
Chi-square (*p*-value)	1.7 (0.20)	2.5 (0.12)	7.5 (0.006)*	15.2 (<0.001)*	3.1 (0.078	0.06 (0.81)	1.20 (0.27)	4.7 (0.024)*	1.8 (0.18)	
Children										
Rural	12 (5.8)	48 (23.0)	13 (6.2)	23 (11.0)	71 (34)	29 (14.0)	4 (1.9)	7 (3.3)	2 (1.0)	209
Urban	28 (8.4)	123 (37.0)	44 (13.2)	23 (6.9)	91 (27.3)	17 (5.1) 2.75	2 (0.6)	2 (0.6)	3 (0.9)	333
Equity (R:U ratio	0.70	0.63	0.47	1.6	1.25	13.1 (<0.0001)*	3.17	5.50	1.11	
Chi-square (*p*-value)	1.2 (0.18)	11.0 (0.001)*	6.4 (0.007)*	2.9 (0.06)*	3.0 (0.05)		2.1 (0.16)	5.8 (0.02)*	0.01 (0.63)	

*$p < 0.05$.

Table 3
R/U differences in specific provider that prescribed treatment of malaria.

	Doctor	Nurse	Medical assistants	Pharmacist	Traditional medicine	Others	Total
Rural	184 (30.6)	71 (11.8)	45 (7.5)	71 (11.8)	45 (7.5)	185 (30.7)	601
Urban	287 (43.0)	59 (8.9)	34 (5.1)	62 (9.3)	49 (7.4)	175 (26.3)	666
Equity (R:U ratio	0.71	1.33	1.47	1.27	1.01	1.18	
Chi-square (p-value)	19.9 (<0.0001)*	3.2 (0.046)	3.2 (0.048)	2.2 (0.08)	0.01 (0.49)	3.5 (0.035)*	

*$p < 0.05$.

It is seen that the rural dwellers were less likely to have utilised the services of medium/high level formal providers such as private and public hospitals compared to the urbanites. It was found that the rural dwellers consumed more of services of low-level providers such as patent medicine dealers (PMD) and PHC centres in addition to the pharmacies. The urbanites (42.7%) compared to the rural dwellers (30.6%) were more likely to be treated by medical doctors ($p < 0.05$) and pharmacists. Conversely, nurses and medical assistants prescribed more treatment in rural areas (11.8% and 7.5% respectively), compared to the urban area (8.9% and 5.1% respectively) (Table 3). Others in Table 3 refer to senior community health extension workers (SCHEW), and junior community health extension workers (JCHEW), midwives, pharmacy technicians, shopkeepers, pharmacy assistants, community health officers and laboratory technicians.

3.4. Rural–urban differences in the type of antimalarial consumed

There was a statistically significant difference between urban and rural respondents in the consumption of antimalarials ($p < 0.05$). The urbanites consumed more chloroquine and quinine tablets than rural dwellers. They also consumed more of SP for adult malaria. There were few cases of consumption of both artemisinin monotherapy (AMT) and artemisinin-based combination therapy, but the consumption of ACTs for both adult and childhood malaria was more in the urban area (Table 4).

3.5. Rural–urban differences in preferences for improved treatment of malaria

Improved malaria treatment services through the public hospitals was the best intervention that majority of the respondents stated that could be used to improve the treatment of malaria. This was followed closely by training of mothers and improved PHC centres. However, apart from use of herbalists which was statistically significantly preferred by the rural dwellers, other preferences were quite similar between the urbanites and the rural dwellers (Table 5).

4. Discussion

There were geographic inequities among the rural and urban areas. The urbanites used public hospitals and private hospitals and clinics more frequently, while rural dwellers often patronized drug sellers. Additionally, urbanites consumed more of ACTs. Urban dwellers patronized healthcare providers that rendered more complete diagnostic services and clinical examination (hospitals and clinics), while the rural dwellers were more likely to use traditional medicine healers, patent medicine dealers and community health workers because of their low cost, even though these health care providers are likely to offer low quality treatment [8,10,11]. The use of appropriate antimalarials was generally low in both urban and rural dwellers but particularly poor among rural dwellers. Similarly, another study found that in five rural communities in Nigeria, the antimalarial drugs bought were often wrongly used [12].

Health seeking behaviour was very poor among rural dwellers and such inequities should inform the design of programmes aimed at reducing the overall burden of the disease [13], and, even with fee exemption, the cost of transportation to the health facility may pose difficulties [14]. The consumption of effective drugs, such as artemisinin-based combination therapy, by the urbanites leaves much to be desired in the current effort towards efficient malaria treatment services. Nigeria, like other African countries, has recently adopted the use of ACTs as the first line drug for the treatment of uncomplicated malaria. The cost of effective malaria drug is still beyond the reach of many rural dwellers, where the poor mostly reside. This may have necessitated the continuous use of low cost, low-level and relatively inefficient drugs for malaria treatment [15,16].

Current efforts to provide malaria treatment services do not address geographic inequities in service delivery. Considering that the quality of care received poses a concern [17], the government must, as a matter of priority and importance, provide continuous training for lower level health cadres and informal providers to improve the level of care they provide. It is also important they ensure a workable intervention strategy to guarantee coverage and access to malaria treatment services irrespective of geographic location of the consumers, especially as majority of the respondents preferred to receive treatment through improved public facilities.

As has been shown in this study, important urban–rural geographic differentials exist in access to malaria interventions, increasing the vulnerability of the rural dwellers to consuming inappropriate treatment which is likely to worsen their disease burden. For instance, the pattern of drug use that was found in this study has equity implications for appropriate treatment of malaria in Anambra state and even Nigeria because the two main failing drugs were used more by rural dwellers. Also, the low-level providers

Table 4
Rural–urban differences in consumed antimalarial drugs.

	AMT *n* (%)	CQ tab *n* (%)	Antibiotics *n* (%)	SP *n* (%)	Quinine *n* (%)	ACT *n* (%)	Herb *n* (%)	Others *n* (%)	Total
Adults									
Rural	18 (2.3)	128 (16.3)	27 (3.4)	153 (19.5)	9 (1.1)	3 (0.4)	54 (6.9)	393 (50.1)	785
Urban	28 (3.0)	166 (17.6)	32 (3.4)	213 (22.6)	11 (1.2)	20 (2.1)	55 (5.8)	417 (44.3)	942
Equity (R:U) ratio	0.77	0.93	1.0	0.86	0.92	0.19	1.19	1.13	
Chi-square (*p*-value)	1.1 (0.19)	1.4 (0.23)	0.02 (0.90)	4.8 (0.029)*	0.02 (0.89)	10.6 (0.001)*	0.42 (0.52)	4.1 (0.044)*	
Children									
Rural	9 (3.5)	54 (21.0)	15 (5.8)	39 (15.2)	3 (1.2)	0 (0)	4 (1.6)	133 (51.8)	257
Urban	17 (3.4)	129 (25.8)	30 (6.0)	52 (10.4)	20 (4.0)	11 (2.2)	2 (0.4)	238 (74.4)	499
Equity (R:U) ratio	1.03	0.81	1.0	1.46	0.30	0	4.0	1.09	
Chi-square (*p*-value)	0.10 (0.47)	7.7 (0.003)*	0.38 (0.33)	1.3 (0.15)	6.2 (0.008)*	6.8 (0.005)*	2.2 (0.15)	1.6 (0.12)	

3 (0.37%) and 18 (1.21%) in rural and urban areas respectively. Chi-square = 4.05 and *p*-value is 0.04.
Note: AMT, artemisinin-based monotherapy; CQ, chloroquine; SP, sulfadoxine-pyrimethamine.

Table 5
R/U differences in household preferences of healthcare providers for treating malaria.

	CHW *n* (%)	PHC *n* (%)	Public hospital*n* (%)	Train mothers*n* (%)	Pharmacy *n* (%)	Herbalists *n* (%)	Private hospital*n* (%)	Others *n* (%)	Total
Rural	142 (8.2)	207 (12.0)	399 (23.1)	232 (13.4)	549 (31.8)	77 (4.5)	115 (6.7)	7 (0.4)	1728
Urban	165 (13.2)	244 (19.5)	362 (28.9)	242 (19.3) 0.69	50 (4.0)	44 (3.5)	140 (11.2) 0.6	7 (0.6)	1254
Equity (R:U) ratio	0.63	0.62	0.80	0.09 (0.76)	8.0	1.39	2.3 (0.13)	0.7	
Chi-square (*p*-value	1.6 (0.21)	3.0 (0.086)	3.6 (0.059)		0.24 (0.63)	10.0 (0.002)*		0.001 (0.98)	

*$p < 0.05$.

with low quality of services were also significantly and predominantly used more by the rural dwellers. These findings infer that the rural dwellers received lowest quality of treatment from all ramifications and urgent interventions should be developed and implemented so as to remedy this inequity. This may include the training of drug sellers that bound in the rural areas, which was effectively undertaken in Kenya [18].

The fact that geographic inequities in malaria treatment are skewed against the rural people requires interventions to correct the imbalance. The proximity to the orthodox health facility affects the cost of transportation and more importantly the cost of time. In order to improve timeliness of treatment, the service consequently would have to be brought closer to patients, especially those in the remote areas, regularly [19]. Hence, pro-rural malaria treatment service provision strategies are needed to ensure equitable access to malaria treatment services especially ACT. These may include improving the availability and quality of services available to rural dwellers, use of instalment and pre-payment methods and fee exemptions and deference so as to encourage people to seek healthcare from health centres, hospitals and other formal healthcare providers, where quality of services is acceptable.

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