Malaria Treatment Patterns among Patent Medicine Vendors in Obio-Akpor Local Government Area of Rivers State, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. All authors contributed to the study concept and design. Authors EOA, KKE, PN, OI and OE wrote the protocol, managed the data collection, entry and analysis. Authors ECO and OOE managed the literature searches. Authors EOA, ECO and OOE wrote the first draft. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Aims: Patent medicine vendors are patronized by people from all segments of the community because they are perceived to be more accessible, caring, and less expensive than public health facilities. However, cases of poor drug prescription and treatment patterns have been reported and have resulted in injudicious use of drugs and drug resistance. This study investigated the treatment patterns of malaria by Patent Medicine Vendors in Obio/Akpor LGA, Rivers State.
Study Design: A descriptive cross-sectional study.
Place and Duration of Study: Obio/Akpor Local Government Area of Rivers State in November 2011.
Methodology: Systematic random sampling method was adopted to select 100 patent medicine vendors from 10 communities in Obio/Akpor Local Government Area. Data was collected using a

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pretested interviewer-administered semi-structured questionnaire and was entered into an excel sheet and analyzed using the Statistical Package for Social Sciences (SPSS) version 16.0.

Results: Respondents were aged 20 to 70 years. There were more females 57 (58.8%) than males 40 (41.2%). The study showed that most of the patent medicine vendors (70.1%) in treating malaria, did not confirm their diagnosis with laboratory tests. More than half of the respondents (67%) knew the World Health Organization's recommended antimalarial drugs and dosages. Fifty one percent of the respondents used the recommended drugs as their first line drug of treatment for malaria.

Conclusion: Patent medicine vendors in Obio/Akpor LGA have considerable knowledge of the recommended treatment for malaria. However, there is still the need for them to be trained on correct prescription patterns.

1. INTRODUCTION

Malaria a public health problem that leads to over 60% of outpatient visits in Nigeria and other Sub-Saharan African countries, places a huge financial strain on the affected countries, and is a major cause of morbidity and mortality in Nigeria especially among children, pregnant women and susceptible individuals [1-3]. The World Health Organization (WHO) pushed for artemether + lumefantrine, artesunate + amodiaquine and artesunate + mefloquine combinations as the drugs of choice for malaria treatment in tropical African countries because of the emergence of resistance to the previous drugs of choice chloroquine and sulphadoxine-pyrimethamine. The new WHO guideline also stipulated a laboratory confirmation of malaria diagnosis before treatment to reduce the early emergence of resistance to these novel drugs because a recent history of fever was used in the past as a basis for the diagnosis of malaria in places with stable malaria or high transmission like Nigeria where antimalarials were prescribed for empirical treatment of malaria without confirming the diagnosis by laboratory investigations. Thus Nigeria, in 2005, changed its National Guidelines for the treatment of uncomplicated malaria to artemisinin based combination therapy (ACT) which consists of the use of an artemisinin derivative and another effective antimalarial drug [4-6]. Patent Medicine Vendors (PMV) are a large group of informal private health providers in many countries who operate as shop keepers, traders in periodic markets, itinerant drug peddlers, and wholesale drug merchants who are patronized by people from all segments of the community especially the poor since they are perceived to be more accessible, caring, and affordable than public health facilities. They are a source of drugs, advice, and treatment for illnesses in many communities and have no formal pharmacy training but are licensed to sell proprietary and over-the-counter drugs although many of their practices have been reported to be substandard [7-11]. There is little or no collaboration between PMVs and government bodies in terms of exchange of information to improve management of malaria [12]. Common problems arising from improper prescription patterns of antimalarials and treatment include: development of drug resistance to antimalarials, relapses due to poor treatment, injudicious use of antimalarial drugs (drug abuse) and wrong drug usage.

Proper treatment of malaria by Patent Medicine Vendors is therefore so essential in overcoming the malaria threat in our environment owing to the fact that up to 15%–82% of caregivers in the sub-Saharan African region make PMVs their first point of call for the treatment of their sick, hence it becomes imperative that the latter be included in programs for malaria control. They have proved to be a predominant source of antipyretic and antimalarial drugs in both urban and rural areas of sub-Saharan Africa with their reach extending to children, adults and people of different socioeconomic groups. For example, on the coast of Kenya, medicines bought from shops were the first used, or exclusively used, in 69% of childhood fevers treated; in rural Tanzania, 39% of the total antimalarials made available in the community were provided by PMVs [9,13-15]; in a survey in three rural communities in Nigeria, Oladepo O et al. [16] found that PMVs constituted the primary providers of malaria treatment (39%) overall and were the first choice of antimalarials for 49% of under-five children while they were the commonest source of malaria treatment (36%) in urban Lagos; furthermore, a study in Edo State reported that 44% utilized medicine shops for the treatment of malaria in children [17].

Studies have shown that knowledge of drugs and their doses is poor among medicine sellers as seen with retailers in rural Tanzania who had adequate knowledge of symptoms and signs of malaria, but 90% lacked knowledge of the pediatric chloroquine doses; in Nigeria, only 1 out of 49 medicine sellers could tell the chloroquine dose appropriate for a three-year-old while 95% erroneously thought that artesunate alone is an ACT. Also, just 4% of children treated with chloroquine obtained from a store received the correct dose as seen in a baseline survey conducted in Kenya, [8,18,19] while the study in three regions of Nigeria revealed that less than a quarter of all PMVs interviewed were wary of the change in recommended antimalarials yet they endorsed and dispensed drugs with doubtful efficacy as 92% and 72% of shops had in stock sulfadoxine-pyrimethamine and chloroquine respectively (both not recommended), whereas only 9% had ACTs [16,20].

Before dispensing medications, PMVs hardly ask questions concerning the illness and antimalarial drugs with low quality have been seen in the private market through laboratory testing. For example, of samples collected from unlawful outlets in urban and rural areas of Cameroon, 12% of anti-folates (including SP), 38% of chloroquine, and 74% of quinine samples either did not have an active ingredient, had an insufficient amount of active ingredient, and contained the wrong ingredient or an unknown ingredient [21,22].

The objective of this study was to evaluate the malaria treatment patterns of PMVs in Obio/Akpor LGA for conformity to WHO's recommendations, assess their knowledge of the use of antimalarials and the availability of WHO's recommended antimalarial drugs.

2. METHODOLOGY

2.1 Study Area

This study was conducted in Obio/Akpor LGA of Rivers State, one of the 36 states in Nigeria with an estimated population of 5 million (2012) [23]. Its capital is Port Harcourt and it has 23 Local Government Areas with Obio/Akpor Local Government Area (having 42 communities) being one of the major centers of economic activities in Nigeria and also one of the major cities of the Niger Delta with a population of 464,789 made up mostly of farmers, civil servants, and business men and women. It has its headquarters at Rumuodomaya.

2.2 Study Population

The study population consisted of PMVs in Obio/Akpor LGA of Rivers State, where there were 373 PMVs at the time of the study. All Patent Medicine Vendors located in Obio/Akpor LGA of Rivers State were included while hospitals, pharmacies and health centers were excluded in the study.

2.3 Study Design and Sample Size Determination

This was a descriptive cross-sectional study. Sample size of 100 PMV's in Obio Akpor LGA was calculated from a prevalence rate of 39% (19) and the margin of sampling error tolerated was set at 10% at 95% confidence Interval and a non-response rate of 10%.

2.4 Sampling Technique

Ten communities were selected by simple random sampling from the 42 communities in Obio/Akpor LGA. Thereafter ten PMVs were selected from each of the 10 communities by a systematic random sampling method, where the first PMV was randomly selected and every third PMV was selected until a sample size of ten was completed for each of the ten communities that were selected, making a total of 100 PMVs for the study.

2.5 Study Instruments

An interviewer-administered semi-structured questionnaire was used and it was divided into four sections. Section one consisted of the socio demographic characteristics of the PMVs, section two consisted of questions on malaria treatment practice by PMVs, section three was on the source and quality of drugs for PMVs, and section four was on the knowledge of WHO recommended antimalarial drugs. The questionnaire was pretested in Aluu community in Ikwerre LGA of Rivers State and corrections were made to ensure its reliability.

2.6 Data Analysis

Data was entered into an Excel sheet and analyzed using Statistical Package for Social Sciences (SSPS) version 16.

3. RESULTS AND DISCUSSION

One hundred questionnaires were administered to Patent Medicine Vendors in Obio/Akpor LGA, ninety-seven of them were completed, reflecting a response rate of 97%.

3.1 Socio-demographic Characteristics of Respondents

Thirty two (33%) of the respondents were between the ages 20 and 30 while 40 (41%) were between 31 and 40 years, there were more females 57 (58.8%) than males 40 (41.2%), while a little more than half of them had attended secondary school 58 (59.8%), 28 (28.8%) had tertiary education and 11(11.3%) had only primary education (Table 1).

Table 1. Socio-demographic characteristics of respondents

Characteristic	Frequency (n=97)	Percentage (%)
Gender		
Male	40	41.2
Female	57	58.8
Age		
21-30	32	33
31-40	40	41
41-50	14	14
51-60	9	9
61-70	2	2
Education		
Primary	11	11.3
Secondary	58	59.8
Tertiary	28	28.8

3.2 Common Symptoms of Malaria Presented to Patent Medicine Vendors

Of the common malaria symptoms presented to the patent medicine sellers, fever was found to be the most (19.6%) easily identified, followed by headache (18.9%), the least were pruritus and diarrhea which were 2.2% and 1.5% respectively (Table 2).

3.3 Laboratory Confirmation of Malaria by PMVs

From the results, only 4.1%(4) of the total respondents carried out laboratory tests always, 20.6% (20) carried out laboratory tests occasionally, while 5.2%(5) of the respondents did a laboratory test after a failed first treatment and 70.1%(68) of the respondents did no laboratory test (Fig. 1).

3.4 Drugs Used for the Treatment of Malaria

The study showed that a little more than half of the medicine vendors used artemisinin based combination therapy 49(50.5%) as a 1st choice anti-malarial drug, this was followed by artesunate monotherapy 25(25.8%) and pyrimethamine/sulphadoxine 15(15.5%). Other antimalarial drugs used as first choice were amodiaquine 3(3.1%), halofantrine 3(3.1%) and chloroquine 2(2%) . A majority of the PMVs used artesunate monotherapy 32 (33%) as 2nd choice antimalarial drug, 29 (30%) used pyrimethamine/ sulphadoxine, 12 (12.4%) used amodiaquine and 11 (11.3%) used ACTs. The other drugs used as 2nd choice were chloroquine 4(4.1%), halofantrine 5(5.2%), quine 1(1%), mefloquine 1(1%) and a combination of mefloquine and Pyrimethamine/sulphadoxine 2(2%). Pyrimethamine/sulphadoxine 26,(27%) also known as fansidar was the most used 3rd choice drug and this was closely followed by artesunate monotherapy 15(15.5%) and amodiaquine (15, 15.5%). Only 12 (12.3%) used the ACTs as third line drugs. Other drugs used for malaria treatment were chloroquine 8(8.2%), halofantrine 7(7.2%), quine 6(6.2%), mefloquine, Pyrimethamine / sulphadoxine 4(4.1%) Pyrimethamine / sulphamethoxazole 1(1%), trimethoprim / sulphadoxine 1(1%)and mefloquine 1(1%). However only one respondent (1%) used antibiotics as a 3rd line drug of treatment (Fig. 2).

Table 2. Symptoms of malaria presented to patent medicine vendors

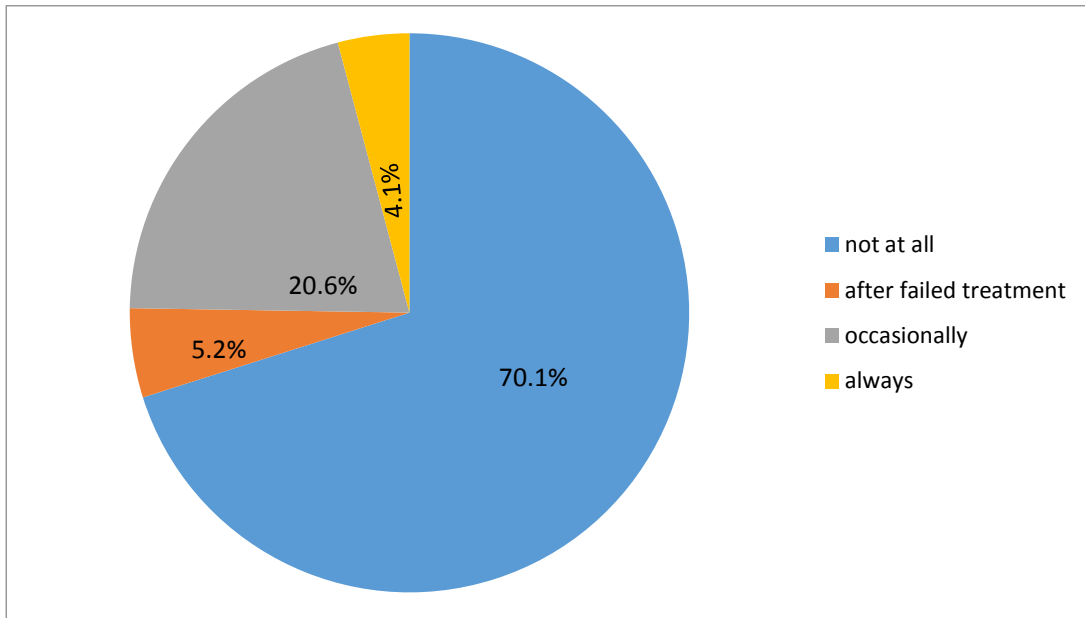| Symptom	Frequency (N=97)	Percentage (%)
Fever	91	93.8
Headache	88	90.7
General body pain	67	69.1
Chills and rigors	48	49.4
Vomiting	45	46.3
Cough	42	43.2
Stuffy/running nose	40	41.2
Abdominal pains or cramps	15	15.4
Others (weakness, dizziness, joint pain loss of appetite made up)	12	12.3
Pruritus	10	10.3
Diarrhoea	7	7.2

(Multiple responses)

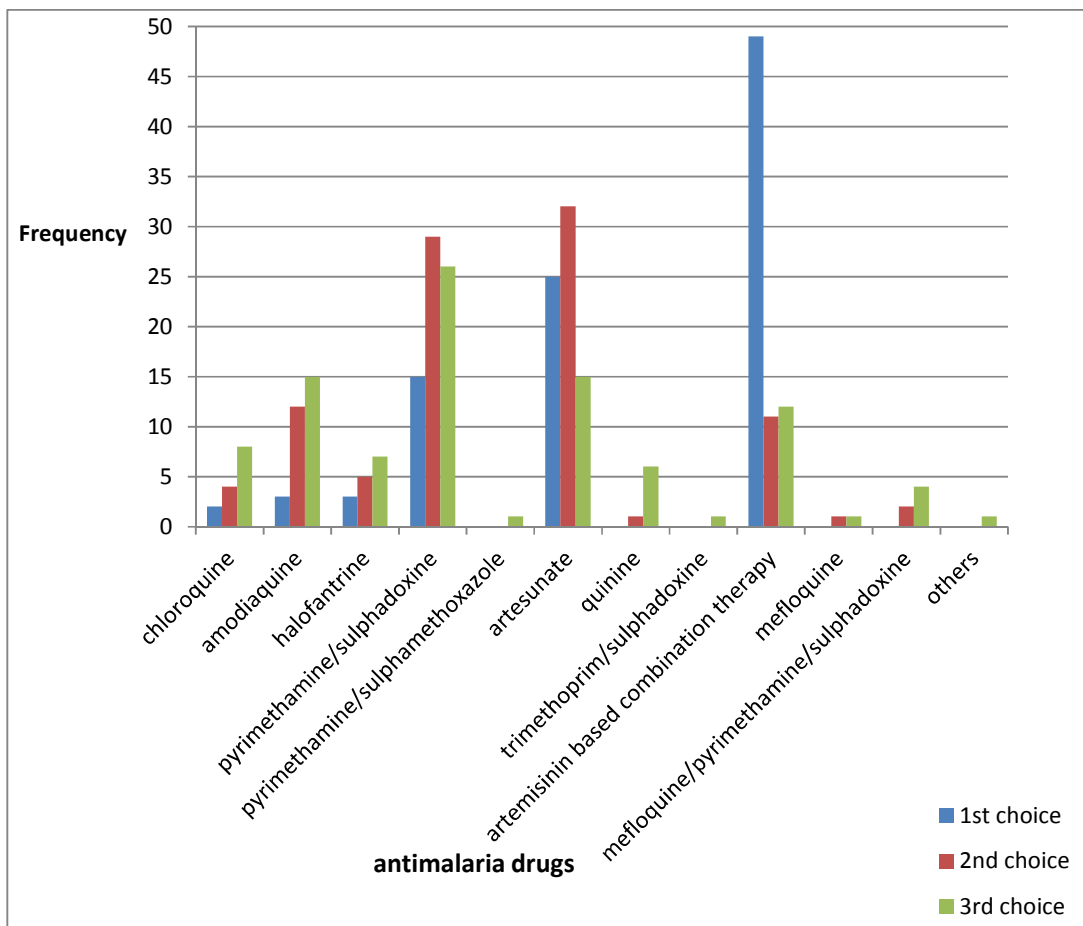**Fig. 1. Respondents that carried out laboratory investigations**

Fig. 2. Drugs used for the treatment of malaria

3.5 Source of Anti-malarial Drugs for Patent Medicine Vendors

Thirty three (34%) of the respondents bought their antimalarial drugs from the open market, 25 (25.8%) of the respondents bought from manufacturers/distributors, and 39 (40.2%) bought from both sources (Table 3).

Table 3. Sources of anti-malarial drugs for patent medicine vendors

Source	Frequency (N=97)	Percentage (%)
Open market	33	34
Manufacturer/ distributors	25	25.8
Both	39	40.2

3.6 Quality of Anti-malarial Drugs for the Patent Medicine Vendors

When asked how they identified good quality medicine, 38 (39.2%) of the respondents said they used the National Agency for Food Drug Administration and Control (NAFDAC) registration number, 22 (22.7%) of the respondents used the Expiry date, while 16(16.5%) of the respondents used the Brand name. Other ways used by the respondents were high cost and recommendation by a reputable doctor/ pharmacist (Table 4).

Table 4. Methods used by patent medicine vendors in identifying quality drugs

Method	Frequency (N=97)	Percentage (%)
NAFDAC registration number	38	39.2
Brand name	16	16.5
High cost	10	10.3
Recommended by a reputable doctor/ pharmacist	9	9.3
Expiry date	22	22.7
Others (taste of drug, odour of drug, etc)	2	2

3.7 Knowledge of the World Health Organization's Recommended Anti-malarial Drugs

Seventy three (75%) of the respondents were aware of the WHO recommended drugs, while 24(24.7%) were not aware; 65(67%) knew the recommended dosage of drugs, while 32(32.9%) did not know the recommended dosage; 69 (71%) had the recommended drugs always available in their stock, while 28 (29%) did not have the recommended drugs in their stock always; and 63(65%) of the respondents preferred specific drug combinations, while 34(35%) had no such preference for specific drug combinations (Table 5).

Table 5. Knowledge of the WHO recommended anti-malarial drugs, dosage and availability among PMVs

Awareness of WHO recommended anti-malarial	Frequency (N=97)	Percentage (%)
Aware	73	75.3
Not aware	24	24.7
Awareness of recommended dosage		
Aware	65	67
Not aware	32	32.9
Availability of WHO recommended drugs		
Available	69	71.7
Not available	28	28.9

Results from our study showed that most PMVs in Obio/Akpor LGA were females with the vast majority having at least secondary level of education. Most of the respondents were between the ages of 31 to 40 years which is similar to a study done by Oladepo O, et al. [16], on the role of patent medicine vendors in the treatment of malaria in three regions of Nigeria [20].

Most of the PMVs could identify the common malaria symptoms presented by their customers, with fever being the most common 91 (93.8%) symptom identified which was similar to the study by Foster S [24], on the Treatment of malaria outside the formal health services. This could be attributed to the fact that most of the PMVs had some form of education with 58.8% of PMVs having had at least a secondary level of education; this was comparable to a report by Asuzu et al. [25], where 69% of the PMVs attended secondary school.

From our study, we found out that most of the PMVs did not confirm their diagnosis with a laboratory test and this showed that most of them depended solely on the common symptoms of malaria such as fever, headache, chills and rigors, body pains, and others for malaria diagnosis and treatment. Although malaria is

endemic in Nigeria, these are unconstitutional symptoms as they can be found in other disease conditions and thus depending solely on these symptoms could lead to wrong diagnosis and abuse of malaria drugs. This finding is in sharp contrast to the current WHO guideline on malaria treatment which requires laboratory confirmation of malaria to reduce the abuse of antimalarial drugs and development of resistance to the recently introduced artemisinin based combination antimalarial drugs [6,26].

Since PMVs provide antimalarial treatment in a substantial proportion of cases in our environment, their knowledge and practice strongly influence people's wellbeing. Our study made some major findings about their knowledge and use of antimalarial drugs: for 1st line drugs, a little more than half of the patent medicine sellers used artemesinin based combination therapy 49 (50.5%); for 2nd line drugs, artesunate was the most commonly used, while pyrimethamine / sulphadoxine was the commonly used 3rd line drug.

From our study it could be seen that many of the PMVs used the recommended artemisinin based combination therapy for malaria treatment, this was in sharp contrast to a study done by Theodora A, et al. [27], on PMVs' perspective on malaria in a rural Nigerian community, where most of them used unconventional drugs such as Chloroquine, halofantrine, sulphadoxine/ pyrimethamine and others for malaria treatment. This may be due to the fact that our study was carried out in an urban area which had increased awareness of the recommended drug of treatment for malaria through the influence of the media and health personnel. Despite this laudable result, many of the PMVs still used drugs such as fansidar whose efficacy is in doubt, artesunate monotherapy, chloroquine that has a high level of drug resistance, halofantrine, a cardiotoxic drug that has been banned in many countries and others for malaria treatment. This showed that many of the vendors had little knowledge of the changing patterns of drug resistance and the consequent changes to the drugs that are effective where continued usage of these non-recommended drugs will undermine the therapeutic efficacy and may promote the emergence and further spread of drug resistance to the more potent and effective artemisinin based combination drugs which is a major threat to the fight against malaria. Also ascribed to the continued usage of these non-recommended drugs was the high cost of the artemisinin based combination therapy and misconceptions about the combination therapy such as tendency to cause reactions and over dosage.

In our study, many of the PMVs bought their drugs from the open market 33(34%), while 25(25.8%) of the vendors bought from manufacturer/distributors and 39(40.2%) from both sources. This finding was similar to a study done by Osamor (2001) on the knowledge and selling practice of PMVs regarding the treatment of malaria in Idikan Community, Ibadan, Oyo State, where 51% of the patent medicine sellers bought their medicine from the open market, and 12% from manufacturers/distributors while 36% bought from both sources [13]. This could be because of the ease of access to the open market by the PMVs and the option of bargaining for a fair price of the drugs. This has also led to the increasing levels of substandard drugs commonly seen in the open market and thus in PMV shops.

When asked how they identified good quality drugs, 38(39.2%) of the respondents used NAFDAC registration numbers, 22(22.7%) used expiry dates, while 16(16.5%) used major brand names. Other ways used by the respondents were cost, and recommendation by a reputable doctor/ pharmacist. The high prevalence of fake and substandard drugs in the Nigerian market has been a major concern both to the government and individuals as this has led to a rise in drug resistance, adverse body reactions and in extreme cases, death of the consumers of such drugs. Thus proper identification of these sub-standard drugs is necessary in the fight against malaria. This high prevalence of fake drugs may be secondary to greed and sometimes ignorance on the part of the marketers and also the patent medicine sellers.

The study also showed that about a quarter of the PMVs 24(24.7%) were not aware of WHO's recommended antimalarial drugs although 65(67%) of them knew the recommended dosages and 69(71%) had the recommended drugs in their stock. This lack of awareness of the recommended drugs will greatly influence the treatment pattern of malaria by the patent medicine vendors and therefore will lead to improper treatment arising from wrong drugs, over dosage, under dosage, etc.

4. CONCLUSION

From our study in Obio/Akpor LGA, the PMVs had a considerably better treatment pattern as compared to other studies carried out in Nigeria.

These findings provide areas for intervention to equitably improve the quality of malaria treatment services by PMVs, since they are the most common providers of malaria treatment. Thus more still needs to be done about the attitude of the PMVs to malaria treatment in Obio/Akpor LGA. We therefore recommend that PMVs be updated on malaria treatment through periodic training to enable them provide correct and full therapy for malaria; provision of better product description by pharmaceutical companies, provision of some simple technology for testing drugs or scanning products to eliminate substandard drugs and that the price of ACTs be subsidized to increase their utilization and reduce the use of monotherapy, thus preventing resistance.

CONSENT

Informed consent was obtained from the participants prior to administering the questionnaires and the objectives of the study were clearly explained. Cconfidentiality of the information gotten from the respondents was ensured by not asking for their names or shop locations and numbers.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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