SHORT COMMUNICATION

Assessment of quality of chloroquine tablets sold by drug vendors in Abeokuta, Nigeria

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The control of malaria has been a major pre-occupation of man for many years. In Nigeria, malaria is holoendemic implying an all year round malaria transmission (Bruce-Chwatt, 1983) with greater intensity in the wet than the dry seasons and about 50% of the population experiencing at least one episode of malaria each year. Various measures have been put in place to reduce the scourge of malaria. One of such measures is to improve access to prompt and effective treatment and home care, which, is one of the strategies of the Roll Back Malaria (WHO, 2000). In many developing countries self-medication is a common practice (Erhun & Abayomi, 2002). This indiscriminate purchase of antimalarials from unofficial drug vendors whose drug is of doubtful quality may be a major set back for malaria control.

In Nigeria, chloroquine (CQ) is widely used in the treatment of malaria and is considered as a first line drug in treating malaria during pregnancy. The circulation of counterfeit chloroquine has been known to contribute to its resistance (Marsh *et al.*, 1999) and invariably to treatment failure thereby giving rise to the morbidity and mortality associated with malaria. Despite the efforts of the National Agency for Food and Drug Administration and Control (NAFDAC) in Nigeria, drug vendors are still circulating drugs of questionable quality. This study, therefore aimed at assessing the quality of CQ tablets sold and administered by drug vendors in Abeokuta, Nigeria.

were administered to drug vendors to obtain demographic information and assess their knowledge of malaria treatment. Questionnaires were also administered to members of the community whom buy drugs from them. Physical appearance of the tablets was examined prior to chemical analysis. Qualitative and quantitative analyses were then carried out on the tablets using colorimetry methods as described by Rogers *et al.* (1998) and Gaderton (1993). Level of significance was tested at 95% confidence level using Epi Info version 6.

Eighty percent of the drug vendors were females (age= 6–35 years) and with secondary school education (82%). Most (92.6%) of the vendors sold CQ tablets while the remaining sold various brands of sulfadoxine-pyrimethamine (SP). Seventy-two percent of the respondents were full-time vendors while 28% were into other businesses. Quality assessment of the CQ tablets purchased from the drug vendors revealed that 6% lacked the active ingredient (fake) while 32% did not contain the right quality of the active ingredients (substandard), the remaining 62% were genuine and standard.

The vendors prescribed CQ tablets differently, 84% of them gave wrong prescription to their customers while only 16% prescribed CQ correctly. It was however, observed that 50% of the correctly prescribed CQ were fake and/or substandard (Table 1) implying that only 8% of the vendors were actually

Table 1: Quality of CQ in relation to physical appearance of tablets and location of purchase

Variable	No. of fake.substandard(%)	No. of standard (%)	Total
Physical Apperance			
Smooth Tables	16 (39.0)	25 (61.0)	41
Rought Tables	3 (33.3)	6 (66.7)	9
Location			
Urban	18 (69.0)	8 (31.0)	26
Rural	13 (54.2)	11 (45.8)	24

The drug vendors were seen in market places, mechanic workshops, motor parks and some rural communities. Samples of CQ tablets were purchased from them for laboratory analysis. Questionnaires

treating malaria with standard CQ and with the right dosage.

The physical appearance of the CQ tablets was observed not to have direct effect on the quality of the

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drug since a higher percentage of the rough tablets were standard compared to the smooth tablet. The difference was not statistically significant ($P>0.05$). Drug vendors with primary education sold more of substandard drugs than the more educated ones (Table 2). Education also influenced positively the knowledge of CQ dosage.

Vendors with ≥ 5 years (72.7%) of experience in drug hawking business sold more of good quality drugs than those with < 5 years (53.6%) of experience, but the difference was not significant ($P>0.05$). Experience did not have a positive influence on knowledge of CQ dosage for malaria treatment. Field observations revealed that all the prescriptions given by the vendors were with overdose of antipyretic drugs such as paracetamol, ibuprofen and aspirin.

Table 2: Quality of CQ sold and prescription administered in relation to education level of the vendors

Variable	Primary Education N (%)	Secondary Education N (%)	Tertiary Education N (%)	Total N (%)
Quality of CQ				
fake I Standard	2 (40.0)	15 (36.6)	2 (50.0)	19 (38.0)
Standard	3 (60.0)	26 (63.4)	2 (50.0)	31 (62.0)
Dosage				
Correct dosage	0 (0)	7 (17.1)	1 (25.0)	8 (16.0)
Incorrect dosage	5 (100)	34 (82.9)	3 (75.0)	42 (84.0)
Total	**5 (10.0)**	**41 (82.0)**	**4 (8.0)**	**50**

Reason for patronage of drug vendors included availability of credit facilities, lack of functional health centres, affordability of vendors' drugs, effectiveness of their drugs and their closeness to the people.

The result obtained in this study indicates that fake/substandard CQ tablets are in circulation in Abeokuta, Nigeria. Although the vendors sold more of standard CQ tablets the poor prescription of dosage recorded in this study imply inadequate malaria treatment, which will invariably contribute to CQ resistance and malaria treatment failure in Abeokuta. Poor handling and storage may have affected the physical appearance of the CQ tablets and may have also contributed to the deterioration of some of the CQ tablets recorded in this study, hence may not be totally attributed to poor manufacturing practice. Ballereau (1997) observed that CQ stored under tropical conditions loses about 10% of its quality.

Education may have been a positive influence on the activities of the drug vendors although the negative effect of long hawking experience on dosage may be as a result of change in treatment policy involving the increase in number of tablets to be taken for malaria treatment. Poverty and ignorance may be the reason for patronage of drug vendors. The overdose of the antipyretic drugs may have been the reason the treatments given by drug vendors were considered effective. In conclusion, for the effective control of malaria in Abeokuta and many other parts of Nigeria, the activities of drug vendors need to be moderated and monitored by health officials, and appropriate education be provided to both the drug vendors and the community at large.

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