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**Enhancing Treatment Compliance  
in the Home Management of Childhood Malaria:  
The Use of a Participatory Approach  
in Ensuring Intervention Appropriateness**

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some of the best ways of achieving intervention effectiveness. It also revealed that treatments with tablets predispose to higher compliance rates than syrups. Public participation in the diagnosis of management problems and proffering of interventions has shifted the role of researchers from interventionists to a supportive role of these populations. This strategy can save cost and ensure the permanence of interventions beyond the lifespan of the research.

## INTRODUCTION

Malaria remains one of the most serious public health problems in numerous countries of the world, especially in developing countries. Malaria serves as one of the main etiological factors responsible for more than half of the children in developing countries who suffer from anemia as well as a major cause of childhood deaths. In Sub-Saharan Africa, an increase in hospital admission as well as the use of traditional health services are a result of the significant burden exerted by malaria on health facilities [1].

Mothers are particularly the first in the home to recognize fever in children as well as seek pathways for first treatment [2]. More women are supporting the use of modern medical treatment in preference to traditional methods [3]. The different pathways identified in the treatment-seeking behavior of mothers and other caregivers include patent medicine sellers, modern health facilities, as well as traditional or herbal homes. The use of modern drugs for malaria treatment is, however, very high [4]; traditional drugs are used either as a first line drug or resorted to as alternatives when modern drugs fail to cure the disease.

The strategy for reduction of malaria morbidity and mortality has shifted from malaria eradication to malaria control [5]. One of the major strategies is prompt access to effective anti-malarial treatment. The promptness has to do with having treatment available and as near the home as possible [6]. Effective and better compliance results from home visits as well as follow-up of sick children by community-based volunteers. A post-intervention study in Nigeria reveals an increase in the proportion of children who received correct dosage (from 14.3% to 26.7%) [6]. Haynes et al., in their critical review of interventions to improve compliance with prescribed medications, revealed that compliance with short-term treatments (less than two weeks) can be improved by clear instructions. The instructions consist of parenteral dosage forms, special reminder pill containers and calendars, and simplified drug regimens [7].

The introduction of a health education package aimed at teaching women how to perceive and treat episodes of malaria was put in place in a rural area of The Gambia. The study revealed that after a period of health education, 67.9% of the study women dispensed complete courses of chloroquine as instructed. Chloroquine consumption was on the increase as a result of weekly morbidity surveillance that was put in place. Mothers interviewed on a weekly basis dispensed more chloroquine than mothers interviewed less frequently [8, 9]. Kidane

and Morrow, in their study of teaching mothers to provide home treatment of malaria in Tigray, Ethiopia, concluded that a major reduction in under-five mortality could be achieved through training of mothers by trained local mother coordinators on how to give under-five children anti-malarial drugs [10]. Their findings showed that under-five mortality was reduced by 40% in the intervention localities [10].

Experiences and findings from these studies have suggested various ways of overcoming the problem, including the use of prepackaged drugs, health education, frequent home visits and training on case management, clear instructions and reminder slips on containers, and simplified drug regimen for mothers. These experiences also emphasized that treatment of malaria requires taking the correct dose at the appropriate time and for the entire length of the duration.

### DESIGN OF INTERVENTION APPROPRIATENESS THROUGH PARTICIPATORY APPROACH

In this study, baseline findings revealed that the factors are not "what" to do, as previous studies suggest, but "why" the factors and "how" to tackle them. Mothers and caregivers believe that the administration of malaria drugs should be terminated as soon as they perceive that the child is (clinically) well. Clinical wellness was based on the disappearance of fever or high body temperature. This has had an adverse effect on the cure rates for malaria reported by mothers after treating their children with chloroquine and leading to the belief that the drugs are not effective.

Also, it was found that there was no age-specific dosage for the treatment of malaria. Various sizes of spoons were used (such as 5 ml spoon for syrup measurement) and the number of tablets given to a child was sometimes what a parent could afford to buy. As a result, children were under-dosed. Additionally, the findings showed that a majority of the mothers and caregivers obtained their drugs from sources outside the health facilities, especially patent medicine sellers, where the quality of drugs in terms of composition and shelf life was doubtful.

Based on these findings, the intervention program was therefore jointly designed by researchers in participatory relationship with the health workers, patent medicine sellers, and mothers. The intervention was done at two levels. The first level was to ensure that correct quantity and quality (drugs whose shelf life had not expired) of anti-malaria (chloroquine) tablets and syrups was dispensed to caregivers by health workers and patent medicine sellers. In the process of participatory discussions and to solve the problem of quantity, the patent medicine sellers in their own contributions suggested the use of prescription charts that will show the age specific dosage of chloroquine tablets and syrup. The chart would show the number of tablets as well as the number of 5 ml spoons of syrup and the time regimen that will correspond to the age of the child. However, the recognition of the 5 ml spoon by drug sellers and mothers still posed

a problem. After a long deliberation on a solution, the patent medicine sellers suggested that a plastic 5 ml spoon can be produced en-mass and distributed in large quantities to all the members through the platform of their association. Each member would display the age-specific prescription chart in the shop and it would be the basis for selling chloroquine to mothers of children diagnosed as having malaria. Additionally, the sellers would undertake to give the 5 ml plastic spoon to every mother who has purchased chloroquine syrup. The executive members of the Association would ensure strict compliance. As to the quality of the drugs, the patent medicine sellers association made and enforced a regulation that no member should stock or sell expired drugs to any customer. Mothers on their own were trained to be self-confident and assertive in asking for evidence that a drug had not expired before purchasing it from the drug store or health facility.

The second level consists of a program of educating mothers and caregivers about the importance of completing treatment regimens. It was visually demonstrated to the mothers, with the aid of microscopic electronic projection, that the cause of malaria is a living parasite which must be totally killed with a sufficient quantity of drugs. If the parasite was half-killed with insufficient drugs and it survived, the drug may no longer be effective in killing subsequent parasites produced by those that survived. Therefore, it is important that the quantity of age-specific drug dispensed by the health workers or the patent medicine sellers be completely taken. The mothers were shown samples of blood taken from children who were not apparently sick but contain malaria parasites to convince that the disappearance of fever symptoms did not necessarily imply that the child was fully cured of the disease.

## METHODOLOGY

Two Local Government Areas (LGA), namely Kajola and Iseyin, were used as the study areas. Kajola had a total population, of 168,260 in 1991 with a projected population of 231,504 in the year 2002. Iseyin LGA had a population of 170,936 in 1991 with a projected population of 235,186 in the year 2002. The two areas are indigenous Yoruba tribe with farming as their major occupation. Kajola is a rural LGA contiguous to Iseyin, a semi-urban local government area.

There were two studies: a based-line community survey on home treatment and management practices of mothers and caregivers covering the two local government areas, and a second which was a post-evaluation study of compliance of the treatment regimen by a sample of mothers and caregivers from the study area.

The criteria for participation in the first survey was that the mothers/caregivers should have children (under five) who had at least one episode of malaria within two weeks preceding the date of survey. The respondents for the baseline survey were 1009 mothers and caregivers selected from a representative sample of households using a multistage cluster sampling technique. Later, a subset of 186

representative sample of mothers and caregivers were randomly selected for the second compliance study. For the second study on compliance, they must be mothers and caregivers who had perceived that their children were currently having clinical symptoms of malaria. Structured questionnaires were designed and used as instruments for the collection of data in the two studies, but the compliance study included an observation check-list.

## FINDINGS

### Base-Line Community Survey

#### *Preferred Formulation of Anti-Malaria Drugs*

The community-based survey on preferred formulation of anti-malaria drugs showed little difference in preferences for syrup (43.2%) and tablets (47.7%) and that 6.8% preferred injections (Table 1). At the training of trainers meeting, injections were discouraged because of the lack of persons with expertise and shortage of facilities and equipments in the rural areas which are potential causes of complications.

#### *Perceived Effectiveness of Last Treatment with Chloroquine Drug*

A greater proportion of the respondents showed that treatment with modern drugs was very effective (98.0%) (see Table 2). This is further confirmed in the fact that 99.5% of the respondents revealed their intention to use the same treatment as the last one used. This finding supported the popularity of modern drug treatment.

Table 1. Distribution of Respondents by Preferred Formulation of Anti-Malaria Drugs

Formulation	Baseline survey (N = 1009)
Syrup	436 (43.2%)
Tablet	481 (47.7%)
Injection	69 (6.8%)
Capsule	4 (0.4%)
No response	19 (1.9%)

### *When to Stop Anti-Malaria Drug Administration for a Sick Child*

The community survey revealed that more than half of the respondents (50.4%) would stop the administration of anti-malaria drugs when the drugs are finished. Thus, the baseline study justified the need for a study on chloroquine treatment compliance in the target area (Table 3).

### **Compliance Study**

The 186 respondents with children currently having clinical symptoms of malaria areas were given age-specific doses of chloroquine and paracetamol by health workers and members of the patent medicine sellers association who had attended a training of trainers meeting conducted by the research team and were also educated on the need to complete the treatment regimen as well as the timing of the administration of the drugs. Table 4 presents the distribution of respondents by the existence of perceived malaria symptoms. Table 4 shows that at least 87.6% of the respondents reported the absence of the different symptoms of malaria.

Table 2. Distribution of Respondents by Perceived Drugs Effectiveness

Effectiveness	Baseline survey (N = 1000)
Very effective	980 (98.0%)
Partially effective	20 (2.0%)
Effective	—
Not effective	0 (0.0%)

Table 3. Distribution of Respondents by When to Stop Administration of Anti-Malaria Drugs

When to stop	Baseline survey (N = 1009)
When a child is well	524 (51.9%)
When the drug is finished	509 (50.4%)
When high body temperature subsides	452 (44.5%)

Table 4. Distribution of Respondents by Perceived Symptoms of Malaria in Their Sick Children

Symptoms	No.	Yes	No response	Total
Cold	4 (2.2%)	181 (97.3%)	1 (0.5%)	186
Fever	11 (5.9%)	174 (99.5%)	1 (0.5%)	186
Headache	3 (1.6%)	182 (97.8%)	1 (0.5%)	186
Weakness	11 (5.9%)	174 (93.5%)	1 (0.5%)	186
Cough	22 (11.8%)	163 (87.6%)	1 (0.5%)	186
Diarrhea	4 (2.2%)	181 (97.3%)	1 (0.5%)	186
Rashes	16 (8.6%)	169 (90.9%)	1 (0.5%)	186
Loss of Appetite	8 (4.8%)	177 (95.2%)	1 (0.5%)	186
Vomiting	6 (3.2%)	179 (96.2%)	1 (0.5%)	186
Restlessness	2 (1.1%)	183 (98.4%)	1 (0.5%)	186
Breathlessness	1 (0.5%)	184 (98.9%)	1 (0.5%)	186
Yellow eyes	4 (2.2%)	181 (97.3%)	1 (0.5%)	186
Convulsion	2 (1.1%)	183 (98.4%)	1 (0.5%)	186

Table 5 shows reported treatment outcome of treatment with correct age-specific doses of chloroquine. More than half (55.4%) of the respondents reported the post-treatment status of the child as being "very well," while less than half (43.5%) reported the present health status as "well." Two of the respondents, however, reported the present health status of the child as not being different.

On the day immediately following the last day of treatment, the research team checked on the mothers' level of compliance with treatment regimen. An indirect way of confirming compliance with treatment regimen was put in place. Respondents were asked for the amount of leftover drugs that they had on them after the third day of administration. During the single day visit, 155 of the 186 respondents used tablets while three used syrups. Tables 6 and 7 show the distribution of the amount of left over drugs after Day 3 (Table 6 for tablets and Table 7 for syrups). The results show that 146 (94.2%) of mothers and caregivers completed the full dose of prescribed chloroquine tablets while 48.4% completed the syrup doses.

## DISCUSSION

Enhancement of Home Management of Childhood Malaria can be achieved through the use of a participatory approach in ensuring intervention appropriateness. Having treatment available as near the home as possible as well as

Table 5. Reported Treatment Outcome of Recent Childhood Fever After Treatment with Chloroquine

Present health status	Frequency	Percentage
Very well	103	55.4
Well	81	43.5
Still the same	2	1.1
Total	186	100.0

Table 6. Distribution of Left Over Drugs (Tablets) After Day 3

Left over tablets	No. of respondents	Percent
No tablets remaining	146	94.2%
1 tablet remaining	1	0.6%
2 tablets remaining	4	2.5%
6 tablets remaining	1	0.6%
No response	3	1.9%
Total	155	100%

Table 7. Distribution of Left Over Drugs (Syrups) After Day 3

Left over syrups	No. of respondents	Percent
No syrup left	15	48.4%
1 ml of syrup left	1	3.2%
3 ml syrup left	2	6.5%
5 ml syrup left	5	16.1%
10 ml syrup left	6	19.3%
No response	2	6.5%
Total	31	100%



having prompt access to affordable and appropriate treatment within 24 hours of the onset of symptoms (TDRnews No. 67) may not be enough as an intervention strategy to reduce the burden of malaria. To ensure high compliance rates by mothers and other caregivers to treatment regimen in terms of taking correct dosages when due and completing the required number of doses, the root causes of non-compliance that are peculiar to different target populations must first be identified.

It is revealed from this study that tailoring educational intervention to the special needs of the various groups and involving them in the design of interventions are some of the best ways of achieving intervention effectiveness. Treatment with tablets predisposes to higher compliance rates than syrups. The participation of groups in the diagnosis of management problems and proffering of interventions has shifted the role of researchers from interventionists to a supportive role of these populations. This strategy can save cost and ensure the permanence of interventions beyond the life-span of the research—a problem faced in the sustainability of research initiatives.

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