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COMMUNITY CHLOROQUINE DISTRIBUTION FOR MALARIA CONTROL IN BUSHENYI DISTRICT OF UGANDA
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F. NUWAHA, J. OKWARE and H.N. TIMBYETAHO

ABSTRACT

Objective: **To document successful community chloroquine distribution for malaria control in Bushenyi district, southwestern Uganda.**
Design: **A cross sectional survey immediately after a four-month community chloroquine distribution exercise. One hundred sixty seven distributors in 140 out of 166 parishes in Bushenyi district did the chloroquine distribution during the 2001 malaria epidemic.**
Participants: **A cluster random sample of 215 heads of households or their spouses were interviewed using a pre-tested questionnaire.**
Main outcome measures: **Socio-demographic characteristics, malaria/fever morbidity, health seeking behaviour in the previous four months, knowledge about chloroquine distribution, opinions about the chloroquine distribution exercise and whether the household had used the service of the chloroquine distributors.**
Results: **Thirty per cent of the people surveyed had suffered from malaria in the previous four months. Seventy per cent of the households were aware of the chloroquine distribution and 56% of the patients who had malaria in the previous four months accessed the services of chloroquine distributors. People who were aware of chloroquine distributors were less likely to use services where a fee is levied. The total cost of chloroquine distribution was about 20,000 United States dollars.**
Conclusions: **Community chloroquine distribution can increase access to treatment and can be done in a short time at an affordable cost.**

INTRODUCTION

Malaria infection and disease are major causes of morbidity and mortality in sub-Saharan Africa (1-3). Stable endemic malaria predominates throughout the continent, but epidemics occur, particularly among communities at the southern most latitudes, across the arid regions of North Africa, and among the highlands of East, central, and Horn of Africa (4). Since 1990, malaria "epidemics" have been reported in the southern Uganda among highland communities (5-8). The risk of malaria infection exists in all the districts in Uganda with 90% of the population living in highly endemic areas of perennial transmission and 10% of the population living in low transmission areas that are prone to malaria epidemics (9). The World Health Organization's Roll Back Malaria's efforts to manage epidemic malaria in sub-Saharan Africa include supporting the establishment of early detection (surveillance), early warning, and forecasting systems to provide adequate preparation time to prevent or contain malaria epidemics (10,11). Provision of early diagnosis and effective accessible treatment is a cornerstone of malaria epidemic control. The use of personal protection methods, such as Insecticide Treated Nets (ITNs) and residual household spraying may not be feasible financially and logistically in a short time.

This is a report of a successful chloroquine distribution carried out in Bushenyi district during the 2001 malaria epidemic. The documentation of such experiences helps to disseminate information and guide policy decision-making.

MATERIALS AND METHODS

Design: This was a cross sectional study where data was collected using pre tested semi-structured questionnaires. The study was carried out from May to July 2001.
Study area: The study was conducted in Bushenyi district of South- westem Uganda that covers an area of 3949 square kilometers (of which 370 square kilometers is water). The district has a total population of 800,000 people (as projected from the 1991 census). Most people are rural based (95%) and mainly live as subsistence farmers growing crops and keeping animals. Bushenyi district is divided into five counties, 27 sub-counties, two town councils, 166 parishes, 2049 villages and about 100,000 households. The political and social organisation in the district is hierarchal based on local councils and committees (LCs). A local council is headed by a nine member executive committee known as local committee. The village has a first level council and committee (LC1), a parish LC2, sub-county LC3, county LC4

and the district LC5. Members of LC2 to LC5 councils and committees are popularly elected.

The health facilities are based on 4-tier system of three types of health centers labelled one to four and a district hospital. The first level health unit health center two (HC2) serves a parish, second level or HC3 serves a sub-county, and third level or HC4 serves a county or a parliamentary constituency whichever is smaller. A district hospital serves the whole district. The district has one district hospital, one non-governmental organization (NGO) hospital, six HC4, 22 HC3s and 29 HC2s. In addition there are a number of private clinics whose number is not known. Only 60% of the population lives within 5 Kilometers of a health facility.

All aspects of health planning, programme implementation and evaluation are vested in the directorate of health services that is one of the departments of the decentralised Bushenyi district. Health service delivery is further decentralised to the health sub-district (based at HC4). A HC4 is staffed by a medical officer, is able to do emergency surgery and supervises HC3s, HC2s, and community based activities like immunization, school health and community education.

The terrain in Bushenyi is characterised by hills and valleys with general altitude of 1200 to 2000 meters above sea level. The district has a relatively wet climate ranging from 1500mm to 2000mm of rainfall annually. Bushenyi is meso to hypo endemic for malaria and is therefore epidemic prone. Upsurges of malaria usually occur in the district every year following the rains of September to November and of February to May. Malaria epidemics have been noted to occur every 3-4 years. The most recent malaria epidemic occurred from January to April 2001. The worst malaria epidemic occurred in 1998 after the heavy rains of the *EL Nino* weather phenomenon (8). Malaria is the leading cause of morbidity and mortality in the district especially among children under five years of age and among pregnant women. However, all ages are affected.

Community distribution of chloroquine: After noticing the increasing numbers of malaria patients in health units coupled with increasing consumption of antimalarials, the directorate of health services decided to implement a community based chloroquine distribution with the aims of increasing access to free treatment and reducing the number of visits to health units. Chloroquine distributors (CDs) were identified and selected by heads of HC4s with the help of LC2 and LC3 committees. Each parish that did not have a health center was allowed one CD with big parishes being allowed 2 CDs. One hundred and forty out of 166 parishes were ear marked for chloroquine distribution with a total of 167 distributors. A simple criterion was used to select the CDs. They must have been residents of the parish, able to read and write and be trusted by their communities. The CDs were then trained for two days on recognition of malaria, dosages of chloroquine, record keeping and referral of patients. After the training the CDs were immediately supplied with chloroquine to start the distribution. The CDs distributed chloroquine from their homes during the morning and at night. In the afternoon they could chose to move to a center of the parish (such as parish headquarters, school, or place of worship). Supervision of the CDs was by the head of the HC3 (clinical officer or a nurse) at least once in two weeks. Stocks of chloroquine could be replenished during the supervision or the CDs could collect it from the nearest HC3. During the supervision the head of HC3 would also collect the data on the number of patients and on the amount of drugs used. This information was submitted to the HC4 that was analysed and sent to the district headquarters for inclusion in the district records. The heads of HC4 and the district task force met once in every two weeks to review the progress of the distribution exercise and provide technical guidance. The district task force included the district director of health services, the district health educator and focal person in charge of surveillance.

The 167 chloroquine distributors were selected and in addition to chloroquine they were provided with exercise books/pens for record keeping, packaging materials, dosage guidelines according to age and indications for referral. They were also provided with general health education materials about prevention of malaria. Each chloroquine distributor was paid a monthly token of 10,000 Ugandan Shillings (about 6 US$) and when they moved to collect more chloroquine from the HC3 a transport refund of 5000 Ugandan Shillings (3US$) was paid. The distribution lasted about four months from January to April 2001.

Anecdotal evidence from the community and their leaders indicated that the exercise was successful and beneficial. As a result communities and their leaders were requesting that chloroquine distribution continues even after the epidemic to become a permanent exercise. There was therefore urgent need to deterrnine whether the chloroquine distribution was successful or not and whether this strategy is worth using in future.

Sample size: The sample of households for the interview was determined using the Expanded Programme on Immunization (EPI) cluster sample method (12). Thirty clusters of seven homes each were selected using the EPI sampling method. This method is normally used to calculate immunization coverage but it was deemed adequate to estimate the prevalence of use of services of CDs.

Sampling procedure: The 30 clusters were chosen from the health sub-district (constituencies) in proportion to their population size. Parishes that have a health facility where the chloroquine distribution was not done were excluded from the sampling frame. Using the lists of villages in each parliamentary constituency, 30 villages were randomly selected from the constituencies proportion to their populations. In each village selected, seven homes were visited and the head of household or the spouse was interviewed. The interviewers started in the middle of the village. A stick was spun and the interviewers followed the direction of the stick. When there was nobody to interview at home, the next home was included. Interviews were with head of household, spouse or any responsible person in the household.

Data collection: Trained research assistants using a pre-designed, pre-tested semi structured questionnaires that had both closed and open responses collected data. Data was collected on: sociodemographic characteristics, malaria/fever morbidity, health seeking behaviour in the previous four months, knowledge about chloroquine distribution in the parish, opinions about the chloroquine distribution exercise and whether the household had used the service of the chloroquine distributors. Malaria and fever are used interchangeably here.

Analysis: This included editing, cleaning, and coding before entry in computer software SPSS/PC for windows that was used in the analyses. Frequencies were computed and univariate analysis with the Chi-square (X^2) or Fisher's exact test using two-tailed tests was used to compare proportions. For all the analysis a level of significant (P-value) of less than 0.05 was used.

Quality control: Threats to validity and reliability of data were minimised through training of all research assistants.

Interview schedules were checked at the end of each day for omissions and inconsistencies. The schedules were pre-tested to ensure clarity and logical sequence. The principal investigator closely supervised the research assistants. Further more the questionnaire was translated in the commonly used language *(Runyankole)* and back to English.

Ethical considerations: The study was approved by the departmental board Institute of Public Health Makerere University, and by the district authorities in Bushenyi. Verbal informed consent was obtained from the respondents before interviewing.

RESULTS

Interviews were held with 215 heads of households or their spouses. Of the 215 households, 25(13.5%) were headed by women. The mean age of the respondents was 32 years with standard deviation (SD) 6 years and range of 18-100 years. The 215 households interviewed had 1510 people of whom 319 (21%) were children under five years of age and 73 (5%) were pregnant women. Only 22 (10%) of the 215 households owned at least one mosquito net. The other socio-demographic characteristics of the respondents/households are shown in Table 1.

Perceived morbidity and mortality due to Malaria: Of the 215 households, 174 (81%) had nursed at least one member of the family in the previous four months with fever suspected to be due to malaria. The total number of people who suffered from malaria among the 215 households in the previous four months was 451 (Mean 2 and Mode 2). Of the 215 households 86(40%) reported that at least one member of the family was admitted for malaria in the previous one year. The study also revealed that 35 of the 215 households (16.3%) had ever had at least one family member die due to malaria.

Health care seeking behaviour: The sources of treatment among the 174 homes that had at least one member suffering from malaria in the previous four months are shown in Table 2. At least a half of the homes assessed the services of chloroquine distributors and about 56 percent used a public health facility. Of the 451 people who had malaria in the previous four months 253(56%) used the services of a chloroquine distributor.

Knowledge and awareness of chloroquine distribution: Of the 215 respondents interviewed, 151 (70%) said they knew about the distribution and availability of chloroquine tablets within the parish. Eighty two (54%) of the 151 said that they learnt about drug distribution from the local council officials (LC I and II), twenty seven (17.5%) heard about the distribution over radio, whereas 70 (46%) of the respondents said they knew about the distribution exercise from other sources like friends, neighbours and from the distributors themselves.

Table 1

Socio-demographic characteristics of respondents and households (n=215)

Variable	No.	%
Type of respondent		
Head of Household	100	46.5
Spouse	104	48.3
Sex of respondent		
Female	129	60
Male	86	40
Marital status		
Never Married	17	7.9
Married	167	77.7
Separated/Divorced/Widowed	31	14.4
Education level of head		
None	67	31.0
Primary	110	51.0
Secondary	28	13.0
Tertiary	11	5.0
Occupation of head of household		
None/peasant/housewife	174	81
Business/salaried worker	29	13.5
Others	10	4.5
Location of household		
Urban	11	5
Rural	194	95
Type of housing (walls)		
Mud and Wattle	169	79
Bricks	46	21
Type of housing (floor)		
Cemented	39	18
Non-cemented	176	82

Table 2

Sources of treatment/health care for malaria among 174 households

Source of treatment	No. of respondents (n=174)	%
Public Health facility	98	56
Private health facility	107	62
Drug shop	69	39.7
Ordinary Shop/others	23	13.2
Traditional healers	66	37.9
Chloroquine distributors	90	51.7

NB: Most households got treatment from more than one source in the previous four months

Table 3

Knowledge of CDs by site of treatment in the 174 households who had at least one malaria patient in the previous four months

Source of treatment	Knowledge of CDs		Chi-Square (df.)	P-value
	Yes (%)	No (%)		
Private clinic	89(63)	37(80.4)	3.98	< 0.05
Drug shops	43(30.7)	22(47)	4.02	0.04
Traditional healers	49(35)	15(47)	0.17	0.68
Public health facility	69(54)	22(55)	0.02	0.88

Table 4

Methods suggested to improve chloroquine distribution (n=215)

Suggestion	No.	%
Distribute drugs at village level (LCI) not at parish level (LC2)	42	19.5
Train and employ more distributors	23	10.7
Include other drugs like aspirin and panadol	31	14.4
Give adequate drugs to the distributors	45	20.9
Make announcements to inform people about the availability of the drugs in the parish	12	5.6
Closely supervise the drug distributors to ensure that they don't divert the drugs	8	3.7
Drug distributors should move home to home distributing the drugs	11	5.1
Provide incentives to distributors, like bicycles	27	12.6
Give drugs to prevent itching	45	20.9
Provide other "tough" antimalarials like fansidar, quinine to cure those not responding to chloroquine	92	43
Provide injectables	63	29

NB: Some respondents gave more than one answer

Table 5

Cost of chloroquine distribution in Bushenyi district

Cost Item	Amount in Ugandan Shillings
Drugs costs (chloroquine)	11,000,000
Operational costs	15,000,000
Evaluation costs	8,000,000

One hundred and twenty six (58.6%) of the 215 respondents knew the drug distributor(s) in their parish by name and 110 (51.2%) out of 215 respondents knew the place of residence of the drug distributor. Of the 90 households who received drugs from the chloroquine distributors, 78(86.7%) said they received only chloroquine tablets whereas 12(13.3%) of them said they received other drugs in addition to chloroquine tablets. The additional drugs were reportedly either paracetamol or aspirin tablets.

Effect of chloroquine distributors on choice of treatment site: A univariate analysis was done to test whether knowledge of chloroquine distribution influenced choice of treatment site. The results of the analysis are shown in Table 3. The Table showed that awareness of chloroquine distributors made it less likely for respondents to use private clinics and drug shops but did not influence use of public health facilities or traditional healers.

Suggestions for improving chloroquine distribution: Of the 215 respondents interviewed, 160 (74.4%) said they would like the chloroquine distributors to be permanent and 208 (96.7%) of the respondents said they were happy with the strategy of distributing antimalarial drugs in the community. However the respondents suggested the following measures (Table 4) to improve chloroquine distribution in future.

Cost of chloroquine distribution: A total of Uganda shillings 34 million (about 20000US$) was used for the whole exercise. The money came from various sources such as Bushenyi district's epidemic preparedness budget, (12 million Uganda Shillings), Ministry of Health / World Health Organization (8 million Uganda shillings) and from UNICEF Uganda office (14 million Uganda shillings). The major areas of expenditure were cost of chloroquine, operation costs such as training and selection of CDs, honoraria for CDs, supervision and monitoring and cost of evaluation (Table 5). The costs of evaluation include those incurred in carrying out this survey.

DISCUSSION

This study assessed the success of a chloroquine distribution exercise that was used as one of the ways to control a malaria epidemic in Bushenyi district of southwestern Uganda. The strength of the design included use of a random cluster survey of households immediately after the epidemic. This gave the advantages of minimising recall bias due to relatively shorter time period and of making the results being representative of the whole district. A major limitation of the assessment was that there was no way of gauging whether the reported patients suffered from malaria or not as the majority of them were neither attended by qualified health professionals nor had their blood been examined for presence of malarial parasites. However, it has been reported that during an epidemic of malaria or during high transmission season most cases of fever and morbidity are attributable to malaria (13). Furthermore, the number of malaria/fever cases that occurred in the community was based on interviewees' recall. This could have underestimated the malaria burden in the district as it is possible that within four months some cases particularly of mild malaria may have been forgotten.

The malaria morbidity during the study period of four months was high with 81% of all the households having nursed at least one family member and 451 out of 1510 (30%) people suffering from malaria. Extrapolating this figure to the district population of 800,000 showed that 240,000 people suffered from malaria during this period. From the records that were available from the office of the district medical office, all the chloroquine distributors treated 115,617 patients during the four months. Evidence from this study showed that chloroquine distributors treated 56% of the patients. Thus of the 240,000 people who suffered from malaria 134,400 are expected to have been treated by chloroquine distributors. Therefore the records brought by chloroquine distributors show that 115,617 of 134,400 (86%) of the malaria patients were captured by the recording system. Estimates from the amount of chloroquine (1000 tins of 200mg x 1000 tablets each) that was supplied to the drug distributors showed that about 150,000 doses were issued during this time (the average dose of treatment was 6.7 tablets per person).

An interesting observation was that knowledge of chloroquine distribution appeared to have influenced health-seeking behaviour towards outlets for payments of household (e.g. drug shops and private clinics) but not of public health units where no payment is levied. This may indicate that a fee for service may be a major factor in influencing choice of health care provider as has been observed elsewhere and in Uganda(14-16). Another interesting observation was that presence of chloroquine distributors did not influence choice of whether households choose a traditional healer for malaria. This may indicate that fee for service is not a major determinant of choosing traditional healers but rather other aspects such as perceived cause of illness(17).

Very interesting suggestions were also forthcoming from the households regarding improving chloroquine distribution. Those that are worth considering include making chloroquine and distributors more accessible as for example basing it on village (LCIs) rather than parish (LC2) and having many more distributors. Increased education about chloroquine distribution may also get more people informed. A policy is also needed on incentives for the distributor to keep their morale. The issue of more drugs such as aspirin or paracetamol for fever, antihistamines for chloroquine induced pruritus (18,19) and sulphadoxine/pyrimethamine for chloroquine resistant malaria were considered by the district team. It was however decided not to give any other drug apart

from chloroquine for the following reasons: First; more than one drug would increase drug costs. Second; provision of more than one drug was thought to complicate the treatment process. Third; multiple drugs were thought to adversely affect compliance. Fourth; it was recently shown that analgesics e.g. paracetamol may actually reduce the efficacy of antimalarials (20). Finally it was thought that chloroquine distribution is first line of treatment and any patient with unresponsive fever should be referred to health units for professional management.

Because of increasing drug resistance in the country, chloroquine has since been replaced as the first line drug for treatment of malaria in Uganda (21). The replacement had been with chloroquine/fansidar with fansidar given on the first day (at the same time as the first dose of chloroquine). The dosing of chloroquine over three days has not changed. Possible effects of this policy change on drug distribution may be increasing drug costs, complicating of doses by drug distributors and possible increase in side effects due to multiple drugs. However, by improving cure rates among malaria patients there will be increased confidence of the population towards treatment.

Thus these data suggest that chloroquine distribution could be implemented at short notice at an affordable cost and that more than half of the population could be reached. The data also shows that records brought in by the chloroquine distributors were reliable and fairly accurate.

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