

TORORO COMMUNITY HEALTH (TORCH)

Malaria, Medicine, and School Children

Findings from a study on malaria and medicine in nine primary schools in rural and urban areas in Uganda

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Abbreviations

ARV	anti-retroviral
CQ	Chroloquine
DANIDA	Danish International development Assistance
DBL	Danish Bilharziasis Laboratory
DHE	District Health Educator
IMCI	Integrated Management of Childhood Illness
MOE	Ministry of Education
MOH	Ministry of Health
NDA	National Drug Authority
NCDC	National Curriculum Development Centre
ORS	Oral Re-hydration Salts
PPF	penicillin procaine fortified
PS	Primary School
PSP	Sulfadoxine pyrimethamine
TB	Tuberculosis
TORCH	Tororo Community Health
RBM	Roll Back Malaria
RTI	Respiratory Tract Infections
UPE	Universal Primary Education
CORPS	Community's Own Resource Persons

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CHAPTER ONE

INTRODUCTION

1.1. Background

Malaria still remains one of the greatest health threats to most African families, as it is a considerable cause of mortality and morbidity. The consequences of malaria on school children's well being, school attendance and educational achievements are maleficent (Brooker et al 2000a, 2000b).

In east Africa, management and treatment of most of the fevers, including malaria, takes place in homes by lay people (Adome et al 1996). Even when people have consulted professional health workers and have acquired medicines from registered pharmacies and drug shops, they still administer the drugs at home. Thus, improving home management of malaria including prompt and effective treatment with anti-malaria drugs is now acknowledged as one of the primary elements of malaria control. In June 2002, the president of the Republic of Uganda, officially inaugurated the home based management of malaria policy in Uganda. In this new arrangement, unit packs of malaria drugs are being made readily available in the community for prompt and easy access. The pre-packs are labeled to ensure that people use them appropriately. However, labeling requires a literate user group that can read and interpret the messages. At the same time we appreciate that slightly more than 50% of the Uganda population can read and write, let alone in English. The potential role of school children in reading and interpreting these labels and ensuring effective home management of malaria is great.

There is ample evidence to the effect that school aged children are often actively involved in home treatment (Meinert 1998, Geissler et al 2000) and school aged children often take care of young children who experience most malaria attacks. However, the dosages taken and regimens followed are predominantly incorrect (ibid.). One of the consequences of incomplete medication is the increasing drug resistance problem well-known in East Africa. School children's active involvement in treatment practices, being in the process of forming their habits of drug use, make them of great strategic importance for improving the management of illness and malaria is no exception. Given this understanding, participatory health education approaches through schools can help promote a community wide understanding of health problems and their solutions in some domains (Onyango-Ouma 2000). However, as Meinert (2001) maintains, the current existing health education practices in schools are often theoretical and formal, and suggested solutions to health problems are experienced as unrealistic by many teachers. This is partly because health education approaches in schools fail to take into account the contexts in which the children have to implement what they are taught. To realize this, there is a need for health education to take children's experiences of problems and the realistic options available into account, and based on that develop interventions that bridge the gap between existing local conditions and required change of practice. It has been seen elsewhere that appropriate action-oriented health education in schools integrated in the school curriculum can give the children the ability to analyze and take action in relation to local communities' health problems (Pridmore and Stephens 2000).

Although children can learn to take important preventive precautions, diseases like malaria also require a more pragmatic involvement of children at the curative management level since these diseases are a big thorn in their day today life. Although most school children can ably recognize signs and symptoms of malaria and are aware about the need to seek care, they are not always able to get access to the care they need, let alone being informed about the right treatment. Although they know a variety of drugs, they cannot distinguish between painkillers and anti-malarials, neither are they conscious about the reasons for development of drug resistance. Hence it is

crucial for children to understand the advantages of appropriate dosing, the adverse outcomes of inappropriate drug use such as curative failure and drug resistance.

If children are to contribute meaningfully to the efforts of the recently espoused policy of home management of malaria, it is high time that health education on malaria treatment is integrated into the existing school curriculum, which is an authoritative term of reference for teachers. If school based health education enterprises and materials do not rhyme well with and fit into the school curriculum, they are likely to be unsustainable.

Potentially the UPE program is a unique chance to educate the public about medicine. School children of today are the parents of tomorrow. The importance of understanding proper use of medicine also increases with new, other, and more complicated forms of medication e.g. ARV and TB treatment.

This report presents findings of a study that explored the current knowledge and practices of school children in relation to medicines in general and anti malarial drugs in particular. The study situates the current knowledge of school children and teachers within the health and drug policy contexts. It discusses the implications for including a component on medicine use in the Ugandan school curriculum. The aim of the study was to assess whether health education on malaria and its treatment through schools would be an effective solution for malaria management both in schools and at home.

The report does not suggest that school children should become “little doctors” as they do not need additional responsibilities. The study aimed at understanding what children are already doing with medicine and suggest how they might be educated to do it a little better, and to recognize when they really need help from better informed people.

1.2. Objectives of study

The main objective

To establish ground information on malaria and its medicines in schools.

Specific Objectives

1. To understand the current health education policies and approaches in Uganda.
2. Establish the current health education teaching, learning practices, level of knowledge about malaria and its management among teachers and school children.
3. Establishing the available options of treatment (of illness in general and malaria in particular) within urban and rural settings and assessing current local treatment practices.

The main activities:

1. Consultations with policy makers and implementers at the national and district levels.
2. Discussions with officials from the Ministry of Education, Ministry of Health, the National Drug Authority and National Curriculum Development Center to share their views about the idea of integrating a health education component on medicines and malaria management in the school curriculum.
3. Review some of the Information, Education and Communication materials.
4. Visiting study-sites and assess the situation on the ground by holding discussions with groups of teachers and children
5. Conducting knowledge tests to assess what children understand about management of malaria, prevention, identification and treatment
6. Interviewing district health team, district education officers and inspectors of schools
7. Conducting an inventory in community drug outlets to establish common anti malarial drugs

8. A one week trip to Kenya to link with other researchers on the related study to exchange experiences and ideas, start and plan the comparison and discuss the research methods.
9. open listing of hospital medicines and their indications by school children
10. listing traditional medicines and the related indications their indications by school children

Overall there were 459 pupils who did the knowledge tests. Most children were from P6 and P7, and a few from P5. The mean age of the children doing the test was 13 years. The number of children who sat varied from school to school as presented in the table below:

Table 1: Distribution of children who sat the test

Name of the school	Females	Males	Total
Agururu p.s	15	26	41
Amagoro p.s	31	31	62
Apuwai p.s	12	33	45
Asinge p.s	20	40	60
City Parents p.s.	32	26	58
Kitante p.s.	27	33	60
Kwapa p.s	26	38	64
Nakivubo p.s.	12	17	29
Rockside Academy	22	18	40
Total number of pupils	197	262	459

Group discussions with pupils: we discussed with pupils about illnesses and the medicines used to treat these illnesses. Emphasis was put on their understanding and experiences about malaria. In each of the schools there were 2-4 groups each comprising of approximately 8-12 children. Discussions were conducted using a diversity of participatory methods including: medicine card sorting and using the same medicine cards to rank the medicines according to the perceived strengths, and drawing of local medicine maps.

Group discussions with the teachers: The discussions with the teachers covered issues ranging from malaria situation in the school, their own experiences with malaria and the related management. Like their pupils, teachers also did medicine card sorting and medicine ranking according to the perceived strengths, and according to the diseases that they treat.

Classroom observations: whenever given an opportunity, we took time to observe the interactions between the teachers and pupils in class so as to assess the teaching methods, the teaching approaches and the interactions between pupils themselves.

Key informant interviews with policy makers:

These were held with officials from the Ministries of: Health and Education and Sports and, National Curriculum and development Center, District officials in the departments of health and education.

1.3. Study Design and study sites

The study adopted both a qualitative rapid assessment approach to obtain basic information as well as a quantitative assessment of the children's knowledge on and experiences with medicines. The study covered urban, semi-urban and rural areas so as to understand how the different settings affect knowledge and practice

about malaria and its management. We also did inventories of drug outlets in areas nearby the schools to enable us cross check the drug sources and related drugs which the pupils and teachers would mention.

The study was conducted in nine schools: three in Kampala, three in Tororo town and three in rural Kwapa sub-county, Tororo district. In all areas, selection of schools was done with assistance from the District Education officers based on our criteria to get a variety of schools ranging from high to low performance and socio-economic characteristics. The details of the characteristics of the schools visited are outlined below:

A. Kampala:

Kitante Primary School is an example of a well functioning UPE school that was best performing UPE School in 2001 Primary Leaving Exams. The children attending the school are mainly from middle class families particularly civil servants who can afford to transport children to school either by public or private means. The infrastructure of the school is well developed and there are good sanitation and water facilities. Children of the school are well dressed in school uniforms; fluent in speaking English and participated very actively in all research activities.

Nakivubo Settlement Primary School is a typical UPE government supported primary school constrained by urban poverty. It mainly serves children from the surrounding Katwe slum area and low-income earners from different parts of Kampala working in the neighbouring Owino market. Children whether from far or near come to school on foot. In case of rainy mornings very few pupils turn up. ¹ On the day we visited the school, there had been a heavy rain pour that morning. The compound was flooded with water. Most of the children came in around 11 am when the rain had ceased. The infrastructure is very poor; there are no proper sanitation facilities and until recently the school did not have power despite being situated in the center of the capital. Approximately half of the children wear school uniforms, some in a rather poor state. Although most of the children in upper classes understood English, comprehension of the research exercises was rather low. They were slow in completing the drug sorting exercises.

City Parents Primary School belongs to children from Ugandan middle and upper class families. The school has a well-laid infrastructure, very competent and well-motivated staff. The children were smart in both dressing and answering questions. Most of them had very good handwriting and were quick to understand the research questions. Most of the parents can afford taking their children to school in private cars. Initially it was difficult to secure an appointment with the school management due to busy schedules. Being an ambitious private school, there was little time for other activities than academic work. During the discussions with both teachers and children, teachers were very cautious about time since most of the parents come to pick their children right on time. Any delays would be inconveniencing for the parents and the management would not approve that. Hence we had to take this into account and go through the exercises very fast. Nevertheless because the children were pretty fast, we were able to complete in time.

B. Tororo town:

Amagoro Primary School located close to Malaba road, slightly out of town. The school is not much different from schools in rural areas: It is heavily populated; and most of the children are from low income families. There are, however, new structures in place, which have been constructed out of UPE funds. The unique feature about the school is that most of the teachers reside in town; they are more exposed and smart compared to those in rural schools. According to the headmaster, most women teachers in this school are wives of prominent men in town. There were some children in P6 who were not very fluent in English, and had rather poor handwriting. It took remarkable time to make pupils understand the research exercise, and some dropped out because they failed to write.

Agururu Primary School the same status as Amagoro School where most of the children are from poor families. Teachers, in Agurru, are also smartly dressed and reside in town. One special feature about this school is that it includes a group of children with special needs. Including those with disabilities such as the deaf and dumb. The number of children is slightly less than the children in Amagoro School. The school has been receiving support from international donors who have special interests in children with disabilities. The school has a wide ethnic diversity like most schools in Tororo town.

Rockside Academy School is a private school in Tororo town established by teachers. The school draws children mainly from relatively well off families in Tororo town who can afford to pay Ushs. 150,000= per term. The school has both boarding and non-residential pupils. The school is located in the premises of an old building that has been partially rehabilitated. Pupils here also have various ethnic origins. The teachers were smart in dress and speech, and most pupils were well dressed in uniforms. However, there was no marked difference in competence in completing the exercises between the pupils from this school and the rest of Tororo Schools.

C. Rural Tororo:

Kwapa Primary School is a typical rural primary school, which has benefited greatly from the UPE program. It is located next to a large Catholic Church and has recently built two new school blocks. Most of the pupils in the school come from poor rural families and have only one meal a day. Pupils' comprehension of English is rather low and many found it difficult to write and spell in both English and Iteso, the local language spoken in the area. Most of the discussions were done by our research assistant who is fluent in the local language.

Asinge primary school is about 2 km from Kwapa primary school, located next to a protestant church. Most of the structures of the school were old. However a new block of the classrooms was coming up, but was not yet in use. The children attending Asinge School were of the same socio-economic characteristics as those of Kwapa and Apuwai. Asinge School is the coordinating center for other schools in Kwapa Sub-county and teachers undergoing upgrading come to Asinge for lessons during weekends and holidays.

Apuwai Primary School was started recently as a parent initiative. Two classroom blocks have now been constructed and some of them even have furniture. The school population has similar characteristic like the other two in Kwapa Sub-county. However, whereas Kwapa and Asinge schools are located close to the main dirt road leading to Tororo, Apuwai is found deep in the village through smaller feeder roads.

Because majority of the people in these areas are typically poor, it was not possible to classify the schools according to socio-economic status. The only difference was that management of the schools belonged to different religious denominations.

Sites for drug-sources inventories

Drug inventories were conducted in drug sources in urban areas of Kampala & Tororo and rural Tororo. The drug sources were identified from the medicine maps that had been drawn by the school children. Besides, during the group discussions, the children and teachers had also referred to some of these outlets. The drug outlets were within the catchment-areas of the schools within a five kilometer radius. In Kampala, drug outlets were much more complex compared to those of Tororo. We were not able to work in all kiosks that were selling drugs. Due to the informal nature of their operations, some of the kiosk operators were not willing to participate in the study. Hence formal outlets visited included drug-shops and pharmacies. In Tororo town drug outlets comprised mainly well established drug shops that also occasionally served as clinics. In rural Tororo outlets were mainly small drug shops, clinics and kiosks that were selling drugs alongside other items.

CHAPTER TWO

RESULTS

2.1 The Current Health & Education Policies and their Implications for malaria initiatives in Schools

This section elaborates on the policy framework and the implications for malaria initiatives in schools. We examine four policy developments: the apparent emphasis on the role of school children in health education and promotion, the malaria control approach that emphasizes promotion of community/home based treatment, the increasing emphasis by NDA to phase out provision of drugs by unqualified people and the policy on the need for changes in the treatment protocols for malaria. In the paper we indicate the policy relevancy as well as the inherent contradictions emerging out of the cross section of policies. The current policy framework was deemed important for two important reasons.

- (1) Help recommend viable solutions,
- (2) Advise on policy change – contribute to the policy debate

Review of the teaching materials indicates that teaching on malaria and drugs is already existing in schools. However, this teaching is mainly limited to the symptoms, causes and prevention aspects of malaria. Although reference is made to drugs this is mainly about drug abuse aspects. Nothing is covered on the drugs that treat malaria, problems of overdose and under dose, resistance, and when to and not to treat malaria at home. This observation was consistent in the review of the science examination questions from 1987 to 2000 that apparently indicate a similar pattern as indicated below:

The following questions were about malaria and medicines

1. What type of mosquito spreads malaria?
2. Name the mosquito that spreads malaria, Name three methods to control malaria.
3. Why should drugs in the home be kept out of reach of children?
4. What causes malaria? What do you understand by drug dependency? Why are prescriptions important in the treatment of sickness?
5. Why would the control of AIDS be easier than that of malaria?
6. State two reasons why proper medical prescription is necessary before taking any medicine?
7. What is drug abuse?
8. What is one possible danger of buying drugs from local shops or markets? What is meant by drug abuse? Give any two pieces of advice to a person who is on drug abuse.
9. What is the danger of taking drugs, which are not prescribed by a health worker? State any two qualities of essential drugs.

A new comprehensive health education and promotion program is now in place. MOH in collaboration with the Ministry of Education and Sports have the mandate to implement a comprehensive preventive and promotional health program in schools. In this new arrangement, schools are supposed to be equipped with adequate facilities and equipment to undertake this exercise (MOH 2000/01- 2004/05). This approach is based on the premise that health education in schools is of strategic importance since under UPE many homes are represented in schools.

Despite this development, in new Uganda Primary School Curriculum, health education in schools has de facto been decreased with introduction of a wide range of new subjects and this means less time for the "old subjects" such as science. In the years to come, children will be sitting exams for eight subjects instead of four. Currently

children are doing exams in Mathematics, English, Basic Science & Health Education and Social Studies & Religious Education. In addition to these four, the new subjects will comprise of Agriculture, Home Economics, Integrated Practical Skills and, Practical Arts & Practical Education.

2.2.1 The Home Based Management of Malaria Policy

At the global level, it is being recognized that there is a great potential in existing community management of malaria (see the Proceedings of the Malaria Workshop in Mbarara, DBL 2001). The aim of Roll Back Malaria (RBM) strategy is not to stop self-medication, but rather inform communities on how to "self-medicate better". Home based management also focuses on improving access to anti-malarial drugs through community based distribution.

In Uganda the management of malaria is conventionally regarded to be the responsibility of qualified health workers. In practice however, most malaria episodes in Uganda are first treated at home through self-medication (Nshakira et al 2002, Adome et al. 1996). Hence this gives justification for a community based strategy for malaria management. Uganda has adopted the home-based management strategy to fight malaria, as described above, and this has been portrayed as the "most friendly and effective way of fighting malaria" (Monitor Friday April 26. 2002). In this approach, every village has at least one volunteer drug distributor trained to recognize the symptoms of malaria and provide the appropriate drugs to treat it (Ibid). At the moment, free pre-packed unit dosed anti malarial drugs (Chloroquine and Fancidar), popularly referred to as *Homapak* for children under five are being supplied through community based distributors in all districts in Uganda.

2.3 The Integrated Management of Childhood Illness (IMCI) approach

The Integrated Management of Childhood Illness (IMCI) strategy emphasizes treatment of all symptoms sick children present. Currently in health facilities, all children presenting fevers are supposed to be treated with both antibiotics and anti-malarial drugs on the basis that it could either be malaria or other infections, such as pneumonia. The IMCI approach and the home based management of malaria are likely to generate confusion: Should a child first be treated at home with *homapak*, and then if it does not work be brought to the health center to be treated according to the IMCI approach or should this approach also apply to other childhood illness such as pneumonia. There is substantial evidence that people treat cough and other related infections using antibiotics. However antibiotics are not the focus of home based treatment of childhood illness. The implication for the malaria in school health education project could be that apart from anti-malarial drugs, anti-biotic drugs should also receive due consideration in a health education component.

2.4 NDA To phase out provision of drugs by unqualified people

The National Drug Authority (NDA) is an independent government parastatal established the National Drug Policy and Authority Statute (1993) to oversee the compliance with and implementation of the drug policy in the country. NDA controls and regulates the importation, manufacture, export, quality control, storage, whole retail sales of pharmaceutical products. Section 14 of the National Drug Authority Statute restricts the mixing, composing, preparation, supply, and dispensing of any restricted drug unless one is a registered pharmacist, medical practitioner, dentist, veterinary surgeon, or a licensed person. Unless this clause is revised, the idea of availing anti-malarial drugs at home still remains illegal in principle. According to NDA policy, Drug shop premises must be licensed by NDA and supervised or managed by one of the following: Pharmacy technician,

Registered or Enrolled Nurse, Comprehensive Nurse, Registered or enrolled midwife, Clinical Officer, Psychiatric nurse, Orthopedic nurse, Dental assistants and Anaesthetic Assistant. It still remains questionable as to how *homapak* that comprise of SP (see section 2.1.5) can be sold "over the counter" when SP according to policy has not been declared an "over the counter drug".

2.5 Policy Changes in the Recommended First Line Treatment for Malaria

The first line treatment recommendation for malaria has recently been changed from Chloroquine as first line treatment to a combination of CQ and SP (MOH June 2002). The launching of *Homapak* to be used for home management of malaria through community distributors adopts this strategy. Changes in the recommendations for treatment of malaria are due to reoccur as resistance patterns change. According to one of the malaria experts we talked to, the combination therapy is a tentative measure as there is suspicion that both drugs combined still remain weak. According to Talisuna (2002), countries that adopted CQ and SP as an interim first line treatment, may need to re-evaluate their decisions. In school health education, this also needs to be taken into consideration. Considering these problems, we explored the views of different stakeholders (Ministry of Health, Ministry of Education & Sports, National Curriculum Development Center, Districts). From the consultations, there were positive opinions toward integration of teaching about drugs in the school curriculum. Most stakeholders were in favor of teaching children to find out about malaria treatment from their local health facility, rather than teaching them to take decisions on what to take specific medicines. However, some teachers were cautious about this solution saying that teaching which involves taking children out of the classroom and consulting a health worker is not practical. They preferred teaching children the correct dosages directly and being updated through the ministry about changes in the recommended treatment of malaria.

2.6 Contradicting Policies and Messages

Although, the policy recommend first line treatment of malaria is CQ combined with SP the information on the ground still indicates malaria should be treated with CQ. In messages to the public it is only when CQ fails that SP was recommended. SP was also recommended for malaria in pregnancy. We recorded some of the adverts from some of the FM radios:

- (1) Eee eee eee, my child has been crying since morning. He is very hot and weak.
That is malaria, let us give him chloroquine and also pass a wet cloth on his body so that his temperature decreases.
Malaria can kill a child if not given proper treatment.
You have to make sure that you give your child a full dose of chloroquine.
If there is no any change in his illness then take your child to the nearest doctor.
Parents remember that malaria kills. Make sure that your child gets proper treatment as soon as possible. The Ministry of Health brings this message to you.
- (2) (Knock on the door).
Be alert, malaria is all over the country and it has affected many while it has killed many others. Remember that malaria is spread by mosquitoes. Mosquitoes lay their eggs in stagnant water, broken pots, empty tins and bushes around our homes. We can prevent malaria and treat malaria by taking full doses of chloroquine every time we get malaria, closing both doors and windows in the evening, getting rid of empty tins and broken pots, digging bushes around our homes and we also have to get rid of swamps near our

homes and if you can use a mosquito net at night when sleeping in order to avoid mosquito bites.

This is a message from the Ministry of Health.

(3) (Knock on the door).

What has happened? Why is there no response?

You are welcome! My husband is sick; he has a headache and also joint pains all over his body. That might be fever, many people get those symptoms, it must be malaria. Our doctor told us that in order for one to be cured from malaria, one has to take a full dose of chloroquine. Now that your husband is an adult, he has to take 4 tablets of chloroquine the first day, then again 4 tablets of chloroquine the second day, then lastly on the third day, 2 tablets of chloroquine.

Malaria can be treated by taking a full dose of chloroquine.

Chloroquine is effective and it's found in all hospitals and pharmacies. Take a full dose of chloroquine every time you get malaria.

If malaria fails to cure, then take 3 tablets of fansidar.

In case there is no any change, go to the nearest doctor.

This message is brought to you by the Ministry of Health.

(4) Malaria causes miscarriages. And I think I have malaria! What can I do?

Don't worry, malaria can be treated and prevented from affecting your pregnancy. Take 3 tablets of fansidar once during the 4th month and again 3 fansidar tablets during the 7th month of pregnancy.

Sleep under a mosquito net; attend the antenatal clinic for proper medical examination and management of any illness.

If you get malaria, seek early treatment from a trained health worker.

To prevent risks of malaria during pregnancy, women should take 2 doses of fansidar during pregnancy; the first dose of 3 tablets of fansidar should be taken at least during the 2nd month and the second dose, 3 tablets of fansidar during the 7th month. This is a message from the Ministry of Health.

These messages were recorded from the radio adverts, some were initially in English and some were in Luganda (one of the local languages) and then later translated into English. Although the policy about the first line malaria treatment has changed, the information being given to people still talks of the old first line treatment. The adverts do not take of the school age category. It mainly takes care of the adult population.

2.7 What Policy Makers say about Integrating Malaria Treatment Education into the School Curriculum

In the previous section we examined the various policy developments in relation to school health promotion, malaria treatment and the related drug policies. In this section we present the responses of different policy-makers and implementers to the idea of including a component on the use of malaria medicine in school health education.

2.7.1 *Ministry of Health*

The ministries of health officials were positive about the idea of integrating a health education component into the school curriculum. According to them, introduction of a malaria treatment component in the education curriculum of the upper primary level would mean empowering children with skills that would enable them to look after their health better:

"I think the pupils would actually be the beneficiaries of this development but at the same time the pupils would have to share this information with parents who are illiterate". (a MOH official reported).

Moreover, it was argued that with this treatment component pupils will grow up to be responsible parents in future, capable of taking care of the medical aspect of their families, knowing when to seek medical help and when to take action themselves.

At the same time, MOH officials were concerned about how to design a simplified curriculum so that the children are not given too much medical knowledge and responsibility:

"You are not going to train health care workers. I think you are just going to empower these pupils to seek malaria cure information but you are not going to encourage them to treat themselves. I think it is important to give the pupils information on where they should go to in case they fall sick and what they should do. But pupils must be told about the dangers of treating themselves or others" (noted one MOH official).

Hence, the content and areas of emphasis need to be carefully conceptualized. The following were the areas of emphasis by policy makers regarding what should be included in the school curriculum:

- Causes of malaria (malaria vectors).
- Transmission (this is mainly through mosquitoes).
- The nature of the environments that promote the breeding of mosquitoes (bushy surroundings coupled with stagnant water).
- Prevention of the disease (using mosquito nets at home, clearing of bushy areas around and draining of stagnant water around), how to reduce contact with the mosquitoes (pupils need to be told about the need for constant use of mosquito nets).
- Home treatment: that simple malaria can be treated at home.
- Hospital treatment: that complicated malaria should always be referred to qualified personnel in medical facilities.
- Pupils need to be given some information on the dosages of some of the anti-malarial drugs. The problem they noted was the rapidly changing treatment regimes, which make it 'dangerous' to recommend particular drugs for the curriculum.

The Ministry of Health officials were also of the view that the integration of components of malaria treatment into the school curriculum could build on the approaches currently enshrined in the Health Education Curriculum, which include some of the following: Health education, water and sanitation, medical and dental care, nutrition, psychosocial development, safety and security, health promotion for the staff, school community partnership and disease transmission (Personal Communication from a MOH official). This proposal fits quite well into the ministry's policy of rejuvenating the school nurse system. The school nurses who will also be trained, as teachers will also be coordinating and teaching all the health related subjects in the schools.

It was recommended that the education curriculum in primary schools should also be introduced in secondary schools since some of the pupils who will continue to this level will have an opportunity to further enrich and develop their knowledge and skills on malaria treatment.

2.7.2 *Ministry of Education*

Like the Ministry of Health officials, those of education were positive about the idea of integrating health education on malaria treatment into the school curriculum. To them if the MOH accepts the idea, there will be no problems with the integration. However they also cautioned that:

- Children should not be fed with too much medical information. Some of the officials preferred upper primary while others thought involvement of lower primary is also crucial. The reason for the latter argument is that under UPE the dropout rates are high and hence to give all the children a chance to get this information before they leave school education on malaria treatment should be scheduled to begin in the early years.
- Emphasis should also be put on combining treatment of malaria with preventive aspects that are already well integrated into the curriculum.
- It may be difficult to integrate specific information on drug indications in the curriculum since drug recommendations are changing from time to time.

2.7.3 *Curriculum Development Center Officials*

The curriculum development officers were in support of introducing a health education component on the treatment of malaria into the school curriculum. However, they cautioned that proper steps are observed when developing the curriculum. They indicated that teaching about illnesses is an integral part of the current primary school health curriculum. Besides, there is already a program on life skills, which encompasses amongst other children's responsibility in health care. The curriculum personnel expressed willingness to participate in the study if called upon. Unlike officers from MOH and Education, they were not much worried about the changing drug regimes since the curriculum can always be adjusted whenever need arises. The information about the changing treatment regimes can always be passed to schools through circulars, they argued.

2.7.4 *National Drug Authority (NDA)*

Although NDA officials supported the idea, health education on the treatment of malaria in schools, they hastened to add that the proposed research should NOT promote self-treatment among school children. It should rather promote *better use of medicines in general*. NDA officials were very enthusiastic about being involved in such a study as it would enable them to understand more of the community dynamics. NDA's interests were to limit prescribing of medicines by untrained people through encouraging licensing of drug distribution. They were aware of the short comings of the regulatory system and to them health education in schools would also discourage people from buying drugs from informal sources. It was also hoped that by participating in the study, NDA would understand more about drug misuse in communities and be able to design appropriate interventions.

2.7.5 *District Officials*

In Tororo District we interviewed a representative of NDA, DHE respectively, The District Drug Inspector, the District Education Officer, and Inspectors of Schools. In principle all the officers interviewed were positive

about the idea of integrating malaria treatment in schools. For instance the NDA representative noted that since high illiteracy levels have always undermined health education efforts, this study would be of seminal value to NDA's efforts of rational drug use:

"I think this study is timely and will go a long way in helping us succeed. This project, to me is very relevant and we now have to look for the way forward. Educating the masses should be one of the ways forward but the problem is what methodology should we adopt? I think *we* should begin by encouraging education in schools to facilitate proper use of drugs among the young children."

The NDA official attributed the current resistance to anti malarial drugs to poor management and knowledge. Most of the people get treatment from drug outlets run by unqualified personnel who give wrong prescriptions. He acknowledged the fact that it is difficult to close such outlets since this would mean putting the lives of the poor beneficiaries at a great risk since as these outlets are the only option for many people. The NDA policy is to educate people about appropriate care seeking so that illegal drug providers can gradually phase out. He was optimistic that hence the school health education on drugs will be of great contribution to such efforts.

The drug inspector noted the study would contribute towards better realization of improved drug use in communities. Already, there are community-based distributors of anti malarial drugs who according to him do not have sufficient knowledge. If everyone gets basic knowledge on drugs, this would improve community-based distribution and use of drugs.

The education officials at the district, apart from supporting the idea, stressed the importance of including the teacher training colleges in the curriculum design. They also emphasized the need to orient the health education towards more practical skills. Children may get the ideas in theory to enable them pass exams. But if they cannot utilize what they have learnt in their daily lives then they will not be able to assist their families in improving drug use.

2.8 Knowledge and practices related to Malaria among School Children and Teachers.

This section discusses the levels of knowledge and practices of teachers and school children about malaria and its management. The issues presented in the section are derived from the focus group discussions held with teachers and children, medicine maps drawn by children and general observations from the schools.

2.8.1 Pupils' Experiences and Understanding of Malaria and Use of Malaria Medicines

Children revealed that malaria was a common health problem in their homes. During the Focus Group discussions, children narrated that they had more of malaria than any other disease, and in most cases they were first treated at home:

"One night I started feeling headache. I was shivering and mummy was not home yet. My Auntie gave me some Panadols and she covered me properly. She called mummy who came gave me some Chloroquine. In the morning I was a little better. I stayed home and after a day I felt better and I went to school". (Girl)

"One day in the morning while I was at school. I started feeling dizzy. I went to the school nurse and she gave me some medicine, which I can't remember well. I went back home later and I told mummy and she

checked my temperature using a thermometer. My temperature was still high so she gave me some quinine tablets. I knew they were quinine tablets because it was written on the small envelope. The next day I stayed at home and the following day I felt better". (girl)

As indicated in the above quotes, most children commonly have experiences of malaria and using this experience, they can confidently describe its signs and symptoms. The reported signs and symptoms of malaria were uniform in all schools and included high temperatures, joint-pains, vomiting, headache and loss of appetite amongst others. In most of the cases, self-medication at home was in most cases the first response both in rural and urban areas. Painkillers are also commonly taken as the first choice followed by anti-malarials. There were few instances where children underwent blood slide tests mainly in Kampala and Tororo town. Children also reported that anti-malarial drugs and painkillers are bought from shops, drug shops and clinics. Pupils from higher socio-economic class schools in Kampala were reportedly given Panadol as a form of first aid at school whenever they felt fever. Immediately, their parents would be summoned to take the child for treatment. In more effective urban better-off schools had a school nurse arrangement whereby children who fell sick were attended to. In one school in Kampala, we saw an improvised sick bay where children were being taken care of before their parents came. In low income¹ class schools, children who fall sick are sent back home to their parents.

Regarding causes, irrespective of their socio-economic status, children did not present accurate information on what causes malaria. Although children generally associated malaria with mosquito bites, some at the same time associated malaria with: playing in the rain, walking for long distances and drinking dirty water. Children often mentioned causes other than mosquito bites and commented that they did this because they had not seen or felt any mosquito biting them and yet they got malaria. When we asked children what they had learned about malaria in schools, it was commonly mentioned that they were taught that malaria is caused by mosquito bites. They did not, however, seem to reflect on this contradicting knowledge and experience. It should be noted that such beliefs reflected in children responses constitute the perceptions held at the community level. This is confirmed by the fact that although children were taught that malaria is only caused by mosquito bites, they often mentioned other causes which they had learnt from the wider community.

2.8.2 *Pupils Knowledge about Medicines (sorting & mapping exercise)*

From the foregoing section it was noted that children were used to the habit of taking drugs at home when they fell sick. Most children were able to mention some of the drugs that they were given. We tried to explore further pupils' knowledge about medicines through sorting of medicine cards and drawing maps of where medicines were bought. Children sorted out the medicine cards according to what they thought the medicine on the cards treated. Apart from enjoying the sorting exercise, children also demonstrated that they have substantial knowledge about medicines and knew to some extent what these medicines treated. Children knew more of anti-malarial drugs compared to other drugs. Table 2 gives the details of what the groups of children thought were anti-malarial drugs in each of the schools.

¹ Low income schools in this case included the urban poor schools and the rural schools.

Table 2:Anti-Malarial Selection according to Schools

Name Of Schools & Location	Drugs Identified School Children As Anti- Malaria Drug
1. Kampala Urban	
• City Parents	Malaraqine, Naboquine, Kamaquine, Interquine, Renequine, Fansidar
• Kitante	Antenam, Fansidar, Chloroquine, Quinine, Comaquine
• Nakivubo Settlement (Kampala Urban slum)	Chloroquine, Kamaquine, Metakelfine, Fansidar, Action, Nobaquine, Homaquine, Quinine
2. Tororo Urban	
• Agururu	Hedex, Action, Chloroquine, Fansidar, Kamaquine, Aspirin, Quinine
• Amagoro	Codafex, Homaquine, Kamsidar, Neverquine, Renequine, Malaraqine, Kamaquine, Metakelfine
• Rockside academy	Homaquine, Kamsidar, Neverquine, Renequine, Malaraqine, Hedex, Quinine, Flucap, Chloroquine, Action, Panadol
3. Tororo Rural	
• Apuwai	Fansidar, Flaggyl, Action, Chloroquine, Magnesium, Nobaquine, Metakelfine, Interquine, Ex-pen tabs, Kamquine, Homaquine, Hedex, Aspirin, Panadol, Malaraqine, Malagon, Quinine, Benzathine, Penicilline
• Kwapa	PPF, Piriton, Fansidar, Action, Hedex, Panadol, Pen V, Quinine, Aspirin
• Asinge	Rob ointment, Hedex, Quinine, Flucap, Chloroquine, Action, Panadol, Kamsidar, Aspirin, Vitamic C, Malaraqine, Vitamic B Complex, Nobaquine, Malaraqine

There were distinct variations in the sorting of medicines according to location and socio-economic class. Pupils from Kitante and City Parents were accurate on the selection of anti-malarial drugs. In urban and rural Tororo and Nakivubo Settlement in Kampala, pupils mixed up anti-malarial drugs with other drugs such as antibiotics. Even in the local health units, the IMCI approach emphasizes treatment of all the symptoms presented especially for children. Therefore from the health unit experience, children have learned that fever¹¹ or *musujja* (in local languages) is treated with both anti malarial drugs, anti-biotics and painkillers.

Children said that they knew about most of these drugs because they had ever received or bought these drugs when they were sick or when family members were sick. The pupils further revealed that they could tell the names of the drugs they are given by reading on the envelopes or packages in which these drugs are packed. They also mentioned getting information about drugs from advertisements in shops and on billboards and from commercials on radio and TV programs. Children in Kitante, when trying to recall what aspirin treats, recited one of the commercial songs they often hear on the radio in Luganda.

2.8.3 *Options for Treatment of Malaria*

Children were asked to draw medicine maps to show where they usually get drugs. From the maps from different groups of children in the schools, it was clear that children were conversant with the drug sources where they are residing. Most of the drug sources named on the maps were easy to locate when we visited the places. Sources that were commonly marked on the maps included shops, clinics, hospitals, drug shops, the forest or bush, healers and pharmacies (in Kampala).

2.8.4 *Teachers' knowledge and experiences with malaria*

Like pupils, teachers were asked to narrate their experiences with malaria. All teachers irrespective of the location had experienced episodes of malaria. In Nakivubo Settlement School one of the teachers commented:

“Even us teachers get sick of malaria. In fact in this school, teachers even suffer from malaria more often than the pupils do”

Most of the teachers reported that they ‘self-medicate’ before going to professional health workers when they have malaria. If the self-medication fails they resort to the clinics and government facilities. In Kwapa (Tororo) teachers said they go to Kwapa health Centre or a local private clinic. In Tororo urban and Kampala, teachers had a variety of options where they went for treatment ranging from private clinics, government health units and drug shops. Minority reported that they first took blood tests before taking drugs. Experiences of malaria were similar among teachers, irrespective of the socio-economic status of the school.

2.8.5 *Teachers Knowledge about Drugs*

During the discussions, the teachers were asked to sort out the same medicines that were given to the pupils. In some schools, teachers clearly categorized anti-malarial drugs and painkillers. In others, teachers combined and vividly discussed whether they were malaria medicines or not. During these discussions, we explored their views about the changing malaria manifestations and treatment regimes. Teachers reported that malaria of today is more severe than it used to be and it has become resistant to some anti-malarial drugs such as Chloroquine.

¹ Fever is often used interchangeably with malaria. But fever actually encompasses more than malaria to include fever due to pneumonia and other infections.

There were few teachers who said they were using bed-nets to prevent malaria infection. They reported not experiencing malaria as a result. There were no variations regarding this in terms of socio-economic status and location. Other teachers said that they had tried using mosquito nets, but did not find this effective because nets were uncomfortable. Other preventive measures included: cutting grass on the compound, getting rid of stagnant water and taking anti-biotic drugs (Septrin) as prophylaxis (for those who acknowledged that they were HIV positive) and planting of the Neem trees which are said to scare away mosquitoes. It was apparent that teachers did not know the importance of the mosquito nets relative to other preventive measures.

2.8.6 *Teachers' Attitudes to Malaria Treatment Education*

In all the schools visited, teachers were positive about the idea of introducing elements of malaria treatment into the school curriculum because;

- Children can assist their parents to administer the drugs appropriately since many parents are illiterate.
- Children are already aware of and are using the drugs that treat malaria but they don't know the right dosages or only know them vaguely.

The following are some of the remarks of teachers about the integration of malaria treatment in health education:

- “It is important to teach malaria treatment in schools because it is the leading cause of mortality and morbidity in the country.”
- In fact it is already in our syllabus. We mainly teach our students about the life cycles of mosquitoes, their habitats, what disease they cause and how we can get rid of them. However, some of these kids already know about the prescriptions for malaria, but this information is not examinable.”
- “Different drugs treat different diseases so I think it is really important that malaria should be addressed in schools so that the young kids grow up knowing how to fight the disease. Actually we are already teaching about malaria, its vectors, how to prevent getting it and how it can be cured.”
- “Malaria is the major killer of children in Uganda today and this is the reason why we should empower all the kids with this information on how to cure the disease. Children should be taught about malaria right from primary level. They should be taught about the cause, prevention and the cure for the disease.”
- “For me, I think the major issues that should be addressed in the malaria component should include the dosage and the side effects of the malaria drugs. Children should also be cautioned about the danger of using un-prescribed drugs since this can easily lead to death. It would be more logical to teach only those pupils in upper primary – say P7, because these ones can easily understand.”
- “I suggest that the teaching should be done according to the levels or classes. I think children from P3 to P5 should only be taught about the causes and prevention of malaria but the teaching treatment should be reserved for those pupils in P6 and P7. Children should also be taught that the symptoms of malaria have changed.”

In all the schools visited, there were a few teachers who had reservations about teaching children on drugs. The concern was how deep the teaching should go. These teachers felt that some pupils would end up being confused

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and misusing the drugs. Teachers with this view gave an impression that the children at the primary level are not mature enough to deal with the drugs.

The teachers who were positive about introducing educating children on drugs, were concerned, they acknowledged that they do not have the capacity to teach this at the moment since they were not trained on medicines and their use when they were in college. Hence health education refresher courses will be mandatory if elements on drug use are to be integrated into the school curriculum.

2.9 *Illness Categories Which Children Said they Knew*

The material presented in this section is based on the findings from the pupils' tests. In the questionnaire, children were asked to list all the illnesses they knew. The table below provides a summary of illnesses written by children grouped in categories:

Table 3: Illness Children said they knew

Illness category	Frequency	Percentage
Malaria	996	29.3
Gastro Intestinal disease	755	22.2
Headache	645	19.0
Respiratory tract infections	478	14.1
Other	384	11.3
Childhood immunisable disease	102	3.0
Total	3360	98.8
Missing	41	1.2

Of the diseases children know malaria scored highest (29.3%) followed by gastro-intestinal diseases (22.2%), headache (19.0%) and respiratory tract infections (14.1%). It should be noted that children categorized headache as a disease, whereas it is a symptom of other diseases including malaria).

2.9.1 Illnesses the Children had Suffered From

Children were also asked to list the illnesses they suffered from since the last vacation (approximately four months). When categorized into the following illness categories, these frequencies came out:

Table 4: Illnesses the children suffered since the last vacation

Illness category	Frequency	Percentage
Malaria	440	25.0
Gastro Intestinal disease	410	23.3
RTI	313	17.81
Childhood immunisable disease	215	12.2
Headache	205	11.70
Other	174	9.9
Total	1557	100

Of the diseases the children said they have ever suffered from, malaria (25.0%) still featured highest, followed by gastro-intestinal diseases (23.3%), the RTI (17.8 %), childhood immunisable diseases (12.2%), and headache. Children were also asked whether they were able to go to school when they had the above illnesses. Among the six illness categories, malaria was a major cause of absenteeism followed by gastro-intestinal disease. Out of the 440 children who had had malaria, 323 (73.4%) of the children said they were not able to go to school.

2.9.2 Medicines known by Children

Children were also asked to list down the different medicines they received or came across from the hospital.

Table 5: Hospital medicines the children reported

Name of drugs	Frequency	percent
Analgesics	846	37.8
Antibiotics	362	16.2
Anti Malarial drugs	607	27.1
Cough medicines	85	3.8
Vaccines	2	1
Nutrition	7	3
O.R.S	41	1.8
Others	94	4.2
Skin Ointment	15	7
Anti worms	35	1.6
Anti acid	128	5.7
Anti histamines	18	8
Total	2240	100

As the table above indicates, of all the hospital medicines listed down by children, analgesics were most commonly mentioned (37.8%), followed by anti-malarial drugs (27.1%) and antibiotics (16.1%). This pattern is not surprising because analgesics are commonly used as a first resort in self-treatment. Furthermore analgesics often serve as a supplement especially for reducing pain and temperatures. These were given to the pupils both at home and school. Besides this, analgesics are easily accessible and unlike the other drugs, they are not restricted, but over the counter drugs. Hence in their daily experiences children come across more analgesics than any other drugs. Anti-malarial drugs follow second because malaria/fever is the most common health problem in this age group.

2.9.3 Children's knowledge about the Treatment of Malaria

The majority of the children indicated that malaria is treated by anti malarial drugs. Very few mentioned that malaria can be treated with analgesics and antibiotics. The mentioning of analgesics was rather low considering that in they are combined with anti malarial drugs in most cases. Less mention of antibiotics is surprising, since they are expensive and hence not commonly used. However, to those who have been to health facilities, antibiotics are sometimes combined with anti - malarial drugs due to the presumptive IMCI treatment approach.

Although the majority of the children indicated that anti-malarial drugs treat malaria, very few (1.1%) could tell the right dose for malaria treatment. Of the eight pupils who gave the correct dosage of anti-malarial drugs, two were from the urban schools while six were from the rural schools. Although many children do know the right drugs for malaria, the vast majority (99.9%) does not know the right dose for their respective ages.

Table 6: Children who were able to tell the right dose for malaria

	Frequency	Valid Percent
Correct Dosage	8	1.1
Wrong Dosage	703	98.9
Total	711	100.0

2.10 Inventory of Drug-shops

An inventory was conducted in drug shops in all the three locations. All the drugs in the shops were listed and later on anti-malarial drugs were singled out. We noticed variations in drug stocks, brands and prices of anti-malarial according to location. There were relatively fewer anti-malarial drugs found in drug outlets in rural Tororo compared to urban Tororo and Kampala. The number of types of anti-malarial drugs stocks was larger in urban Tororo and was much more in Kampala. In the two urban areas there were more brands of chloroquine and SP compared to the rural areas. In rural Tororo, the most expensive drug was Fansidar, which costs 1500/= (US \$ 0.8). In Kampala, the most expensive drugs were Artenam and Halfan that cost up to 15.000 Uganda shillings (USD \$8). Most of the drugs sold in rural Tororo and urban Tororo were also in Kampala. But there were some anti malarial drugs such as Halfan and Artenam, which were only sold in Kampala.

Costs of anti-malarial drugs varied in drug shops both in rural and urban settings. Chloroquine was the commonest anti-malarial in the surveyed drug shops, but with its cost per dose varying between 150-500 Ug shillings. (A dose taken as ten tablets for an adult). According to the drug providers Chloroquine is given to the following categories of clients (1) those who asked for it (2) those who had the first bout of illness (3) those who could not afford other anti-malarial drugs that they would otherwise have taken since Chloroquine appears the cheapest and (4) those who came with prescriptions.

Other than Chloroquine, there are other branded anti-malarial drugs being sold and taken as treatment of malaria. They include Nobaquin, Kamaquin, Amodiaquin, Sugarquine and Midaquin. According to some of the providers, the severity of illness, people's perception of potency, and the price are the common factors that determine the customer choice of the anti-malarial drugs. In most cases, the customers are given their preferences and it is only when they request for advice that the providers choose for them.

Discussions held with providers indicated that patients' compliance still remains a problem and the providers attributed this to poverty and ignorance. In most cases people cannot afford to prioritize buying a complete dose of Chloroquine and are told to come back and complete the dose. Most of the customers still do not usually come back to finish the dose. Some providers noted that the child clients who come to buy drugs are often what they referred to as "under aged". Sometimes the children do not know what they have been sent to buy and cannot grasp the instructions the provider gives about taking the drugs. Most of the providers interviewed were not in favor of integrating a health education treatment of malaria in the school curriculum. This is because most of them still think that children are not mature enough to be trusted with drugs. They were worried that children were most likely to abuse the drugs if they were given much information on the drugs.

CHAPTER THREE

CONCLUSIONS AND RECOMMENDATIONS

3.1 Introduction

The current school health education and promotion policy provides a strong benchmark for the implementation of improved malaria education in school. Besides, if the home management of malaria approach is to succeed, there is need for deeper involvement of school children in malaria management. This conclusion is based on the assumption that children constitute the majority of the literate members of most families.

At the same time such an approach is likely to face policy constraints if the current contradictions in health policies on drugs are not ironed out. The apparent parallel nature of implementation of programs needs to be streamlined. Hence the project should be able to initiate a policy reform and dialogue with an objective of ironing out such contradictions. Crucial issues worth considering are the problem of legitimizing the currently considered illegitimate drug supply and provision channels. A level of understanding about how far the informal drug provision should go should be worked out. Secondly, a process of negotiation about the way of regulating home management of malaria should be worked out. Hence the malaria in schools project should initiate a process of dialogue between policy makers so that they can negotiate these issues.

The policy makers visited during this study were positive about the idea of integrating health education on malaria into the school curriculum. However, on the ground there seems to be no policy commitment. The malaria in schools project could consolidate this potential by involving the key stakeholders at policy level in the design and implementation of the project.

An overview of some of the education materials shows that some materials on malaria education are already in place in terms of health Education and promotion. However, the content of the health education needs to be considered. Issues of better medicine use should be included.

Some of the stakeholders we did not have in mind at the conception of this project were the teacher training colleges that constitute the core of the training of teachers and development of the related materials. In the course of data collection we were notified of their importance, which should be considered.

The study findings indicate that the children have experience of malaria as a sickness: they know a wide range of drugs that treat malaria. However, there were problems of children not being able to tell the right dose. This is another justification of the need to address this through educating the children on the proper dosages of common anti-malarial drugs.

The findings show that children knew analgesics more than any other drugs, followed by anti-malarial drugs and antibiotics. In their daily experiences, children come across more analgesics than any other drugs. Hence it is important to include analgesics into the school health education on drugs.

Teachers demonstrated much knowledge and experience on malaria as a disease. However, like the children, they did not know on the right dosages of anti-malarial drugs. Given the current level of knowledge on malaria management, teachers cannot adequately handle the subject without further training. If education on medicine is

to succeed, as a pilot requirement, the teachers should receive courses on malaria and the related treatment approaches. As a long-term measure, the training curriculum for teachers should also integrate aspects of anti-malarial drugs.

Management of illness at home continues to remain a common practice. The study findings show that medicines kept at home was one of the sources of treatment. People keep medicines for precautionary reasons and hence this gives more justification for home management approach. Children who go to school and learn to read and be critical about medicine use can be a great asset for the home management strategy.

According to the drug inventory made, there were variations between rural and urban areas in terms of anti-malarial drugs sold. In rural areas the stocks include cheap anti malarial drugs compared to more expensive ones sold in towns. Besides, there were so many brands of anti-malarial drugs in urban areas. Hence a question remains about which anti malarial drugs should be stressed in the schools. Although generic names would reduce the number of anti-malarial drugs, the common tendency is that people are used to brand names. This is a problem for the syllabus, especially that brand names also change from time to time.

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