

**Health workers' compliance to treatment guidelines for
uncomplicated malaria under the artemether-lumefantrine
drug policy in Hoima District**

BY

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2005/HD20/1460U

**A dissertation submitted in partial fulfillment of the
requirements for the award of the Degree of Master of Public
Health of Makerere University**

March 2013

DEDICATION

I dedicate this book to my parents Mr. and Mrs. Balyejjusa who have done their best, within their means, to provide me with the best in life, including sponsoring me for this course.

ACKNOWLEDGEMENT

I extend my sincere gratitude to my supervisors, Dr. Talisuna and Mr. Mukanga for their contributions, which served to enrich this book. Thanks also to my lecturers at the Makerere University School of Public Health, from who I picked vast amounts of knowledge and skills, both within and outside the field of Public Health.

My sincere gratitude goes out to the Department For International Development (DFID), for funding this study.

Special thanks go out to Dr. Joseph Ruyonga, the District Medical Officer of Hoima District and the entire District Health Team for their unlimited support during the time I spent in Hoima district.

I also recognise the contribution of the Research Assistants, who helped me gather this information. In the same light, I thank all persons who accepted to be interviewed for the study.

To my husband, Hebert, thank you for encouraging me to finish this book, and for the useful criticism.

I also thank my classmates, Joseph Ouma and other public health professionals like Dr. Sheba Gitta and Dr. J.B Ddamulira for their support during the writing of this dissertation.

Last, but definitely not the least, I thank God, without whom nothing is possible.

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LIST OF ACRONYMS AND ABBREVIATIONS

- AMDP:** Antimalarial Drug Policy
- CFR:** Case Fatality Rate
- CQ:** Chloroquine
- HBMF:** Home-based Management of fever
- HMIS:** Health Management Information System
- HU:** Health Unit
- HW:** Health worker
- MCP:** Malaria Control Programme
- MoH:** Ministry of Health
- PNFP:** Private-not-for-profit
- SP:** Sulfadoxine/Pyrimethamine
- WHO:** World Health Organisation

OPERATIONAL DEFINITION

Compliance to treatment guidelines: Prescription by a health worker of an adequate weight-specific regimen of artemether-lumefantrine; informing the caregivers of children aged 4-59 months of the correct way to take the medicine; advising that the drug be taken after a meal, and that the full course of treatment be taken even if the child starts feeling better.

Health worker involved in the care of children: Health worker who participates in out-patient consultations for children aged 4-59 months on a given survey day.

ABSTRACT

Introduction: In June 2004, the Uganda Ministry of Health changed the antimalarial drug policy from chloroquine and fansidar to a fixed combination of artemether-lumefantrine. Consequently, new case management guidelines were drawn up to aid health workers in the implementation of the new policy.

Objectives: This study aimed to assess the compliance of health workers to the new treatment guidelines, under the artemether-lumefantrine drug policy. Factors that influence compliance of health workers to treatment guidelines were also assessed.

Methodology: This was a health-unit based survey carried out in Hoima district in North-western Uganda. It was a cross-sectional study where 40 government-owned and private-not-for-profit health units were included in the study, and each was visited once during the study period. In addition 79 health workers involved in out-patient consultation for children aged 4-59 months on the survey day were interviewed. For each health worker, 2 caregivers of children aged 4-59 months who were diagnosed with and treated for uncomplicated malaria were also interviewed resulting in a total 158 caregivers. Data were collected using a questionnaire for health workers; a checklist for health units; an exit interview for caregivers of children aged 4-59 months, and a key informant guide for in-charges of health units.

Compliance with treatment guidelines was defined as prescription by a health worker of an adequate weight-specific regimen of artemether-lumefantrine; informing the caregiver of the correct way to give the child the medicine; advising that the drug be taken after a meal, and that the full course of treatment be taken even if the child starts to feel better.

Results: Health workers were found to be fully compliant with new national malaria treatment guidelines in only 53 of 158 (34%) instances when they were assessed. Level of formal training of the health worker was significantly associated to compliance with malaria treatment guidelines. Clinical officers were 3.4 times [OR: 3.42 95% CI (1.29, 9.32)] more likely to be compliant compared to nurses / nursing aides. Also health workers who had been supervised regarding the new AMDP were 2.8 times [OR: 2.78, 95%CI (1.19, 6.52)] more likely to comply compared to their counterparts who had not

been supervised. Health unit factors such as level of health unit; presence of at least one functional thermometer or weighing scale did not have any influence on health worker compliance.

Conclusion: The overall compliance of health workers with treatment guidelines for uncomplicated malaria is low.

Recommendations: There's need to strengthen support supervision of health workers at their work stations, so as to strengthen weak points, especially in drug dispensing and counselling of patients. More importantly, this policy change should be integrated into the curricula of training schools for health workers at all levels.

Key words: *Hoima, Malaria, Artemether-Lumefantrine, compliance, treatment guidelines, health workers*

CHAPTER ONE

1.1 INTRODUCTION

1.1.1 Global malaria burden

Despite considerable progress in malaria control over the past decade, malaria remains one of the most important and potentially fatal parasitic diseases in the world (Enato and Okhamafe, 2005). The number of countries with areas at risk of malaria transmission reduced from 140 in the 1950s, to 107 in 2004, and rose again to 109 in 2008, with 3.3 billion people still at risk (WHO, 2000; WHO 2008). The estimated number of clinical disease episodes occurring annually worldwide has dropped from about 350–500 million (Korenromp, 2004; Greenwood *et al*, 2005), to 247 million cases in 2006 (WHO, 2008). Approximately 60% of the cases of clinical malaria and over 80% of the deaths occur in sub-Saharan Africa (WHO, 2003). Further, more than 1 million Africans die from malaria each year, most of whom are children under 5 years of age (WHO, 2003; Snow *et al*, 2005, WHO, 2008).

Recent estimates indicate that the global burden of disease due to malaria is falling, with 29 countries reporting at least a fifty percent decline in malaria cases and deaths worldwide (WHO, 2008). This has been the result of increased access to Long Lasting Insecticide-treated nets (LLINs) and the use of artemisinin-based combination therapies (ACTs) supported by Indoor Residual Spraying (IRS) and Intermittent Preventive Treatment in pregnancy (IPT). However, challenges still remain with regard to access to these life-saving measures by susceptible populations (WHO, 2008). The previous rise in malaria mortality rates in Africa was probably due to the then increasing resistance to insecticides and available antimalarial drugs; the breakdown in public-health infrastructure; and land-use changes such as dam building, irrigation, and deforestation (Sachs and Malaney, 2002; WHO/UNICEF, 2003). Malaria also contributes significantly to anaemia in children and pregnant women; adverse birth outcomes such as spontaneous abortion, stillbirth, premature delivery and low birth weight; and overall child mortality (Steketee *et al*, 2001; Guyatt *et al*, 2001). The disease is estimated to be responsible for an average annual reduction of 1.3% in economic growth for those countries with the

highest burden (Sachs, 2003). High as these figures may seem, it is thought that they are lower than the real picture because of inefficient reporting systems, but also because many malaria cases are treated at home, and also, deaths at home are often not reported (Greenwood *et al*, 2005).

1.1.2 Malaria burden, prevention and control strategies in Uganda

In Uganda, malaria is the leading cause of morbidity and mortality, accounting for 40% out-patient attendance and 9-14% in-patient deaths each year (MOH, 2000; Uganda National Bureau of Statistics, 2001). Transmission occurs all year round in most parts of the country. In 2006, there were 10.6 million reported cases of malaria (WHO, 2008). The incidence rate is 0.98 malaria episodes/child/year in children under 5 and 0.64 in older patients (CDC, 2004). In line with the Roll back Malaria (RBM) initiative the main intervention strategies against malaria in Uganda are prompt (within 24 hours) case management; intermittent presumptive treatment (IPT) during pregnancy; vector control (through the use of insecticide-treated materials and indoor residual spraying); and epidemic preparedness, prevention and response (MCP, 2000). 1.9 million LLINs were distributed between 2005 and 2006, while IRS began on a limited scale in 2005, protecting 500,000 people at risk (WHO, 2008). However, each of the strategies has met challenges in its implementation. For instance, effective and prompt malaria case management, the mainstay of malaria control, has been set back by the emergence of parasite resistance to antimalarial drugs (Kamya *et al*, 2000; Talisuna, *et al* 2002; Bakyaitya *et al*, 2004, Staedke *et al*, 2004; Yeka *et al*, 2005).

1.1.3 History and epidemiology of malaria drug resistance

The earliest anecdotal reports of resistance to an antimalarial agent are those for quinine in 1844 (Elioston, 1844). Since then, resistance to all known antimalarial drugs, except the artemisinin derivatives, has been reported in several countries (Mahomva *et al*, 1996; Enato and Okhamafe, 2005). Worse still, the rate at which drug resistance is spreading is faster than that of new drug development (Enato and Okhamafe, 2005), thus the need to maintain high levels of efficacy for the presently recommended first-line drugs for as long as possible.

Drug resistance has been associated with increased malaria-specific morbidity and mortality (Trape *et al*, 2001; Uganda Health Bulletin, 2001; Snow *et al*, 2003; Talisuna, 2004). Similar trends have occurred all around Africa, warranting a change in the antimalarial drug policy (AMDP) sequentially from monotherapy to combination therapy, preferably artemisinin-based combination therapy (ACT), which is anticipated, will delay the development of drug resistance (White & Olliaro, 1996; White *et al*, 1999; Yeung *et al*, 2004). The rationale for using fixed combination ACTs is that the two drugs have different modes of action, and therefore different resistance mechanisms. Therefore the per-parasite probability of developing resistance to both drugs at the same cell division is reduced (Peters, 1969; Curtis, 1986; Chawira *et al*, 1987).

The gold standard measure for drug resistance is clinical efficacy in symptomatic individuals who have been administered an antimalarial drug and are then followed up for a given duration (preferably more than 28 days). The clinical outcome is then classified as the clinical failure rate (early and late clinical failure), late parasitological failure (LPF) or adequate clinical and parasitological cure rate, which is measured in terms of the clinical failure rate for a given drug or combination (WHO, 2003). WHO recommends that a change of first-line treatment be initiated if the total failure proportion exceeds 10%. Other considerations include: prevalence and geographical distribution of reported treatment failures; health service provider and/or patient dissatisfaction with the treatment; the political and economic context and the availability of affordable alternatives to the commonly used treatment (WHO, 2006). Furthermore, because of the time required to implement a change in policy (usually 2-3 years); the evaluation of potential alternatives should begin as soon as failure of the specific drug starts to emerge (WHO, 2001).

1.1.4 Treatment guidelines for uncomplicated malaria

In June 2000, Uganda reviewed the antimalarial drug policy and adopted an interim policy of Chloroquine + Sulfadoxine/Pyrimethamine (CQ+SP) for the treatment of uncomplicated malaria (Kanya *et al*, 2002). However, since 2001, several antimalarial medicine efficacy studies in several sites in Uganda showed rising resistance to Chloroquine + Sulfadoxine/Pyrimethamine (CQ+SP), the 1st line treatment at the time

(Staedke *et al*, 2004; Fogg *et al*, 2004; CDC 2004; Bakayita *et al*, 2005; Yeka *et al*, 2005). Antimalarial drug resistance levels were as high as 30% in areas like Mbarara, southwestern Uganda (Legros *et al*, 2001; Priotto, 2003), warranting a review of the antimalarial medicine policy. Furthermore, other drug combinations like Amodiaquine + Sulfadoxine/Pyrimethamine (AQ+SP) and Amodiaquine+Artesunate (AQ+AS) showed mean clinical failure rates of 5.4% and 1.8% after 14 days of follow up. In addition, an effectiveness trial using Artemether/Lumefantrine (AL) in Mbarara showed no clinical failure after 28 days of follow up. In view of these findings, and WHO recommendations, the first-line treatment was changed to AL (coartem[®]) in 2004. Following this change, the Uganda Ministry of Health revised the training materials and treatment guidelines for health workers at all levels of care, to tailor them to the new AMDP (MCP/MOH, 2005b). This new policy has been launched and is being operationalised in all districts in Uganda, and the new artemisinin-based combination is being administered at health units, while CQ + SP continues to be used for Home-based management of fever (HBMF) (MCP/MOH, 2005a). A summary of the newly adapted AMDP is included below:

i. Treatment of uncomplicated malaria:

- The recommended first line medicine is Artemether/Lumefantrine. This medicine (Artemether/Lumefantrine) is not recommended for children below 4 months of age or 5 kg bodyweight and pregnant women in the first trimester. Artesunate+ Amodiaquine is the alternative when Artemether/ Lumefantrine is not available.
- The recommended second line medicine is oral quinine for all patients.

ii. Treatment of severe and complicated malaria:

- Parenteral quinine is the recommended treatment for the management of severe malaria for all patients. Parenteral artemisinin derivatives may be used if quinine is contraindicated or not available.

iii. Intermittent Preventive Treatment of malaria in pregnancy:

- Sulfadoxine/Pyrimethamine (SP) is the recommended medicine.

iv. Treatment of uncomplicated malaria for special groups:

• Pregnant women:

- During the first trimester quinine should be used instead of Artemether/Lumefantrine or other ACTs. After the first trimester, Artemether/Lumefantrine or other ACTs may be used.

• Children below 4 months of age:

- Artemether/Lumefantrine or other ACTs are not recommended for children below 4 months of age or 5 kg body weight. Such children should be treated with quinine.

Since the operationalisation of the new AMDP in Hoima district about a year ago, it remains unclear whether the policy has taken effect, and if so, the extent and gaps in its implementation.

1.2 HOIMA DISTRICT PROFILE

Hoima District is located in Mid-western Uganda. The district is divided into 2 counties, 11 sub-counties, 2 townships, and 53 parishes. Children under 5 years constitute 20% of the total population of 349,794. The health status indicators for Hoima are poor, having an infant mortality rate of 91/1000, under 5 mortality rate of 124/100,000 live births, and a maternal mortality ratio of 800/100,000 live births (DHT Hoima, District Health Profile, 2005). See Appendix for map of Uganda showing the location of Hoima District.

The main source of livelihood for the population is subsistence farming, which is dependent on the rainy season, which is also associated with the peak of malaria transmission (MCP, 2000). This adversely affects agricultural production, and the subsequent lack of cash means that people are unable to afford preventive measures such as insecticide-treated materials (ITMs); they get inadequate treatment or seek appropriate treatment late. This raises the likelihood of transmission to others, severe malaria and death. Malaria accounts for 33% of all causes of morbidity and mortality in Hoima district. As of 1998, the case fatality rate (CFR) for malaria in under fives was 10.7 (MCP, unpublished report), which is way above the lower accepted threshold of 4 for sub-Saharan Africa (WHO, 2006). In contrast, the CFR for persons older than 5 years in the district stood at 4.9 in the same period (MCP, 2000).

As of 1998, the parasitological failure rate for CQ in Hoima was 28%, while that for SP was 1%, within a 7-day follow up period (Ndyomugenyi & Magnussen, 2000). However, like the rest of the country, the combined resistance to both drugs continued to increase, prompting the change to the current AMDP, which calls for the use of ACTs (MCP, 2004). This policy was launched in Hoima district in March 2006, and activities included training of staff, followed by delivery of drugs.

CHAPTER TWO

LITERATURE REVIEW

2.1 Preamble

Early diagnosis, prompt and effective treatment is one of the strategies developed by WHO to combat malaria, and is the main pillar of global malaria control programs (WHO, 2000). However, antimalarial drug resistance is a major barrier to the implementation of effective malaria control policies in several African countries (EANMAT, 2001). This has resulted in the change of antimalarial drug policies in African countries, including Uganda. The latest policy change regarding antimalarial drugs in Uganda occurred in 2004 (MCP, 2005).

Effectiveness of the new AMDP will be largely dependent on the health workers' performance in drug prescribing, patient counseling and drug dispensing, which will in turn affect patient adherence (Zurovac *et al* 2006). Should these be efficient, patients will achieve clinical and parasitological cure, resulting in a reduced likelihood for partially resistant parasites to survive (Yeung *et al*, 2004).

2.2 Proportion of health workers who are compliant to the new national malaria treatment guidelines

Deciding on a new drug policy is said to be the easiest part of a complex process of policy change, while the greatest challenge is changing clinical practices (Zurovac *et al*, 2004). Prescribers' compliance to treatment guidelines is critical to the success of any new drug policy (Zurovac *et al*, 2004). This is an increasingly important problem as antimalarial policies involving drugs with more complex dosing regimens, such as ACTs, are implemented (Zurovac and Rowe, 2006).

Various health facility surveys have shown that health workers (HWs) frequently do not comply with treatment guidelines (WHO, 1996; Herman, 1999; Rowe *et al*, 2000; Rowe *et al*, 2003; Zurovac and Rowe, 2006;). However other studies have found a high proportion of HWs who adhere to treatment guidelines, as shown by caregivers who

received appropriate counselling (85.4%) and direct observation of the first dose of treatment (96.7%) (Chinbuah *et al*, 2006). In the latter study, data were collected shortly after the training of the health workers, and so it is highly likely that the information was still vivid in the HWs' minds. Also, the researchers are reported to have worked closely with the HWs, increasing the likelihood of influencing their performance for a better outcome.

Nshakira *et al*, 2002, found that 34% of HWs complied with standard treatment guidelines for uncomplicated malaria. Like Chinbuah *et al*, 2006, the present study employed direct observation techniques. The former study does not explore reasons why HWs fail to comply with the study guidelines, even when the recommended drugs are available at the health units.

2.3 Health worker factors influencing compliance to the new treatment guidelines for uncomplicated malaria.

Zurovac *et al*, 2006, found that more qualified HWs made more errors in managing children with malaria. However, the reason for this has not been established, but it could be linked to the fact that more qualified HWs are usually involved in both administrative and clinical work, and may fail to strike a balance between the two. Higher caseload, older age of the HW, HW's sex; in-service training in malaria, were found to influence HW performance (Rowe *et al*, 2006). However, information was obtained from HWs using focus group discussions, unlike in the present study where the HWs were subjected to a questionnaire and Key Informant (KI) guides.

2.4 Health unit factors influencing compliance to the new treatment guidelines for uncomplicated malaria.

A study carried out by Zurovac *et al* (2006) in Kenya found that only 16% of HUs experienced at least one month of first line drug stock out in the previous six months, while approximately half of facilities (51%) had stock out of second-line drugs. Some studies have found that programmatic interventions such as provision of guidelines and

wall charts, are significantly associated with better treatment quality in Kenya (Zurovac *et al*, 2004), while others have found them to have no effect (Zurovac *et al*, 2005).

CHAPTER THREE

3.1 Problem statement

The new antimalarial drug policy based on the use of a fixed combination of artemether and lumefantrine has been in place in Uganda since 2004. The implementation of the policy in Hoima district began in March 2006. To date, it is not clear if health worker practices are in line with the recommended treatment guidelines for uncomplicated malaria under the new policy.

According to the District Health Officer of Hoima, during the training of health workers about the new drug policy and guidelines, the training period was short, and in some cases, there were no practical case scenarios. Subsequent supervisory visits have uncovered deficiencies in health worker practices as regards the new treatment guidelines, but these have not been assessed in a systematic manner.

Important areas of progress that need to be understood include level of health worker compliance to treatment guidelines; and influencing factors at national, district, health unit, health worker, caregiver and patient levels.

3.2 Justification for the study

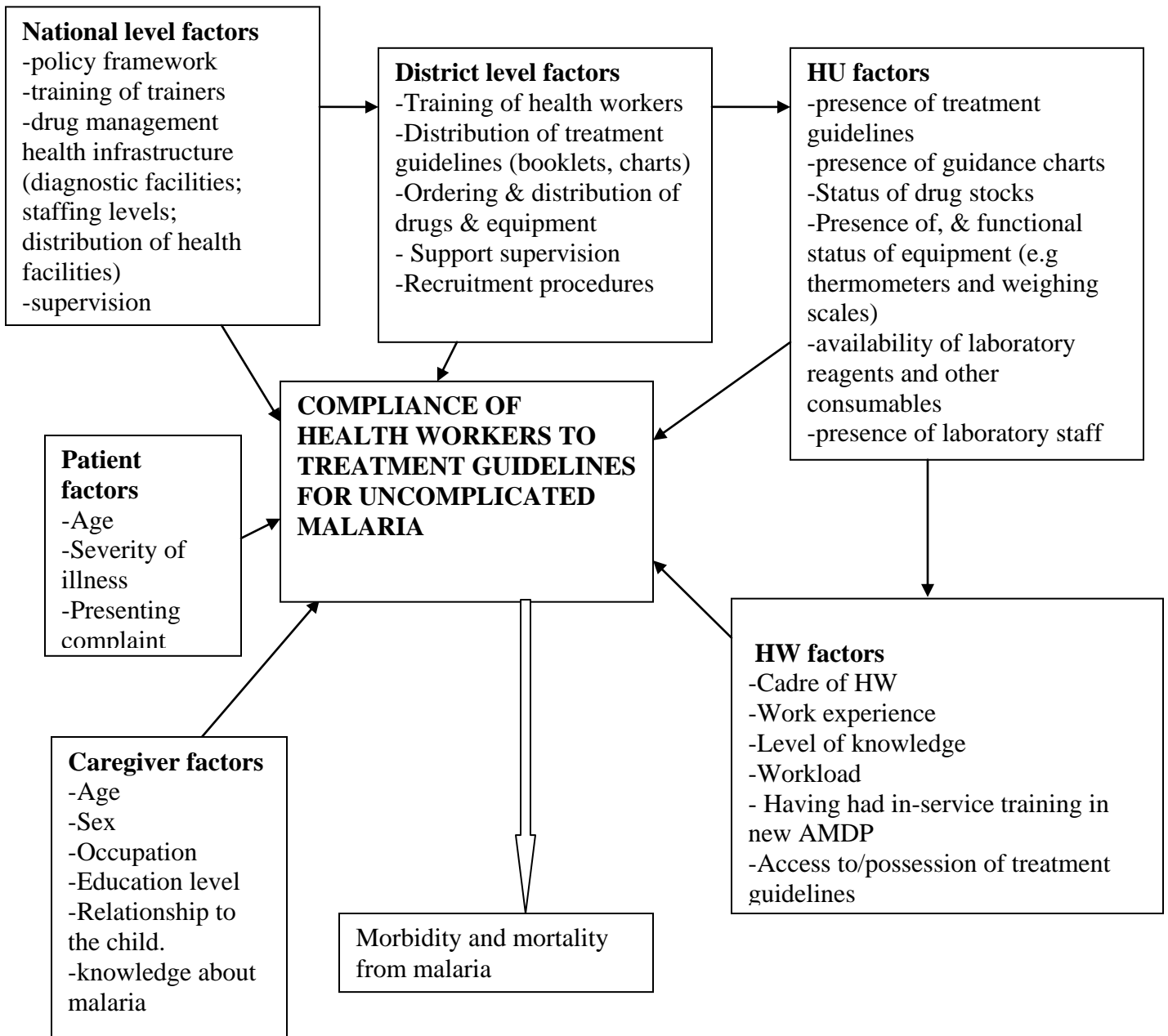
AL has been found to be more effective in treating malaria than the previously used monotherapies. Poverty is one of the risk factors for malaria, but malaria is also known to have a negative effect on the economic status of affected populations mainly due to lost work hours, and the cost of a single full course of treatment. The proper use of AL by patients as the first line drug for malaria, based on health worker practices like diagnosis, treatment and counseling, will consequently reduce the cost of malaria morbidity and mortality to the population of Hoima.

In addition, the new drug combination is at least 3 times as expensive as the older regimen. Given the risk of emergence of resistance to the new combination, there is a need to ensure that the new drug combination is used well, both at prescriber and patient

levels. However, the proper use of drugs by patients largely depends on prescriber practices like diagnosis, treatment and counseling, thus the need for this study.

The results of this study will enable the District Health Team map a way forward so as to improve HW practices. This will indirectly result in improved use of AL by patients.

3.3 Conceptual framework



3.4 Narrative of the conceptual framework

Compliance of health workers to treatment guidelines is a complex issue, involving interplay of factors at national; district; health unit; health worker; caregiver and patient levels. Compliance of health workers to treatment guidelines impacts on morbidity and mortality from malaria in such a way that poor compliance increases morbidity and mortality, and vice versa. This study will focus on determining the proportion of health workers who comply with treatment guidelines; and identifying health unit and health worker factors that influence compliance to the latest treatment guidelines for uncomplicated malaria.

3.5 Research questions

- I. What is the proportion of health workers who comply with the new treatment guidelines for uncomplicated malaria?

- II. What health worker factors influence compliance of health workers to the latest treatment guidelines for uncomplicated malaria in Hoima district?

- III. What health unit factors influence compliance of health workers to the latest treatment guidelines for uncomplicated malaria in Hoima district?

CHAPTER FOUR

STUDY OBJECTIVES

4.1 General objective

To assess the compliance of health workers to the treatment guidelines for uncomplicated malaria under the new antimalarial drug policy, in Hoima district.

4.2 Specific objectives

1. To determine proportion of health workers in Hoima district, who comply to the new national treatment guidelines for uncomplicated malaria.
2. To identify health worker factors that influence compliance of health workers to treatment guidelines for uncomplicated malaria under the new AMDP in Hoima district.
3. To identify health unit factors that influence compliance of health workers to the treatment guidelines for uncomplicated malaria under the new AMDP in Hoima district.

CHAPTER FIVE

METHODOLOGY

5.1 Study area

The study was conducted in Hoima district, a holoendemic area in mid-western Uganda. Hoima district is divided into 2 health sub-districts (HSDs), Bugahya and Buhaguzi. In total, there are 51 health units (HUs), including Hoima Regional Referral Hospital. There are 9 government-owned health centre IIs and 8 such health centre IIIs in Bugahya HSD, while Buhaguzi has 6 and 10 respectively. The only health centre IV in the district is found in Bugahya HSD. Overall, there are 14 private-not-for-profit (PNFP) HUs, of which 8 are in Buhaguzi HSD.

Children under 5 years account for 20% of the district's population. Also, malaria accounts for 33% of morbidity and mortality in the district, and as with the rest of the country, children under 5 and pregnant women are the most severely affected.

5.2 Study site

This was a health unit-based study.

5.3 Study population

The primary study population was health workers involved in the care of patients on the respective survey days. Secondly, it comprised health units and caregivers of children aged 4-59 months.

The latter were crucial for gaining insight into health worker practices.

5.4 Study design

This was a cross-sectional study, employing both quantitative and qualitative methods of data collection.

5.4.1 Inclusion criteria

Inclusion criteria for health units

- Government-owned and PNFP health units in active operation during the survey period.

Inclusion criteria for health workers

- Health workers involved in the care of patients on the day of the survey.
- In-charges of health units.

Inclusion criteria for caregivers

Caregivers of children between 4-59 months, who had been treated for malaria in the out-patients' department on the survey day.

5.4.2 Exclusion criteria

Exclusion criteria for health facilities

- Private for profit health units – excluded because they were only receiving training on the new AMDP at the time of the study.
- Redundant health units –excluded because they were closed and inaccessible.
- Hard-to-reach health units –excluded because access was difficult due to rough terrain and unsafe in some instances.

Exclusion criteria for health workers

- Health workers not involved in the care of patients on the day of the survey. These were excluded because data on health worker practices in this study was obtained by reviewing records and interviewing caregivers of children as they left the health facility.

Exclusion criteria for caregivers

- Caregivers whose children are older than 5 years or younger than 4 months.
- Caregivers of children 4-59months old who are treated for malaria as in-patients.

5.5 Sample size determination

For the health workers, the sample size was determined using the formula with finite population correction (Daniel, 1999) as follows:

$$n' = \frac{NZ^2P(1-P)}{d^2(N-1) + Z^2P(1-P)}$$

where

n' = sample size with finite population correction.

N = population size (426 health workers),

Z = Z statistic at 95% confidence interval (1.96)

P = Expected proportion (0.5)

d = precision (0.1)

Substituting the above figures in the equation gave a sample size of **79 health workers**.

5.5.2 Health units

Regarding the health units, a sampling frame of all government-owned and PNFP health units was prepared by the Principal Investigator from a listing of all health units by the District Health Office. The sampling frame had a total of 50 health units, with the exclusion of those that were reported as being redundant (10 in number). This left a total of 40 health units.

5.5.3 Caregivers

Regarding the caregivers of children aged 4-59 months, for each health worker, 2 caregiver would be interviewed. This meant that we would have **158 caregivers**.

5.6 Sampling procedures

At each health unit, all health workers involved in the care of children under 5 on the day of the visit were purposively sampled. If the health workers had different academic qualifications, efforts were taken to involve the different cadres. For each health worker interviewed, two caretakers of children between 4-59 months, who accepted to be included in the study, were interviewed.

Regarding the health units, the only health centre IV in the district, and the regional referral hospital were selected purposively. Proportionate sampling was then carried out to determine how many health units at level II and III would be sampled from each HSD.

In total, 21/28 health units from Bugahya HSD were sampled, while 17/21 health units were sampled from Buhaguzi HSD. Further, because of the low number of PNFPs in both HSDs (7/29 in Bugahya and 6/22 in Buhaguzi), they were all purposively sampled. Of the

13 PNFPs in the district, only 1 was a HC III, the rest being HC IIs. This left 14 government-owned health units to be sampled from Bugahya HSD and 11 from Buhaguzi HSD. Regarding the government-owned health units, proportionate sampling was carried out, taking into account their levels. As such, in Bugahya HSD, 7 HC III and 7 HC II were selected. In Buhaguzi HSD, 7 HC IIIs and 4 HC IIs were selected.

Each sampled health unit was further randomly assigned to a survey day within the survey period. This was done by writing the names of the health units on small pieces of paper of equal size. These were placed in a container and tossed then 5 papers were sequentially picked out. Each group of 5 health units that was picked was assigned a survey day, the first group being for day 1.

5.7 Study variables

5.7.1 Dependent variable

Compliance of health workers to treatment guidelines for uncomplicated malaria under the new antimalarial drug policy.

5.7.2 Independent variables

Proportion of health workers who comply with the new national malaria treatment guidelines.

Definition of compliance:

- **Fully compliant:** Prescription of an adequate weight-specific regimen of Coartem® AND two counselling and drug administration tasks are performed: counselling on dosing schedule; dietary advice; and emphasizing the need to take the full dose of treatment.
- **Partially compliant:** Coartem® is not correctly prescribed for weight
- **Non compliant:** Coartem® is not prescribed at all yet patient qualifies by weight.

HW factors that influence compliance of health workers to the treatment guidelines for uncomplicated malaria under the new AMDP in Hoima district.

- Knowledge about the change of the AMDP (Yes/No).

- Sex (Male/Female)
- Level of formal training (Doctor, Clinical Officer, Nurse, Nursing Aide).
- Having had in-service training in malaria case management based on the new AMDP (Yes/No).
- Having access to treatment guidelines during routine work (Yes/No).
- Having been supervised at least once regarding AL (Yes/No)

Health unit factors that influence compliance of health workers to the treatment guidelines for uncomplicated malaria under the new AMDP in Hoima district.

- Availability of functional diagnostic equipment (microscopes, weighing scales and thermometers) (Yes/No).
- Availability of other consumables (gloves, slides, cotton wool, reagents) for laboratory tests on survey day (Available/Unavailable).
- Presence of displayed treatment guidance charts at health unit (Yes/No).
- Available antimalarial drugs (AL, chloroquine, SP) on the day of the survey (Yes/No).
- Presence of at least one copy of the new malaria treatment guidelines at the health unit (Yes/No).

5.8 Data collection methods

5.8.1 Quantitative data

Data was collected by trained research assistants (RAs), who had a history of clinical practice, such as nurses or clinical officers, so that they could provide appropriate care to the children if deemed necessary (for example in cases where AL was not prescribed yet the child qualified to receive it). There were five study teams, each consisting of 2 people, so that 5 health units were visited each working day. The RAs were selected both locally and from neighboring Masindi district, so as to bridge the gap of language barriers.

On each survey day, the research teams reported to the assigned health units without any prior notice. It was always ensured that the study teams got to the health units before the

health workers started work, and left at the end of the working day. On arrival, the RAs introduced themselves and the purpose of their visit to the in-charge of the health unit or his representative.

First, they carried out the health unit assessment, and then performed the exit interviews for the caregivers. To identify caregivers who met study criteria (child 4-59 months and treated for uncomplicated malaria), RAs requested to look at the child's treatment records that were often contained in a book. At the end of the working day, the health workers who took part in patient consultation at the health unit on that day were interviewed.

During the course of each day, the PI visited randomly selected study sites to supervise the RAs. Additionally, all RAs were facilitated so that they could easily communicate with the PI as and when the need arose.

5.8.2 Qualitative data

The PI personally conducted the KI interviews, with the in-charges of health units. A total of 12 interviews were conducted, and data was collected using tape recorders and notes.

5.9 DATA COLLECTION TOOLS

These included health unit observation checklists; Key Informant (KI) guides; health worker questionnaires and exit interview questionnaires for the caregivers of the children.

5.10 QUALITY CONTROL

To ensure that the data collected was of good quality, a list of all health units and the number of all health workers in the district was obtained from the records officer, so as to get an updated sampling frame. This helped to identify redundant health units, and those which were geographically inaccessible. Redundant health units were those that had been closed down for various reasons; while geographically inaccessible ones could not be easily reached by road.

Further, 10 RAs were trained for a period of five days. The RAs included nurses and clinical officers, and were trained in interviewing skills and recording of responses. The latter was practiced by role playing with the RAs entering questionnaires, until there was 95% concordance among RAs. The background of the study, objectives, methodology, expected benefits of carrying out the study were explained to the RAs during training. The data collection tools were pre-tested at one health unit which was not included in the study, and appropriate changes were made as necessary.

At the end of each survey day, each data collection tool was checked by the RAs for mistakes and omissions so that necessary corrections could be made before leaving each health unit. The PI also checked the tools at the end of each survey day, and at the beginning of each subsequent survey day, the PI gave feedback to the RAs regarding the previous day's work.

5.11 DATA MANAGEMENT AND ANALYSIS

Collected data was checked for completeness and accuracy, and then entered into a prepared database using the computer program EPIINFO, version 3.2.2. The data was double-entered to ensure that mistakes were eliminated, after which it was exported to STATA version 10.0 for analysis. During cleaning, 5 questionnaires were discarded as they were found not to match others in the database, leaving a total of 145 health worker and 145 caregiver questionnaires.

Univariate analysis was carried out to yield descriptive frequencies, means and proportions for health workers, health units and children aged 4-59 months. Also, to assess overall performance of health workers as regards the new AMDP, treatment practices were analysed for all health workers regardless of whether or not they complied with the guidelines.

Health workers were then separated based on the definition of compliance with treatment guidelines, as defined by this study. Bivariate analysis was carried out on the compliant health workers, so as to establish the relationship between health worker compliance and

the independent variables. This was done using odds ratios, their 95% confidence intervals and p-values as measures of statistical significance.

Multivariate analysis was done to assess the independent effect of the independent variables on the dependant variable. Binary logistic regression was carried out to explain relationships between dependent and independent variables.

5.12 ETHICAL CONSIDERATIONS

The proposal was presented to and approved by the Institutional Review Board (IRB) of the School of Public Health, Makerere University. At district level, permission to carry out the study was obtained from the in-charges of the HUs through the District Health Officer (DHO), who consequently wrote introductory letters that the RAs used at the HUs.

Respondents took part in the study only when they freely consented to do so, having been duly informed about the study by the RAs. For this study a respondent was considered to have consented if he signed the consent form (Appendix I & II). Furthermore, confidentiality of the collected information was maintained by using unique identifiers for the respondents, and also by limiting access to the data to only the PI and her assistants. Patients benefited from the study by receiving appropriate counseling and treatment, whenever these had not been given by the receiving health worker.

5.13 DISSEMINATION OF RESULTS

The results of the study will be disseminated in report form to Makerere University School of Public Health, and to the DHT of Hoima District. The findings of the study will also be submitted for publication in a peer-reviewed journal.

CHAPTER SIX

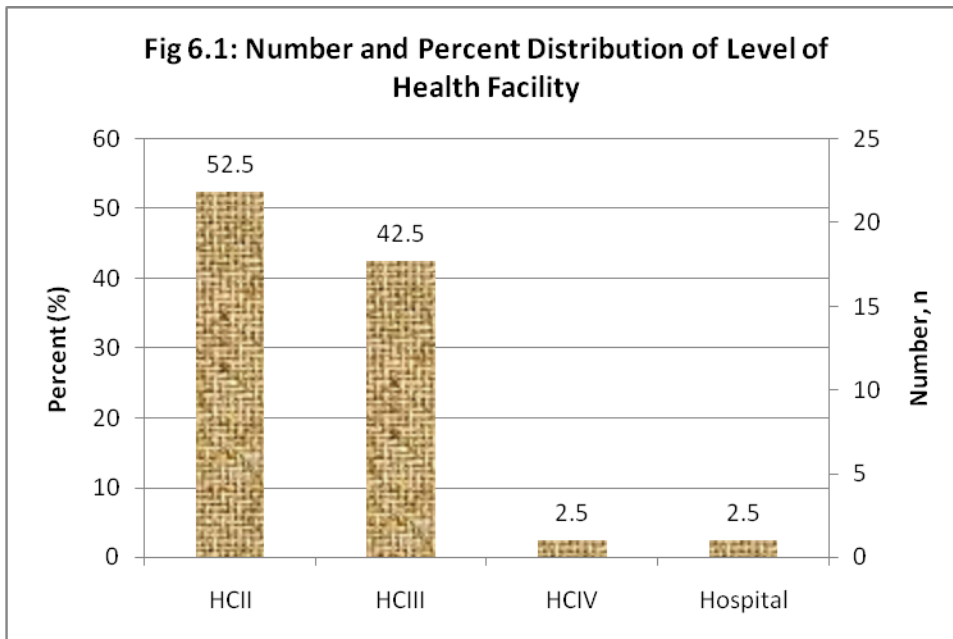
6.0 RESULTS

6.1.1 Characteristics of Health Units

This subsection presents the characteristics of health units where this study was conducted.

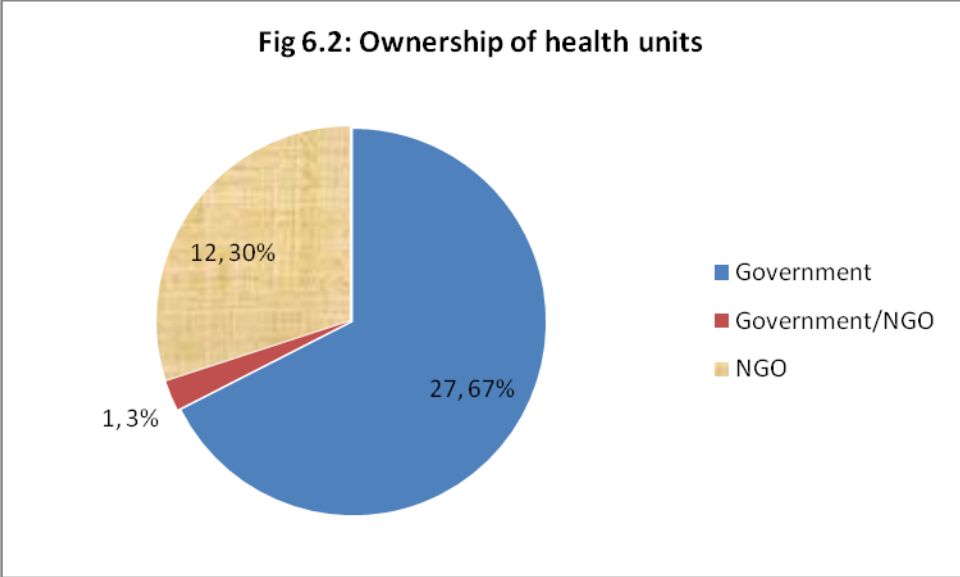
6.1.2 Level of health units visited

Overall, a total of 40 health units were included in the study. Of these, 21 (52.5%) were HCII, 17 (42.5%) were HCIII, and only 1 (2.5%) each of HCIV and hospitals (see Figure 6.1 below).



6.1.2 Ownership of health units visited

As shown in Figure 6.2 below, of the 40 health units visited, 27 (67%) were government, 13 (30%) were privately owned and 1 unit (3%) was both government / NGO owned.



6.2 Health workers

6.2.1 Characteristics of health workers

As shown in table 6.1 below, the age range of health workers was 24 to 58 years with a mean age of 34.2 (SD: 6.7) years. By gender, we interviewed 60 (76%) female health workers and 19 (24%) male health workers. Among health workers interviewed, 38 (48%) were from HCIIIs, 35 (44%) from HCIIIs, 4 (5%) from HCIVs and only 2 (3%) from hospitals. Markedly, none of the respondents was a doctor while nurses formed the majority of staff interviewed from the health units. Majority of health workers (71%) reported having completed their formal training over 5 years ago.

Table 6.1: Background characteristics of health workers

Characteristics	Number, n	Percent (%)
Gender		
Male	19	24%
Female	60	76%
Age group (years)		
20-29	14	17.7%
30-39	46	58.2%
40+	19	24.0%
Mean age	34.2	SD: 6.7
Health facility level		
HCII	38	48.1%
HCIII	35	44.3%
HCIV	4	5.1%
Hospital	2	2.5%
Formal Training Level		
Clinical Officer	16	20.3%
Nurse	36	45.6%
Nursing Aide	27	34.2%
Time Since Training		
< 1 year	3	3.8%
1 - 5 years	20	25.3%
5 - 10 years	26	32.9%
> 10 years	30	38.0%

6.2.2 Knowledge of health workers about anti-malarials

Health workers were asked questions on knowledge of the anti-malarial drug policy and whether they had received training in case management of malaria based on the new drug policy. As shown in Table 6.2 below, all health workers had heard about changes in the anti-malaria drug policy and about 92% had been trained in malaria case management. The most common sources of treatment for malaria case management were district health teams (78%), malaria consortium (10%) and MOH staff (8%). Also, majority of health workers (92%) had access to the new malaria treatment guidelines and these were seen by the interviewer in 52% of instances.

Table 6.2: Knowledge of health workers on anti-malarials

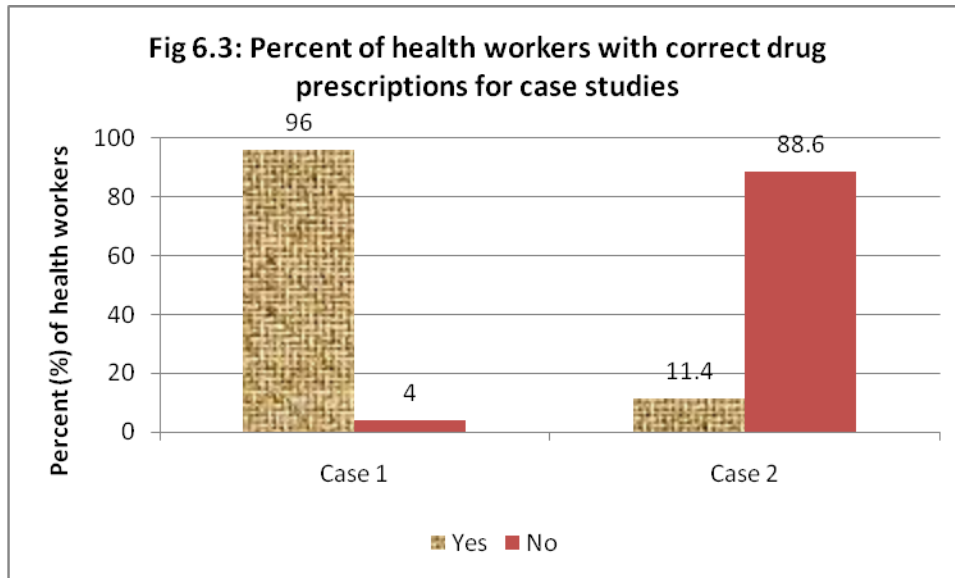
Characteristics	Number, n	Percent (%)
Heard about change of anti-malarial policy		
Yes	79	100.0%
No	0	0.0%
Trained in malaria case-management		
Yes	73	92.4%
No	6	7.6%
Source of training		
District health team	57	78.1%
Health Unit in charge	2	2.7%
Malaria consortium	7	9.6%
MOH staff	6	8.2%
WHO	1	1.4%
Access to new treatment guidelines		
Yes	73	92.4%
No	6	7.6%
New treatment guidelines seen by interviewer		
Yes	38	52.1%
No	35	48.0%

To further ascertain the knowledge in malaria case management, healthcare providers were presented with two case studies of malaria patients and were asked to prescribe treatment. The case studies are detailed below:

Case 1: Mary is 2 years old and weighing 12 kg. She became sick two days ago. Her mother reported fever, especially at night, coughing and loss of appetite. No other complaints are mentioned after history taking. She was not given any drugs before coming to facility. Her auxiliary temperature is found to be 37.4. Laboratory services are not available at the facility.

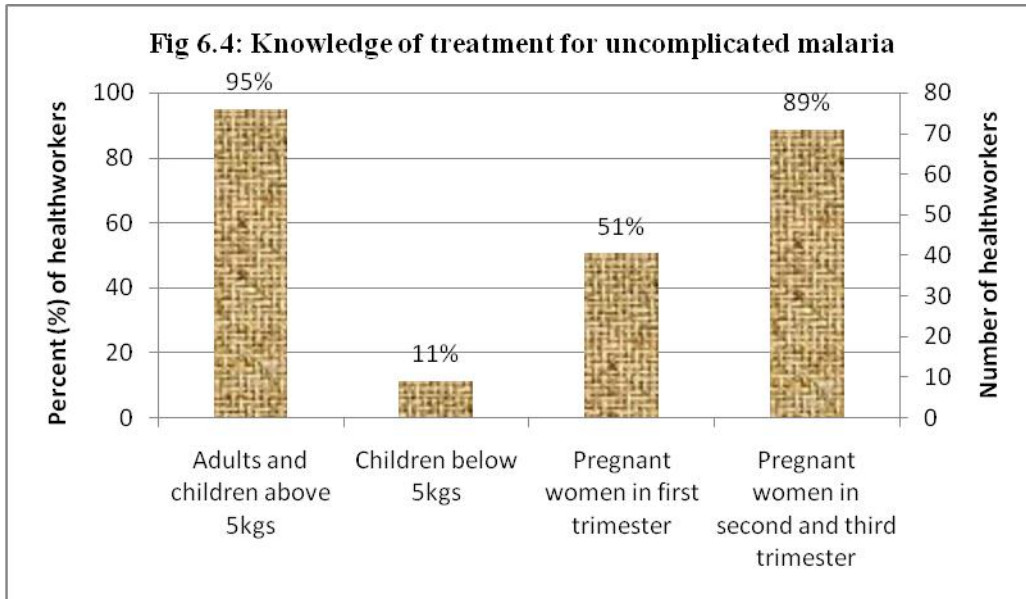
Case 2: George is 3 months old, and weighs 4kg. He started coughing and developed fever three days ago. Today his auxiliary temperature is 38.0 C. He also cries a lot and is restless. After history taking and examination no other abnormalities are detected. Laboratory service is not available at the facility and there is no stock out of any medicines.

As shown in the figure below, 96% of health workers suggested the right prescription for Case 1 but only 11% prescribed correctly for Case 2.



6.2.3 Knowledge of treatment for uncomplicated malaria

To ascertain knowledge of treatment of uncomplicated malaria, health workers were asked for the name of the first line drug recommended for patients with uncomplicated malaria for persons of different weights and physiologic states such as pregnancy. As shown in figure 6.4 below, 95% and only 11% of health workers were knowledgeable of the treatment for uncomplicated malaria in persons above 5kgs and children below 5kgs, respectively. Regarding uncomplicated malaria in pregnant women, 51% and 89% were knowledgeable of the recommended treatment for women in the first two trimesters and third trimester, respectively.



6.3 Sick children at health facilities

6.3.1 Demographic characteristics of children

Interviews were conducted among caregivers of children aged 4 months to 5 years. These caregivers were asked questions on demographic characteristics of children and the care and treatment received from the health providers. These were used in ascertaining whether children had received the correct antimalarial medication for age, as per the new AMDP.

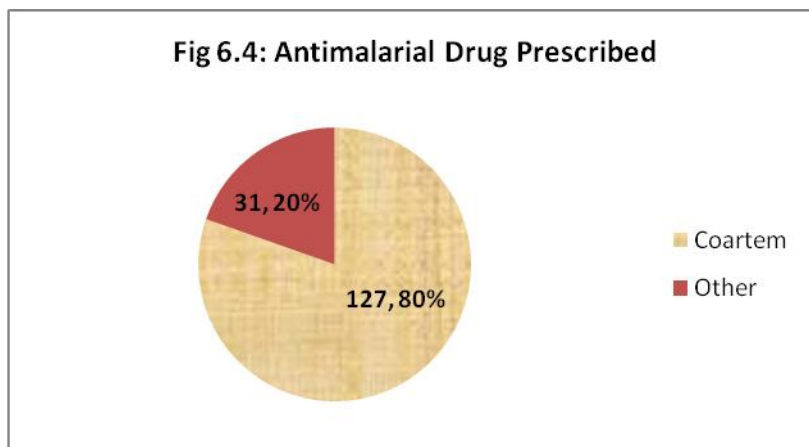
As shown in Table 6.3 below, there were 86 (54%) male children and 72 (46%) female children. Their age range was 0 to 59 months. The children’s weight distributions were as follows: majority weighed between 5-9 kgs (32%) and 10-14 kgs (49%). For other distributions of demographics refer to Table 6.3 below.

Table 6.3: Background and Physical characteristics of sick children

Characteristics	Number, n	Percent (%)
Gender		
Male	86	54.4%
Female	72	45.6%
Age group		
<12 months	33	20.9%
12-<24 months	44	27.9%
24-<36 months	38	24.1%
36-<48 months	21	13.3%
48-<60 months	22	13.9%
Weight (kgs)		
0-4	2	1.3%
5-9	50	31.7%
10-14	77	48.7%
15-19	26	16.5%
20-24	3	1.9%

6.3.2 Case management of sick children

Care givers were asked what anti-malarial drug was prescribed to the sick child. As shown in Figure 6.4 below, 80% of sick children had prescriptions of Coartem while 20% had prescriptions for other anti-malarial drugs.

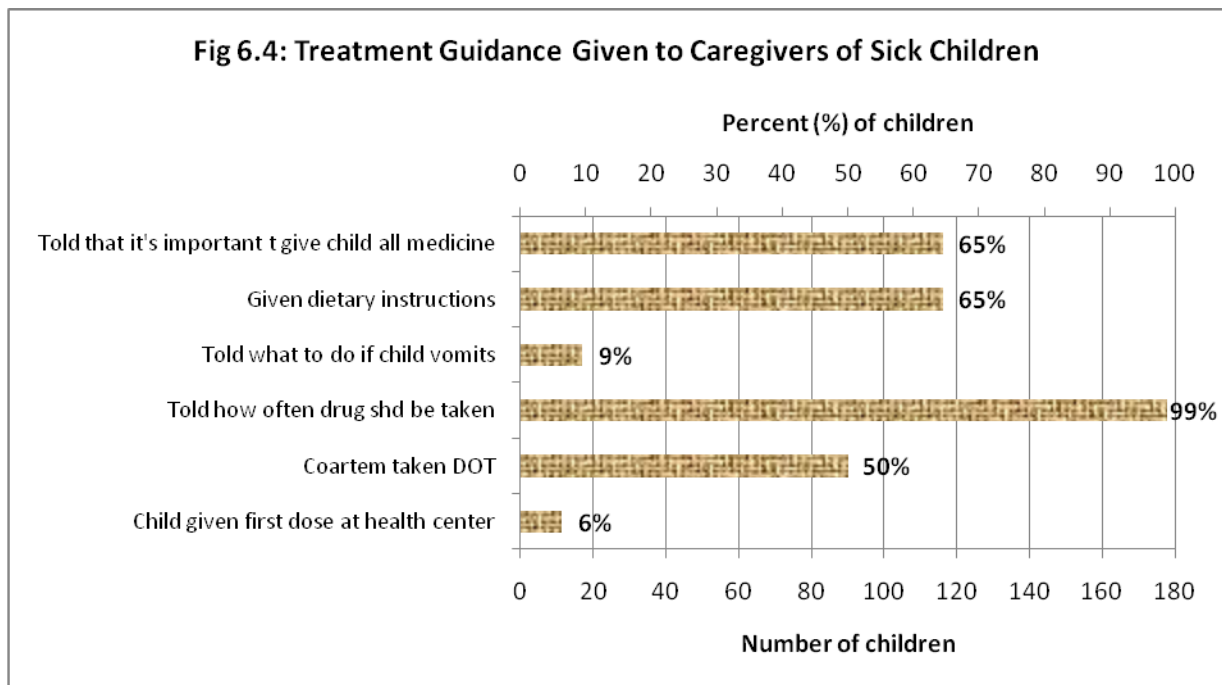


Furthermore, caregivers were asked if health providers followed relevant case management steps in treating sick children. As shown in Table 6.4, almost all caregivers were asked for the age of the child. Also, the child’s weight was measured in 53% of instances while the temperature was captured in 59% of the cases. Markedly, only 10% of the children were referred to the laboratory for a blood slide.

Table 6.4: Case Management Practices on Sick Children by Health Worker

Category	Number, n	Percent (%)
Asked for child's age		
Yes	157	99.4%
No	1	0.6%
Measured child's weight		
Yes	84	53.2%
No	74	46.8%
Measured child's temperature		
Yes	93	58.9%
No	63	41.1%
Probed for fever in child		
Yes	154	97.5%
No	4	2.5%
Referred child to laboratory for Blood Slide		
Yes	16	10.1%
No	142	89.9%
Blood Slide taken		
Yes	15	93.8%
No	1	6.2%

To further ascertain the provision of case management guidelines to care givers, all were asked questions and responses summarized in Figure 6.4.



6.4 Health worker factors that influence compliance to treatment guidelines for uncomplicated malaria

In this study, compliance was a composite variable derived from questions to caregivers of children on whether the health worker prescribed an adequate weight-specific regimen of AL, informed the patient of the correct way to take the medicine, advised that the drug be taken after a meal and that the full course of treatment be taken even if the child started feeling better. The levels of compliance were categorized as follows:

- A fully compliant health worker was one who performed all the above on a patient.
- A partially compliant health worker was defined as one who prescribed an adequate weight-specific regimen of AL.
- A non compliant one was one who did not prescribe AL at all, yet the patient qualified by weight.

Table 6.7 below shows the levels of compliance by health workers to treatment guidelines. Overall, in 34% of instances, health workers were fully compliant, 39% were partially compliant in 39% cases and non-compliant in 19% of cases.

Table 6.7: Compliance of health workers to treatment guidelines

Level of compliance	Frequency (n=158)	Percent (%)
Fully compliant	53	33.5
Partially compliant	62	39.2
Non-compliant	30	19.0
Missing	13	8.3

6.4.3.1 Associations between health worker factors and compliance to treatment guidelines

To assess these associations, a logistic regression model was used with the outcome as compliance (1= Fully compliant and 0=Partially / Non-compliant). As shown in Table 6.8 below, of seven predictor variables that were assessed, 2 were found to significantly influence health worker compliance to the new treatment guidelines. One of them was the level of formal training of the health worker, where clinical officers were 3.4 times [OR: 3.42 95% CI (1.29, 9.32)] more likely to be compliant compared to nurses / nursing aides. Also health workers who had been supervised regarding the new AMDP were 2.78 times [OR: 2.78, 95%CI (1.19, 6.52)] more likely to comply compared to their counterparts who had not been supervised.

Table 6.8: Associations between health worker factors and compliance to treatment guidelines

Category	Compliant, n (%)	Non-compliant, n (%)	Crude OR, 95%CI	P-value
Sex				
Female	38 (46.3%)	44 (53.7%)	Referent (
Male	15 (45.5%)	18 (54.6%)	0.96, (0.39, 2.34)	0.931
Level of formal training				
Nurse/Nursing aide	30 (34.5%)	57 (65.5%)	Referent	
Clinical Officer	18 (64.3%)	10 (35.7)	3.42 (1.29, 9.32)	0.005**
Years of experience				
1-<5 yrs	20 (46.5%)	23 (53.5%)	Referent	
5-10 yrs	15 (41.7%)	21 (58.3%)	0.82 (0.31, 2.20)	0.666
>10 yrs	18 (50.0%)	18 (50.0%)	1.15 (0.43, 3.06)	0.757
Knowledge of new AMDP				
No	0 (0.0%)	0 (0.0%)	Referent	
Yes	53 (46.1%)	62 (53.9%)	-	-
Trained in new AMDP				
No	5 (45.5%)	6 (54.6%)	Referent	
Yes	48 (46.2%)	56 (53.9%)	1.03 (0.24, 4.54)	0.964
Has AL guidelines				
No	7 (70.0%)	3 (30.0%)	Referent	
Yes	46 (43.8%)	59 (56.2%)	0.33 (0.05, 1.58)	0.112
Supervision regarding AMDP				
No	24 (49.0%)	25 (51.0%)	Referent	
Yes	48 (72.7%)	18 (27.3%)	2.78 (1.19, 6.52)	0.009**

6.4.3.2 Multivariable analysis on associations between health worker factors and compliance to treatment guidelines

Multivariable logistic regression was performed using 4 predictor variables. Of these, 2 had been identified as showing a statistically significant association with health workers' compliance to treatment guidelines. These included level of formal training of health workers and having been supervised regarding AL. The other two predictor variables that were entered into the model were sex of health workers and possession of treatment guidelines. The basis for their inclusion was the fact that other studies have found them to have a significant association with health worker compliance to treatment guidelines.

Level of formal training of health workers was dichotomized into nurses (including nursing aides) and clinical officers. Doctors were completely excluded as none had been interviewed.

The 4 predictor variables were entered into a model, and level of formal training and having been supervised regarding AL were found to still have a statistically significant association with health worker compliance.

Table 6.9: Associations between health unit factors and compliance to treatment guidelines

Category	Compliant, n (%)	Non-compliant, n (%)	Adjusted OR, 95%CI	P-value
Sex				
Male	15 (45.5)	18 (54.5)		
Female	38 (46.3)	44 (53.7)	1.91 (0.30-12.10)	0.493
Level of formal education				
Clinical officer	18 (64.3)	10 (35.7)		
Nurse	30 (34.5)	57 (65.5)	2.25 (1.58-4.57)	0.012**
Possession of treatment guidelines				
Yes	46 (43.8)	59 (56.2)		
No	7 (70.0)	3 (30.0)	0.32 (0.08-1.31)	0.114
Having been supervised regarding new AMDP				
Yes	48 (72.7)	18 (27.3)		
No	24 (49.0)	25 (51.0)	3.5 (1.62-6.42)	0.002**

6.5 Health unit factors that influence compliance of health workers to treatment guidelines for uncomplicated malaria under the new AMDP.

This section analyses factors in health units that determine compliance to treatment guidelines to uncomplicated malaria. As shown in the table 6.9 below, none of the health unit factors was found to have a statistically significant association with health worker compliance with treatment guidelines.

Table 6.10: Associations between health unit factors and compliance to treatment guidelines

Category	Compliant, n (%)	Non-compliant, n (%)	Crude OR, 95%CI	P-value
Weighing scale available				
No	50 (47.6%)	55 (52.4%)	Referent	
Yes	3 (30.0%)	7 (70.0%)	0.47, (0.08, 2.22)	0.286
Thermometer available				
No	47 (46.5%)	54 (53.5%)	Referent	
Yes	6 (42.9%)	8 (57.1%)	0.86 (0.23, 3.07)	0.796
Microscope available				
No	50 (47.6%)	55 (52.4%)	Referent	
Yes	3 (30.0%)	7 (70.0%)	0.47, (0.08, 2.22)	0.286
Wall chart with recommended anti malarial drug available				
No	7 (46.7%)	8 (53.3%)	Referent	
Yes	46 (46.0%)	54 (54.0%)	0.97 (0.28, 3.42)	0.962
Wall chart with AL dosages available				
No	20 (51.3%)	19 (48.7%)	Referent	
Yes	33 (43.4%)	43 (56.6%)	0.73 (0.31, 1.70)	0.423

Note: Equipment was listed as available only if it was functional

6.6 Qualitative results

At most of the health units, it was reported that at least 1 copy of the new guidelines for the treatment of malaria was available, with health workers having easy access to them, since they were displayed on desks, or walls of the health units. This is in agreement with the data collected which shows that 77/145 (53.1%) had guidance charts for AL that were displayed on either the walls of the health units or on desks.

Regarding supervision, most health unit in-charges reported that they had been supervised once or none at all.

“So far, we have only been supervised once by the officials from the district headquarters; they rarely come here”. In-charge, Buhanika Health Centre III

It was also reported that the biggest problem faced regarding the implementation of the new antimalarial drug policy was irregular supply of drugs/ frequent AL stock-outs.

“The drugs work well, but we are having problems with stocks. The drugs run out in a short while, because patients come in large numbers when they hear that we have drugs. Our orders never come in on time.” In-charge, Mparangasi Health Centre III

Others included inability of patients to afford the recommended foods that increase the absorption of AL; patients’ complaints regarding the long treatment course, and inability of patients to afford AL when advised to buy from drug shops (due to stock-outs at health units).

“When you tell people that they have to take the drugs with fatty foods, they say they cannot afford them.” In-charge, Lucy Bisereko Health Centre II

“Our people are poor; they cannot afford the drugs when we don’t have them at the health unit.” In-charge, Butema Health Centre III.

CHAPTER 7: DISCUSSION

7.1 Introduction

This study was carried out after one and half years of implementation of the new policy in Hoima district. This should have been ample time for the health workers to familiarize themselves with the new guidelines, and effectively translate the new policy into clinical practice.

7.2 Compliance with e new national malaria treatment guidelines

Though it was found that overall 80% (n=79) health workers prescribed AL, only 67% prescribed a weight-appropriate dose of AL. Further, in 158 instances when health workers were assessed, they were found to be compliant in only 34% of instances. While these findings sharply contrast with those of Chinubua et al, 2006, who found high compliance of health workers to treatment guidelines, they are in sync with those of a Ugandan study that found that 34% health workers complied with treatment guidelines (Nshakira et al, 2002). However, the difference between this study and Nshakira's is that the latter used direct observation techniques, while the former relied on answers provided by caregivers of children, which may have reduced the accuracy of the information.

Most of the patients who did not receive a prescription of AL were given CQ + SP or quinine. This practice occurred even in health units that had AL in stock. CQ + SP which is a phased out first-line treatment for uncomplicated malaria as per the new guidelines was found in large quantities in all health units, which was totally unexpected, given that it was more than a year since the implementation of the new AMDP. Also, the negative effects of the presence of ineffective drugs on prescription practices of health workers have been described in Kenya (Zurovac *et al*, 2004 & Wasuna *et al*, 2008).

Where health workers did not give AL in blister packs as recommended by the new guidelines, patients were given cut blister packs. This was done at the discretion of the health workers, because the guidelines do not state what health workers should do in case the appropriate weight-specific pack is absent in the presence of others. The practice of administering cut blister packs may compromise the recorded high levels of patients'

adherence to AL (Fogg *et al*, 2004). The ideal solution to this situation would be to ensure a stable supply of all weight-specific doses of AL at all health units at any one time.

Also, the guidelines stipulate that patients should take a repeat dose of AL if they vomit the medication within 30 minutes of ingestion. However, in a situation where only pre-packed dosages are available, it's not known how the replacement doses would be given. Should health workers administer cut blister packs with as many tablets as are required to compensate for the lost ones?

7.3 Health worker factors that influence compliance of health workers to the treatment guidelines for uncomplicated malaria under the new AMDP.

Being a clinical officer and having been supervised regarding the new AMDP were found to increase the likelihood of with treatment guidelines. Zurovac *et al* (2006) also found lower cadres of health workers to be more compliant. So far, no possible explanation for this has been found. Regarding supervision, Zurovac *et al* (2004) also found it to significantly increase the likelihood of health worker compliance to treatment guidelines. However, results from the key informant interviews involving in-charges of health units in this study show that since the implementation of the new AMDP, supervision has been irregular, most having been supervised only once or not at all.

In this study, in-service training of health workers and possession of treatment guidelines did not have a significant on health worker compliance.

7.4 Health unit factors that influence compliance of health workers to the treatment guidelines for uncomplicated malaria under the new AMDP.

This study did not find any health unit factors to significantly affect health worker compliance with treatment guidelines. In one study conducted by Zurovac *et al*, it was found that health unit factors such as having wall charts and having in-stock recommended antimalarial drugs affected compliance of health workers to malaria treatment guidelines. Yet another study by Zurovac *et al* did not find health unit factors to

have any effect on health worker compliance with treatment guidelines. This in line with what Zurovac *et al* (2008) found in Ugandan health units.

7.5 Study Limitations

Because it was a cross-sectional study, we were unable to capture trends over a period of time. Also, the presence of the research assistants might have affected health workers' performance, making it better than usual. So the result we have is most likely the best case scenario, implying that it could be worse on other days.

Furthermore, there was no clinical or laboratory re-examination of the children to provide a 'gold standard' diagnosis of malaria, mainly due to cost implications.

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

- HWs comply with treatment guidelines for the new AMDP in 34% of instances when they are assessed.
- Level of formal training of HWs and having been supervised regarding the new AMDP have a strong influence on compliance of HWs to treatment guidelines.
- HU factors do not influence compliance of HWs with treatment guidelines regarding the new AMDP.

8.2 Recommendations

The DHT should strengthen support supervision of HWs at their work stations so that they can focus on problem areas. Practices that especially need to be reinforced include administering the first dose of AL at the HU, and advising appropriate action if medication is vomited within 30 minutes of intake. Additionally, special attention needs to be given to the care of children/persons who weigh less than five kilograms and pregnant women in the first and second trimesters. We found that health workers had little knowledge on recommended treatments for these vulnerable groups, a gap that needs to be urgently addressed.

During supervisory visits, extra attention should be given to nurses, as they tend not to comply with treatment guidelines, as shown by study results.

More importantly, this policy change should be integrated into the curricula of training schools for health workers at all levels, to ensure universal access to this information.

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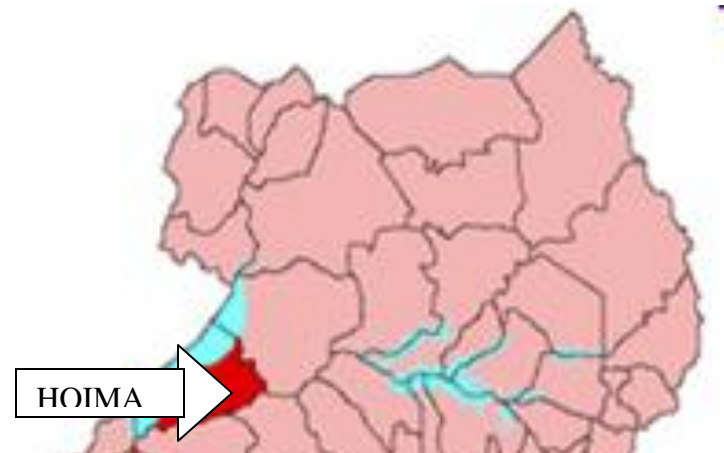
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APPENDICES

APPENDIX I: MAP OF UGANDA SHOWING HOIMA DISTRICT



APPENDIX II : CONSENT FORM FOR CAREGIVERS.

Study Topic: Compliance of health workers to malaria treatment guidelines under the Artemether-Lumefantrine drug policy in Hoima district.

Principal investigator: Dr. Babirye Rebecca.

Makerere University School of Public Health, Kampala.

Study purpose: To determine the compliance of health workers to the treatment guidelines for uncomplicated malaria under the Artemether-Lumefantrine drug policy in Hoima district.

Study procedures.

If you agree to participate in the study, you will be asked to respond to an interview with a trained interviewer. The interview will involve answering questions about the child's condition, and the drugs he/she has received and actions by the health worker.

Benefits: You will get some basic information about the antimalarial drug coartem, and also if necessary, your child will be given a complete dose of the drug.

Risks: No risk will be posed to your life or that of your child as a result of the study.

Reimbursement: You will not be paid for participating in the study.

Right to refuse or withdraw participation: Your participation is entirely voluntary and you are free to respond or not respond to any question and you can withdraw your participation any time during or after the interview.

Confidentiality: The information of the study will be kept strictly confidential and used only for research purposes. Your identity will be kept confidential in as far as the law allows. All information will be kept on coded form and your name will not appear on any of these forms.

STATEMENT OF CONSENT

I have been told procedures, the risks, and the benefits involved in participation of this study. I understand that my decision to participate in this study will not alter my access to treatment in any way. I am aware that I may withdraw from this study at any time. I understand that by signing this consent form I do not waive any of my legal rights but merely indicate that I have been informed about the research study in which I am voluntarily agreeing to participate.

Signature of participant.....

Age Date.....

Signature of interviewerDate.....

APPENDIX III: CONSENT FORM FOR HEALTH WORKERS.

Study Topic: Compliance of health workers to malaria treatment guidelines under the Artemether-Lumefantrine drug policy in Hoima district.

Principal investigator: Dr. Babirye Rebecca.

Makerere University School of Public Health, Kampala.

Study purpose: To determine the compliance of health workers to the treatment guidelines for uncomplicated malaria under the Artemether-Lumefantrine drug policy in Hoima district.

Study procedures.

If you agree to participate in the study, you will be asked to respond to an interview with a trained interviewer. The interview will involve answering both personal and other questions.

Benefits: The results of this study will provide useful information that improve the quality of care of your patients.

Risks: No risk will be posed to your job as a result of the study.

Reimbursement: You will not be paid for participating in the study.

Right to refuse or withdraw participation: Your participation is entirely voluntary and you are free to respond or not respond to any question and you can withdraw your participation any time during or after the interview.

Confidentiality: The information of the study will be kept strictly confidential and used only for research purposes. Your identity will be kept confidential in as far as the law allows. All information will be kept on coded form and your name will not appear on any of these forms.

STATEMENT OF CONSENT

I have been told procedures, the risks, and the benefits involved in participation of this study. I am aware that I may withdraw from this study at any time. I understand that by signing this consent form I do not waive any of my legal rights but merely indicate that I have been informed about the research study in which I am voluntarily agreeing to participate.

Signature of participant.....

Age Date.....

Signature of interviewerDate.....

APPENDIX IV: OBSERVATION CHECKLIST FOR HUS.

Date.....

Serial number (Day/HU number)/.....

Name health facility.....

Level of HU.....

Ownership

1) EQUIPMENT:

a) Is there at least one functional weighing scale at the HU?

Yes

No

b) Is there at least one functional thermometer at the HU?

Yes

No

c) Is there at least one microscope at the HU?

Yes

No

d) If yes, is the laboratory service functioning at the HU on the survey day?

Yes

No

2) WALL CHARTS :

ITEM	YES	NO
Recommended malaria drugs		
Artemether-lumefantrine dosage		

3. Antimalarial drug stock out (enter total number of stock-out days that occurred in from November 2006-April 2007)

DRUG	Total
Coartem	
1) 6 pack (yellow)	
2) 12 pack (blue)	
3) 18 pack (brown)	
4) 24 pack (green)	
5) All AL packs	
6) CQ tabs	
7) CQ syrup	
8) CQ vials	
9) CQ+SP (red)	
10) CQ+SP (green)	
11) QN tab	
12)QN vials	

APPENDIX V: QUESTIONNAIRE FOR HEALTH WORKERS

Date

Serial number (Day/HU number/HW number)/...../.....

Health facility name and level.....

1) Age of health worker..... 2) Sex M / F

Circle the correct alternative

3) Level of formal training

- a) Doctor
- b) Clinical officer
- c) Nurse
- d) Nursing aide

4) When did you complete your formal training / when did you qualify?

- a) Less than a year ago.
- b) More than 1 year ago but less than 5 years ago.
- c) Between 5 to 10 years ago.
- d) More than 10 years ago.

5) Have you heard about the change of the antimalarial drug policy?

- a) Yes
- b) No

6) Have you had in-service training in malaria case management based on the new antimalarial drug policy?

- a) Yes
- b) No

7) If yes, who offered the training?

.....

8) Do you have access to the new treatment guidelines during the course of your work?

- a) Yes
- b) No

9) If yes, the interviewer should ask to have a look at the treatment guidelines, and tick the appropriate box below.

- a) Didn't see the guidelines

b) Saw the guidelines

10) Have you been supervised regarding the new policy for treatment of malaria in the last 6 months?

a) Yes

b) No

Health workers should fill this part of the questionnaire by themselves.

Please read the following case scenarios and answer the questions that follow

Scenario I

a. Case study 1

Mary is 2 years old and weighing 12 kg. She became sick two days ago. Her mother reported fever, especially at night, coughing and loss of appetite. No other complaints are mentioned after history taking. She was not given any drugs before coming to facility. Her axillary temperature is found to be 37.4. Laboratory services are not available at the facility.

10) What treatment that would you prescribe for Mary?

b. Case study 2

George is 3 months old, and weighs 4kg. He started coughing and developed fever three days ago. Today his axillary temperature is 38.0 C. He also cries a lot and is restless. After history taking and examination no other abnormalities are detected. Laboratory service is not available at the facility and there is no stock out of any medicines.

11) What treatment would you prescribe for George?

c. What is the name of the first line drug recommended for patient with uncomplicated malaria? (write responses for each category)

12) Adults and children above 5 kg..... [_____]

13) Children below 5 kg..... [_____]

14) Pregnant women in first trimester [_____]

15) Pregnant women in second and third trimester[_____]

**APPENDIX VI: QUESTIONNAIRE FOR EXIT INTERVIEW FOR
PATIENTS/CAREGIVERS OF CHILDREN AGED 4-59 MONTHS OLD**

Date..... ID Number (Day-HU-HW).....

1) Age of the CHILD.....

2) Weight of the CHILD (taken by the interviewer).....

3) Sex of the CHILD (*Tick the appropriate response*):

a) Male

b) Female

DIAGNOSIS

For the following questions, check prescription note (preferred) or ask the caregiver and tick the appropriate response.

5) Did any health worker ask for the child's age?

a) Yes

b) No

6) Did any health worker take the child's weight?

a) Yes

b) No

7) Did any health worker take the child's temperature?

a) Yes

b) No

8) Were you asked if the child has a fever or had had one previously?

a) Yes

b) No

9) Was the child sent to the laboratory for a malaria blood slide?

a) Yes

b) No

10) If yes, was the malaria blood slide taken?

a) Yes

b) No

PRESCRIPTION

11) Which antimalarial drug was prescribed for the child? (Cross check caregiver's answer by asking to see the drug and the prescription note)

- a) Coartem
- b) Other antimalarials (Specify).....
.....

12) If coartem was given, in what form was it given?

- a) Blister pack of 6.
- b) Blister pack of 12
- c) 6 loose tablets
- d) 12 loose tablets
- e) Others (Specify).....
.....

13) If a blister pack was given in 12 above, state the number of packs given.

.....

14) If loose tablets of coartem were given, state the number.

.....

15) If coartem was prescribed, was the child given the first dose at the health unit?

- a) Yes
- b) No

16) If yes to the above, did the health worker watch as you gave the drug to the child?

- a) Yes
- b) No

APPENDIX VII: KEY INFORMANT GUIDE FOR IN-CHARGES OF HEALTH UNITS

Date

Health facility name and level.....

- 1) How many health workers are involved in the treatment of patients at this facility?**

- 2) On average, how many patients do you receive per day?**

- 3) Is there a copy of malaria treatment guidelines at the health unit?**

- 4) If so, how accessible is it to the health workers?**

- 5) How many times have you been supervised regarding the new malaria treatment guidelines in the past 6 months?**

- 6) What problems are you facing in the implementation of the new antimalarial treatment guidelines?**

Thank you.