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Home management of malaria in children under 5 years in Kassena-Nankana District of upper-east region of Ghana: knowledge, attitude and practices of home caregivers

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1.0 INTRODUCTION

1.1 Background information

Home management of malaria has been well studied in several African countries in eastern and western Africa, but there is need to improve the accuracy of diagnosis as well as the accuracy of home management of malaria, especially in the era of Artemesinin Combination Therapy (ACT). Further, Africa seems to be experiencing an epidemiological transition with respect to the malaria burden, making this research quite relevant.

Malaria is a protozoan infection caused by intracellular parasite of the genus plasmodium and transmitted from one person to another by the bite of a plasmodium infected female anopheles mosquito[1]. Of the hundred species of plasmodium genus, only four can transmit malaria to human host: *P. falciparum, P. ovale, P. vivax and P. malariae. Plasmodium falciparum* is the most predominant parasite causing malaria in sub-Saharan Africa (SSA) and mortality due to falciparum malaria has the highest mortality due to its complications and drug resistance[1]. The background section covers a general overview of the burden of malaria, the historical perspective of malaria control programmes that led to the emergence of the Home Management of Malaria (HMM) strategy and a brief introduction of Kassena-Nankana District (KND) as the study setting.

1.1.1 Burden of Malaria Globally and in Africa

More than half of the global population (3.2 billion people) is at risk of malaria infection. It has been estimated that 350-500 million clinical episodes of malaria occur annually with over one million deaths per year. Thirty percent of these annual deaths occur in children under 5

years (U5s)[2, 3]. Around 75% of global malaria cases are due to *P. falciparum* and more than 80% of global malaria deaths occur in (SSA)[2].

In endemic African countries, malaria accounts for 25-35% of all outpatient visits, 20-40% of hospital admissions and 15-35% of hospital deaths[2]. Most vulnerable are HIV infected persons, pregnant women and U5s[2]. Children are vulnerable because of low immunity to malaria infection. Mortality in children is higher if appropriate treatment is not commenced within 24 hours of the onset of fever. The wellbeing of children during malaria illness is entirely dependent on the health care-seeking behaviour of their home caregivers (HCGs).

In addition to contributing to mortality, malaria causes such morbidities as anemia, brain damage, decreased cognition and productivity in children. Severe malaria infections hamper children's education and social development through sickness absenteeism and neurological disabilities[4]. Furthermore, the education system becomes disrupted when children are either too sick to attend school, or their teachers are absent because of malaria-related illnesses. Parents of children debilitated by the disease either cannot work or do so at decreased capacity, and therefore lose earnings [5, 6]. In Africa the annual economic burden of malaria has been estimated to be about US $12 billion and slows economic growth by about 1.3%[7].

1.1.2 Burden of malaria in children in Ghana

In Ghana, malaria accounts for more than 44% of reported outpatient visits and an estimated 22% of under-five mortality[6]. Under five mortality in northeast region of Ghana where KND belongs is 23.9 per 1000 children/year[7] and malaria is estimated to account for about 25% of child deaths in this district[8].

1.1.3 Malaria burden in children in Kassena-Nankana District of Ghana

Kassena-Nankana District (KND) was the study setting. It is a rural district situated in the upper-east region of Ghana. Details of the characteristics of KND are given in section 2.1. In Ghana, malaria accounts for 22% of U5 mortality[2]. In the upper-east region of Ghana where KND is situated, U5 mortality is 23.9 per 1000 children/year [9]. Malaria is endemic in the KND accounting for over 60% of all outpatients seen at health facilities and continues to rank first on the ten causes of Out-Patient Department (OPD) attendance in the district[10]. Malaria mortality estimate (25%) in U5s in the district is higher than that of Ghana (22%) [11]. These make malaria a serious health problem in the district

1.1.4 Historical overview of malaria control strategies

Following the failure of malaria eradication campaigns in some parts of the world in the 1960s and the 1970s [1, 3], the World Health Organization (WHO) launched the Role Back Malaria (RBM) programme in 1998, with the aim of reducing by 50% the global burden of malaria in 2010 and by another 50% in 2015 through implementation of country specific malaria strategies[2]. This aim is consistent with the 8th target of the Millennium Development Goals (MDGs) which is to have halted and begun to reverse the incidence of malaria and other related diseases by 2015. These goals were articulated by the United Nations in 2000 to chart the road map for global development as a way of re-enforcing the aim of the RBM programme[12]. Malaria control strategies have been classified into preventative and treatment strategies.

1.1.4.1 Preventative strategies

Preventative strategies include the use of Insecticide-Treated Nets (ITNs) and bed nets treated with synthetic pyrenthroids, Indoor Residual Spraying (IRS) with insecticides and Intermittent Preventive Treatment (IPT) with doses of sulphadoxine-pyrimethamine (SPs)[2].

1.1.4.2 Treatment strategies

RBM advocates that malaria endemic countries develop updated national antimalarial treatment policies based on evidence of drug efficacy, safety and availability. In response to widespread resistance of P. falciparum to monotherapy with conventional antimalarial drugs such as chloroquine (CQ) and Sulphadoxine-Pyrimethamine (SP), Artemisinin-based Combination Therapies (ACTs) have been adopted as first-line or second-line treatment in countries experiencing such resistance[2]. In 2002, Ghana adopted Artesunate and Amodiaquine combination therapy [13].

In a response to achieving the aim of RBM programme in Africa, Heads of States and other senior government officials from 45 of the 50 malaria affected countries in the African summit on RBM held in Abuja on the 25th April 2000 adopted the HMM as a strategy. The aim of the strategy is to achieve high coverage of prompt and effective anti malaria treatment within 24 hours of the onset of symptoms in areas of high malaria transmission and poor access to facility based health care particularly in rural Africa [2]. HMM was included in the national malaria control strategies in Ghana in 2000[14].

Therapeutic strategies for control of malaria in Ghana include early diagnosis and prompt treatment of confirmed malaria cases, monitoring of antimalarial drug resistance and home management of malaria. Preventative strategies for the control of malaria in Ghana include

intermittent preventive treatment of malaria in pregnant women and in infants with doses of sulphadoxine-pyrimethamine, monitoring insecticide resistance, distribution of insecticide treated mosquito nets and epidemic preparedness. The targets of the Ghana antimalaria policy are consistent with those of the Roll Back Malaria programme [2].

1.2 Home management of malaria

Home management of malaria is the presumptive treatment of febrile illness within 24-48 hours of onset of symptoms based on the recognition of clinical symptoms by HCGs [15-17]. HCGs (biological mothers, grand mothers and care takers) can be differentiated from caregivers (doctors, nurses and other health care providers) because they (HCGs) have the responsibility of caring and initiating treatment at home as the first action for febrile illness presumed to be malaria. The next section highlights the rationale for instituting HMM and the components of HMM.

1.2.1 Rationale for instituting the HMM strategy

Access to health care is a major health and development issue. Rationale for instituting HMM was mainly due to poor access to health facilities which has five dimensions: Availability, Accessibility, Affordability, Adequacy and Acceptability[18]. Unavailability of antimalarials in health facilities was one of the reasons why pre-packaged antimalaria drugs are distributed for free or sold to HCGs by trained community-directed drug distributors, public and private drug vendors. Inability to physically access (due to long distances to nearest health centre and scarce public transport system) public health facilities constitutes a barrier to the provision of early treatment of malaria in developing countries[19]. Communities, therefore, resort to self-medication through the unregulated and untrained private and informal sectors like

pharmacies, medicine shops or vendors[20]. The evidence of this coping mechanism is that 70%-90% of HCGs treat children with febrile illness presumed to be malaria at home as the first line of action[21, 22]. Studies have shown that such treatments commenced at home by HCGs are grossly inadequate, resulting in poor malaria treatment with consequent drug resistance, high morbidity and mortality in children[21].

Inability to afford treatments often in form of high cost of hospital fees, drugs and transport also constitutes a barrier to accessing health centers. This often discourages HCGs who then resort to cheaper alternatives like initiating self medication at home by buying antimalaria drugs from drug vendors[23]. Perception of certain febrile illnesses (cultural acceptability) discourages HCGs from utilizing the services of health care facilities. For example, the belief that certain fevers are treatable at home might possibly influence the preference of home care to health care facilities[24, 25]. Because HCGs with this cultural belief would treat children with presumed malaria at home, it was necessary to inform and educate them on the need to initiate appropriate treatment at home. Initiation of HMM can also be attributed to the inadequacies of health facilities such as the inability to deliver timely and quality treatment for all at risk of malaria. Health institutions in developing countries are unable to cope with providing quality services to clients[26]. This may be attributable to poor funding by governments with the attendant problem of poor motivation by health workers.

These factors informed the RBM programme to institute HMM as a way of circumventing barriers to access by making effective antimalarial drugs available in or near the homes through the help of trained community volunteers. The HMM strategy acknowledges time element as being critical to saving children's lives and reducing the burden of the disease in

endemic regions since the majority who die from malaria do so within 24 hours of the onset of symptoms[27].

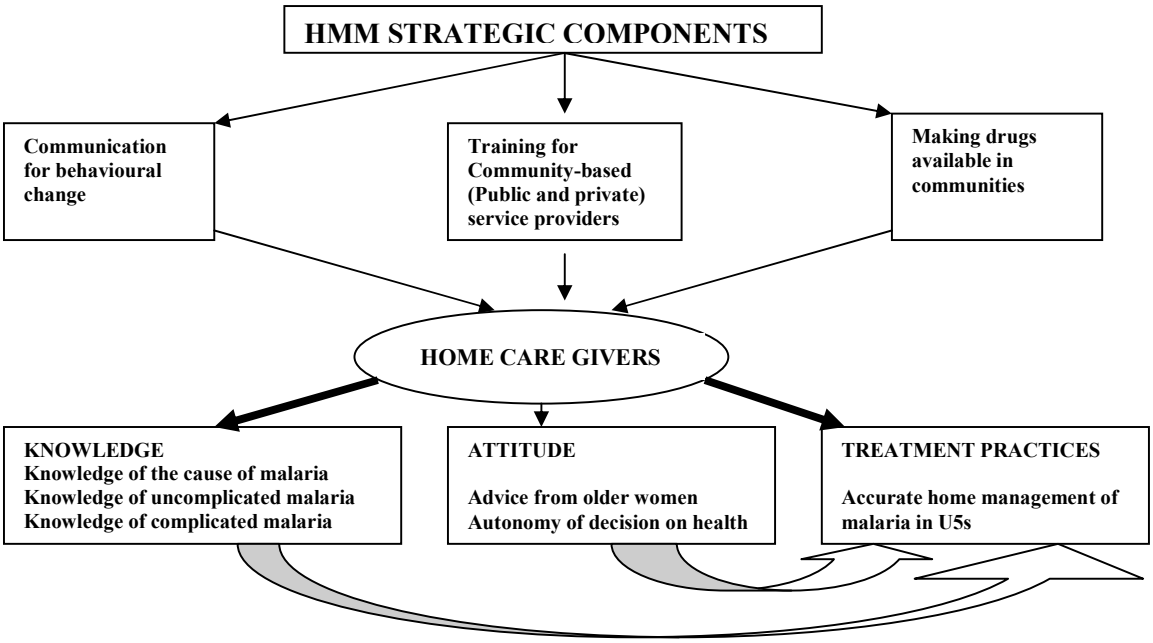
1.2.2 Components of HMM

Components of HMM include information and education given to HCGs by the community health workers, making prepackaged antimalarials available to communities and training of community-based health workers. Community-based health service workers provide health information and education to HCGs to enable them recognize the symptoms of uncomplicated malaria defined as episode of fever and any one or more of the following: vomiting, weakness, diarrhoea, chills, loss of appetite, cough, shivering stomach ache and yellow discolouration of urine [28, 29] for the purpose of commencing treatment at home. HCGs are also trained to identify complicated or severe malaria defined as every episode of fever followed by convulsions or loss of consciousness [28, 29] for the purpose of referral. These clinical case definitions were developed by the WHO in recognition of the difficulty in diagnosing malaria when and where skilled microscopists are not available particularly in SSA [29]. Other components include making pre-packaged antimalarials available to the communities by community drug distributors (CDDs) and training of drug shop owners and other service providers on the prescription of optimal doses of antimalarials [15-17].

Having discussed the concept of HMM strategy, its components and the rationale for its institution, the next section focuses on the model that I have developed to test the impact of the HMM strategic components on the knowledge, attitudes and practices of HCGs in the home management of malaria.

1.3 Home Management of Malaria model for this research

Figure 1.1: Impact of HMM strategy on the knowledge, attitudes and practices of HCGs



The HMM strategic components address the physical gap in access by enabling the home to be the first "health institution", relying upon the community and the services offered by community-based service providers[30]. The effective communication strategy for behavioural change component provides direct information to caregivers through mass and print media to enable them to recognize uncomplicated malaria illness promptly in U5s and take early and appropriate action, and to recognize complicated malaria for the purpose of self referral to health facilities. The second component trains different community-based public and private (medicine vendors) groups to deliver prompt and effective treatment for uncomplicated malaria and to refer complicated malaria cases. It also enables the Community Health Officers (CHOs) who are the public service providers of HMM in the district to inform

and educate HCGs on how to identify the symptoms of malaria. The third component improves access to high quality pre-packaged antimalarials through services provided by the CDDs and drug vendors in the public and private sectors respectively.

The three arrows pointing from HCGs to knowledge, attitude and treatment practices boxes indicate how the three strategic components of HMM are expected to impact on HCGs by increasing their knowledge of malaria, empowering them to overcome household attitudinal factors and ultimately improving their treatment practices respectively [30]. The two block arrows from knowledge and attitude boxes to treatment practices box indicate that knowledge and attitude are expected to lead to better malaria treatment practices among the HCGs.

1.4 Methodology of malaria KAP studies

Malaria KAP studies are done using either qualitative[31, 32] or quantitative methods, or a combination of both methods in sequence[33]. Qualitative methods which often convey meanings and interpretations are done by conducting Focus Group Discussions (FGDs), Key Informant Interviews (KIIs) and In-Depth Interviews (IIs) among different target audiences as a way of complementing quantitative methods. Quantitative Knowledge, Attitude and Practices (KAP) malaria surveys can be done contextually by recoding qualitative variables to quantifiable numeric forms for analysis. The key points emphasized in the previous sections is that one or more of these methodologies can be used to design and carry out KAP studies on HMM with the aim of describing the KAP of HCGs in the HMM as well as making inferences on factors associated with the treatment practices

1.5 Statement of problem

One of the targets of the Abuja declaration is that at least 60% of all persons suffering from malaria should have access to, and are able to correctly use, affordable and appropriate treatment within 24 hours of the onset of symptoms[34]. As a way of achieving this, trained community volunteers inform and educate HCGs on the recognition of symptoms of malaria in U5s. Following this, HCGs are to administer the correct dose of prepackaged antimalarials to children upon identification of symptoms[35]. In KND, the CHOs have been helpful in informing and educating target groups in malaria control programmes and other health activities[36, 37].

There is, therefore evidence that HMM strategy results in more timely treatment[38], reduces severe morbidity[35] and mortality[39] in children. But malaria still remains an enormous burden in Africa as over 30% of annual deaths occur in these children[2] and a quarter of child deaths in the KND is attributable to malaria[11]. Part of the reasons for this trend is because home care providers in rural African communities have poor treatment practices in the management of presumed malaria in children[40]. Undeniably, the question is: why is there no improvement in malaria treatment given to children in the homes [41, 42] despite good knowledge of malaria[41] among HCGs following the integration of HMM strategy in malaria control policy in Ghana since 2000?

1.6 Justification for the study

Description of home caregivers' knowledge, attitude and practices in the home management of malaria in children in the district have been the focus of numerous studies[35, 40, 43-46]. However, few studies have investigated the factors that are associated with such identified

home treatment practices. This study described the knowledge, attitudes and practices of HCGs in the treatment of U5s with presumed malaria. It also investigated the predictors of poor malaria treatment practices among home care givers in rural KND in upper-east region of Ghana as a way of contributing to the improvement of HMM strategy in the district and in Ghana, and meeting the targets of the Abuja declaration and RBM programme globally.

Findings from this study could be used to inform HMM policy implementers at the district and national levels on ways to improve and strengthen the current efforts of the Ghanaian government in integrating HMM strategy with the malaria control programme in a bid to meeting the targets of Abuja and achieving the goal of RBM programme.

1.7 Literature review

The following highlights the literature review on the knowledge, attitudes and malaria treatment practices of HCGs in the home management of malaria in U5s in Africa.

1.7.1 Malaria treatment practices among home care givers

With respect to malaria treatment practices, research findings from different countries have shown that a large proportion of U5s presumed to have malaria are given sub-optimal doses of antimalarial drugs in a manner that suggests poor treatment or poor adherence practices[44, 45]. This is a predominant feature in rural communities in Africa and in KND[37]. The main factors which influence treatment practices among HCGs in the home management of uncomplicated malaria in U5s in developing countries include knowledge of malaria and attitude of HCGs towards malaria, community remoteness, individual, household and community factors.

1.7.2 Knowledge of Malaria

Knowledge of the cause, symptoms and treatment of malaria determine the extent of accurate home management practices among home caregivers in the HMM in children[47]. Studies have revealed that the majority of HCGs have good knowledge of the cause and symptoms of malaria in U5s[33, 48-50]. A survey conducted in rural Bolifamba, southwest Cameroon showed that 80% of women had good knowledge of cause and symptom of malaria[50]. This is a corroboration of a similar finding in KND in upper-east region of Ghana[41]. On the other hand, a few studies have reported poor knowledge of malaria among HCGs. A study conducted in rural Gambia showed that only 16% of women had good knowledge of how to treat malaria at home[51].

1.7.3 Attitude of the home caregivers to seeking malaria treatment

Advice and autonomy of health care decision-making are the types of treatment seeking attitude that have been described by literature. With respect attitude, a study in Sudan and in Nigeria revealed that mothers of children with malaria received advice from older women before commencement of treatment[33, 52]. In 80% of the cases, such advice was on the use of herbs[52]. In KND, the attitude of HCGs in seeking treatment may be influenced by household factors considering the traditional lifestyle in which people live in extended compounds that accommodate one or more several households[19]. In this extended family system, decisions taken on the care for U5s during malaria illness may be influenced by parents-in-law or older women who live with family members in the compounds or neighbourhoods [41]. On autonomy, a study in Nigeria showed that fathers were mainly responsible for the decisions made in treatment of a child with presumed malaria[52]. This leaves the mothers with little autonomy of health care decision-making[20, 53].

1.7.4 Rural location

Some research have revealed that the more remote a community is, the more likely it is that malaria treatment practices will be poor. A two-stage cluster survey of households conducted in 2000 in Malawi to study care seeking behaviour and home treatment of fever in Blantyre District showed that rural location was statistically associated with failure to receive prompt and appropriate treatment at home [40].

1.7.5 Individual, household and community factors

Home management of malaria is influenced by several factors including individual, household and community factors [40]. Individual factors include HCGs' age and education. Studies have shown that younger inexperienced women are more likely to visit health facilities to seek treatment for their febrile children while the older women are more likely to treat malaria in U5s at home. A study conducted in Uganda to determine caregivers' perceived treatment failure in the HMM showed that caregivers with higher educational level tended to use the HMM more[54]. Determinant of accurate home treatment at household level include higher household Socio-Economic Status (SES)[55]. Community factors include socio-cultural practices in which some communities believe that certain fever is treatable at home. This may possibly inform the choice of home care in treating malaria [24, 56]. A community in Kenya believes that antimalarials and antipyretics are contraindicated in convulsions and so are withheld or withdrawn from children with fits associated with fever[57].

The previous sections have focused on the concept, components, and dimensions of HMM and the main determinants of malaria treatment practices among HCGs as demonstrated by other studies. This study conducted in KND, however, sets to confirm or refute these findings and hence contribute to establishing key predictors of HMM.

1.8 Study aim and objectives

1.8.1 Research Question

Is there an association between knowledge of malaria and treatment-seeking attitude among home caregivers and accurate home management of malaria in U5s in KND of Ghana in 2005/2006?

1.8.2 Aim

To determine the impact of HMM strategy in the treatment of malaria in children under the age of five years in KND of northern Ghana using data from a household survey in 2006.

1.8.2.1 Specific objectives

1. To describe home caregivers' knowledge, attitudes and management practice in the home management of malaria in U5s in Kassena-Nankana district.
2. To determine the relationship between home caregivers' knowledge of malaria and accurate home management of malaria in U5s in Kassena-Nankana district.
3. To determine the relationship between home caregivers' malaria treatment-seeking attitudes and accurate home management of malaria in U5s in Kassena-Nankana district.
4. To identify factors that influence home caregivers' accurate home management of malaria in U5s in Kassena-Nankana district.
5. To identify how the differences between women who would give drugs and those who would not influences home management of malaria.

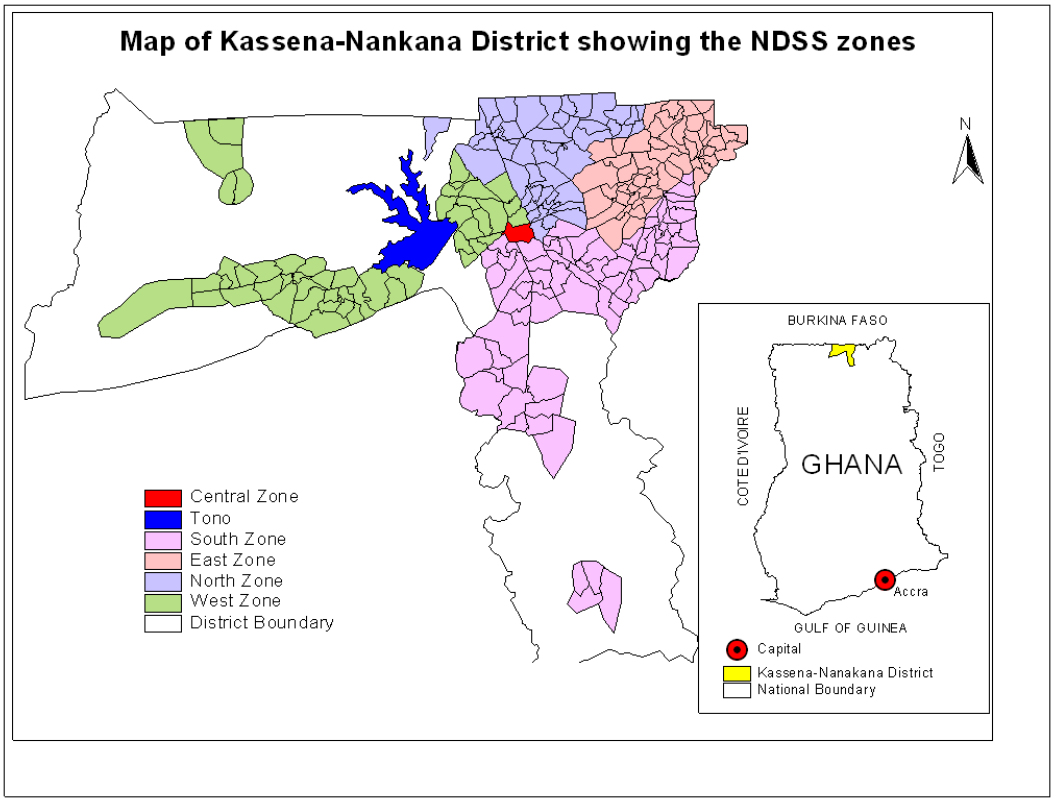
2.0 METHODOLOGY

2.1 Study setting

2.1.1 Geo-political characteristics

Kassena Nankana District is the study setting. It is one of the eight districts in the Upper East Region located in the northern part of Ghana. The district lies between latitudes10°30' and 11°00' north of the equator and between longitudes 1°00' and 1°30' west of the zero meridian and stretches for 55 kilometers from north to south and 53 kilometers from east to west with an area of 1,675 square kilometers along the Ghana-Burkina Faso border. The district capital is Navrongo[58].

Figure 2.1 Maps of Ghana and Kassena-Nankana District



2.1.2 Ecological features

Located in the Guinea Savannah belt, the district's ecology is typically Sahelian (hot and dry), with the vegetation consisting mostly of semi-arid grassland interspersed with short trees. There are two main seasons: the wet and dry seasons. The wet season extends from May to October with only about three months of heavy rainfall. The dry season is subdivided into the Harmattan (November to mid February) and the dry hot (mid February to April) seasons. During the dry season, rainfall is virtually absent and day temperatures could be as high as 42° Celsius and night temperatures are as low as 18° Celsius[59]. In the district, the Tono agricultural dam which is a source of irrigation for farming constitutes a nuisance as it serves as breeding sites for malaria transmitting female anopheles mosquitoes. Several dugouts used for irrigational purpose further heighten breeding of the vectors. These mosquitoes have a long flight range, partly accounting for stable malaria transmission (with peak in the wet season) in the district[58]. Use of ITNs is very high during the peak season but ITNs are hardly used during the dry season when people perceive there are fewer mosquitoes.

The all year warm condition and the irrigational farming system in the district are appropriate for mosquito breeding, thereby, contributing to making malaria a public health burden particularly among vulnerable children.

2.1.3 Socio-demographic profile

The population of the district in 2006 was 144,862 people with females and males accounting for 52.5% and 47.5% of the population respectively. U5s constitute 12.5% of the total population[60]. The majority of the population belongs to the two predominant ethnic groups (Kassenas and Nankanis) from which the district name was derived [60]. The KND is

predominantly rural with 10% and 90% of its population living in urban and rural areas respectively[58]. Agriculture remains the mainstay of the district's economy and accounts for about 68.7 per cent of the employable population; some of whom still use bullock ploughs for farming. The district has virtually no sizeable manufacturing industries[58]. Access to modern facilities such as electricity, telephones and television are scarce except in urban settlements. The use of bicycles, donkey carts as means of transportation is still common place [61]. Remoteness of the district could be a factor influencing malaria treatment practices among HCG.

2.1.4 Health status

In the district, health care is provided through one hospital (which serves as referral point), four health centres, eighteen clinics, sixteen chemical (drug) sellers, three health posts run by the Catholic Mission, a maternity home, an orphanage and the Navrongo Health Research Centre (NHRC). With a Doctor/Patient ratio of 1:75,488 and Nurse/Patient ratio of 1:5,245, the district is plagued by a dearth of health personnel as the number of practicing doctors in the employment of the district government remained at two from 2003 to 2005[61]. Information on current doctor population in the district is not available. Although the CHOs are the main source of malaria related information to the HCGs in the district, their number in the selected study communities is not available in the data. All cause U5 mortality rate in KND in 2006 was 109/1000 live births[60] and malaria remains the highest cause of mortality among children despite intensive research and intervention programmes such as the use of insecticide treated bed nets by U5s and pregnant women[58].

2.1.4 Educational status

The district has seventeen Pre-school, seventy-two Primary Schools, thirty-four Junior Secondary School, five Senior Secondary Schools, one Teacher Training College, three Vocational Training Centers and a faculty of the University for Development Studies. Despite the availability of these resources, the district has a very low literacy rate of about 4 percent [58]. Low literacy level may have the propensity to reduce uptake of malaria preventive and treatment services and to negatively influence the knowledge of malaria among HCGs.

2.1.5 Historical background of the Demographic Surveillance System site

The NHRC started in 1989 as a field site to determine the impact of repeated large doses of vitamin A supplements on child survival. The Centre is located in Navrongo, the headquarter of the district. The Centre maintains a Demographic Surveillance System (DSS), which provides a database of all compounds and individuals in the district on a 90 day cycle. The DSS divides the district into five zones (East, West, North, South and Central) and clusters (sections of communities within each zone) for the purpose of research activities. There are about 244 of such clusters in the entire district with each cluster comprising an average of 60 compounds with an average of one U5 per household. A compound is made up of a cluster of building(s) in which different households or a single but large household of one or more generations live. This is a reflection of the typical rural African traditional extended family system in which people live together and are seen and regarded as one another's keeper.

2.2 Study design

This cross sectional analytical study is based on secondary data analysis of an exploratory survey of the role of health information recipients in access and utilization of treatment for malaria management in U5s conducted among mothers in the KND between June 2005 and

June 2006. The aim of the primary study was to determine the impact of the HMM strategy in the district by assessing home caregivers' knowledge of malaria based on the treatment information given them by the CHOs.

2.3 Sampling and study population

The description of the sampling technique in which the study participants were recruited in the original and secondary studies is explained in the next sub-sections.

2.3.1 Sampling and study population for the primary study

A multi stage sampling was done using a sampling frame from the DSS database to select the study population. Firstly, using a simple random number table, ten clusters (communities) each from each of the five zones in the district were selected. Secondly, twelve compounds each from the selected communities were randomly selected. Thirdly, within each selected compound all households with U5s were selected. Fourthly, in the households where U5s were reported to have had "malaria" two weeks before commencement of the study, the HCGs were administered questionnaires irrespective of number of U5s in the household with the unit of analysis being the household (600 households). The criterion for including older women as caregivers is because U5s are also directly cared for by older women other than their biological parents as a result of the traditional extended family support system of care in KND.

Community consent was obtained from the community gatekeepers after community entry, mobilization and sensitization during which the purpose of the research was explained by the research team. Individual informed consent were also obtained from the selected study participants who voluntarily agreed to participate in the study after adequate information on

the aim of the study was given by the interviewers. Using semi-structured interviewer administered questionnaires, a total of 818 HCGs from 600 households with U5s were interviewed. In the primary study, the older women were those 50 years and above and the younger women were those within the reproductive age (15-49 years). Focus Group Discussions (FGDs) and In-Depth Interviews (IDIs) were conducted among a few selected study participants. The study was conducted at the height of the rainy season (between June 2005 and June 2006) to coincide with the season of peak malaria transmission. Preceding the main survey was a pilot study that lasted 2 weeks which was conducted outside the selected clusters for the main survey during which all study tools were pre-tested and refined.

2.3.1.1 Measures to ensure quality of data

The quality of the household interviews was controlled by daily supervision of interviewers by the researcher and supervisors. At the end of each day, completed interviews were checked and verified for consistency before submitting them for data entry. Questionnaires that were incomplete and contained some inconsistencies were returned to fieldworkers for verification. The data collection supervisors randomly selected 5% of the completed interviews and repeated the interviews with respondents to ensure that interviews were conducted appropriately and accurately. The data were doubled entered by two data entry clerks, and lastly a verification check was run to reconcile differences where they arose.

2.3.1.2 Inclusion criteria

Younger and older home caregivers (818) in the selected households where U5s had malaria two weeks before the study was conducted were recruited and interviewed.

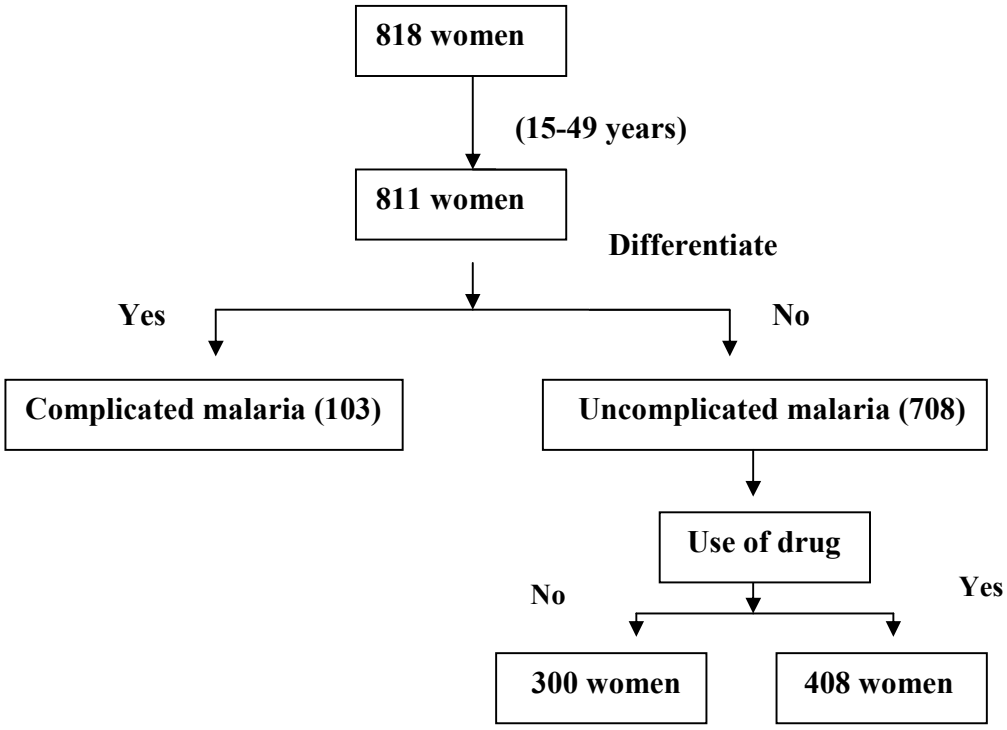
2.3.1.3 Exclusion criteria

Households with children 5 years and above were excluded irrespective of the presence of malaria illness two weeks before the study commenced.

2.3.2 Sampling and study population for the secondary analysis

The inclusion criterion in the secondary research was limited to (1) younger women and (2) those who responded to knowledge of the treatment of uncomplicated malaria among the younger women. The justification for focusing on this group (708 women) is because the study explores attitude of these women in seeking advice from older women in the home treatment of uncomplicated malaria. The HMM strategy recommends home treatment of uncomplicated malaria in U5s while referring identified complicated cases to health facilities for appropriate treatment. The remainder of the 103 women who responded to knowledge of complicated malaria was excluded because the questionnaire was designed such that they could not respond to questions on knowledge of the treatment of uncomplicated malaria.

Figure 2.2 Sampling methods for the secondary analysis



2.4 Theoretical and operational definition of terms

The definitions below clarify terms or phrases that are used in this research report:

- **Accurate HMM:** This is a proxy outcome variable that refers to what HCGs did to treat accurately children presumed to have malaria based on the standard treatment protocol of the Ghana Ministry of Health (2000) which the CHOs used as a guideline in giving treatment information to HCGs . Accurate HMM is a composite variable made up of the correct dosage and the correct duration of treatment with the selected antimalarial drug. Due to the absence of the actual treatment given to a child with presumed malaria in the questionnaire, knowledge of the treatment of malaria (dosage and duration) with an anti malaria drug among respondents was used as proxy for accurate HMM based on the literature supporting the evidence that knowledge of the appropriate treatment of malaria could lead to good treatment practices[47].

- **Clinical case definition of uncomplicated (mild) malaria:** Uncomplicated malaria in U5s is defined as episode of fever and any one or more of the following non-specific symptoms: vomiting, weakness, diarrhea, chills, loss of appetite, cough, shivering stomach ache and yellow discolouration of urine[28, 29]. Clinical diagnosis of presumed malaria in U5s is based on the recognition of these symptoms by the HCGs.

- **Clinical case definition of complicated (moderate/severe) malaria:** Complicated malaria in U5s is defined fever, convulsion or loss of consciousness[28, 29]. The most important distinguishing symptoms of complicated malaria in U5s easily recognizable by HCGs in the questionnaire are hot body, very hot body, convulsion and any other symptom indicated as such as impairment of consciousness.

2.5 Study variables

An interviewer administered semi-structured questionnaire (App A) written in English was used to collect information on measurable variables from the respondents. The interviewer read out the questions to the respondents to obtain appropriate responses. In order to facilitate comprehension of the questions where respondents did not understand English, the interviewers who are well trained, experienced and fluent translated the questions to the respondents in local languages (Kassena and Nankani) predominantly spoken in the district. For clarity, the study exposure, outcome and confounding variables are described in sub-section 2.5.1 while details of their measurements are presented in the data management part in section 2.6

2.5.1 Exposure variable

Main exposure variables include:

- Knowledge of malaria:
    - Knowledge of cause of malaria (transmission by mosquito bite).
    - Knowledge of the symptoms of uncomplicated malaria (hot body, vomiting, very hot body, cough, very weak, diarrhea, chills, loss of appetite, weak, body itching, urine changes to yellow, shiver, stomach ache, convulsion and others).
- Attitude towards seeking malaria treatment:
    - Young women receiving advice from older women
    - Autonomy of health care decision making in the household.

2.5.2 Outcome variable

The binary proxy outcome variable is accurate or inaccurate home management of malaria in U5s among HCGs. It is a composite variable made up of the following components:

- Knowledge of the age dependent correct dose of the selected drug.
- Knowledge of the correct duration of treatment for the selected drug.

2.5.3 Confounding variables

Anticipated confounders include age, Socio-Economic Status (SES), education, ethnicity and religion of the women.

2.6 Data management

2.6.1. Data extraction and cleaning

Data extraction from the original database available in Fox Pro format was done in order to select study variables that focus on the study objectives of the secondary research. After data cleaning, the total number of respondents who responded to questions related to the outcome variable was 708.

2.6.2. Measurement of study variables

The original study questionnaire contains 83 questions that were used to collect information from respondents. Thirty (27) of these 83 questions marked with an asterisk (*App A*) which cover bio-demographic information, malaria-related knowledge, attitude and practices, autonomy of health care decision making in the household and household assets of the respondents are variables used in this research. Appendix B shows the questions related to the

three main study variables (knowledge, attitude and practices) and their components in the questionnaire.

2.6.2.1 Recoding of exposure variables into (quantifiable) measurable forms

After data cleaning and analysis with STATA 10, variables related to knowledge of malaria among respondents were recoded to enable analysis and interpretation in the following manner:

- **Knowledge of the cause of malaria:** Mosquito is the only correct response for the cause of malaria. Knowledge of cause of malaria is categorized *correct* if the respondent chose only mosquito bites, *partly correct* if the respondent chose mosquito bites and one or more incorrect response(s) and *incorrect* if the respondent did not choose mosquito bites or Don't Know (DK).

- **Knowledge of the symptoms of uncomplicated malaria:** All responses to question 13 are correct except convulsion; a symptom of complicated malaria. In question 14, respondents were asked to rank the symptoms in descending order of importance. A weighted scoring system was used to assign scores to the symptoms. A score of 2 was each assigned to respondents who chose hot body or very hot body in the first two boxes of the ranking because fever was regarded as the cardinal presenting symptom of uncomplicated malaria. Other symptoms were assigned a score of 1 while convulsion or other category was assigned a score of 0. Therefore, knowledge of the symptoms of uncomplicated malaria was categorized as *good knowledge* if the score was ≥ 4 (i.e. hot body + very hot body + any other correct symptoms included in the ranking) and *poor knowledge* if the score was < 4.

- Variable related to attitude towards malaria among respondents will be *YES* (if a young woman received advice from an older woman) or *NO* (if a young woman did not receive advice from an older woman).

- Autonomy of health care decision making was YES (If the respondent did not rely on someone for decision before treating a sick child) or NO (If the respondent relied on someone for decision before treating the child).

2.6.2.2 Recoding of outcome variable into a quantifiable measurable form

Variables related to home management of malaria among respondents was recoded to enable analysis and interpretation. Home management of malaria is a composite variable made up of dosage and duration of the antimalarial selected by the respondent. The respondents could only select one drug to treat uncomplicated malaria. Three hundred and ninety-five (395) respondents selected antimalarials while thirteen (13) respondents selected paracetamol; a non-antimalarial drug used to reduce fever.

- *Accurate Home Management of Malaria:* Respondents who gave the correct dose and correct duration of the selected antimalarial drug were categorized accurate HMM.

- *Inaccurate Home Management of Malaria:* Respondents who fell short of the criterion for accurate HMM were categorized inaccurate HMM. These included respondents who gave: (I) the correct dosage but wrong duration of an antimalarial, (II) correct duration but wrong dosage of an antimalarial, (III) wrong dosage and wrong duration of an antimalarial, (IV) all respondents who did not give drug and (V) use of paracetamol irrespective of its correct dosage and correct duration. The justification for categorizing the use of paracetamol as inaccurate HMM is because it is not

recommended alone for the treatment of malaria without an antimalarial even though it is necessary to reduce fever.

2.6.2.3 Coding of confounding variable into a quantifiable measurable form

- Socio-economic status of respondents was measured by wealth index which was constructed using information on household possessions and housing characteristics and categorized in to five levels in descending order: least poor, less poor, poor, more poor and very poor, using the principal components analysis technique.

- In order to determine which age group needs to be targeted for policy purpose with respect to the impact of age on accurate HMM, age was categorized into three groups: 15-24 years, 25-34 years and 35 years and above.

- Similar to the reason for which age was categorized; highest educational status of the participants was categorized in ascending order into: Primary, Junior Secondary School (JSS), Secondary and Tertiary levels.

- Ethnicity of the women was categorized into: Kassena, Nankani, Bulsa and others.

- The religion of the women was categorized into: Traditional, Christian, Moslem and other religion.

The Table 2.1 shows the dose and duration of the drugs used as standard for measuring accuracy of HMM among home caregivers. These were the drugs selected by the participants

in the original study during which the new Ghana antimalarial policy on the use of Artemesinin-Based Combination Therapy (ACTs) had been implemented. (The ACTs were actively introduced in the district health facilities in June 2006). The respondents had the choice of selecting other antimalarial drugs including the Artemesinin-based Combination Therapy drugs (ACTs) in the questionnaire.

Table 2.1 Dose and duration treatment guideline of the Ghana Ministry of Health (2000)

For drugs selected by the respondents

AGE (YEARS)	TOTAL DOSE/DAY (mls)	DURATION		
		DAY 1	DAY 2	DAY 3
1. CHLOROQUINE SYRUP (50mg/5mls)				
0	**5**	**5**	**5**	**2.5**
1-3	**10**	**10**	**10**	**5**
4	**20**	**20**	**20**	**10**
2. KINAQUINE® SYRUP (100mg/5mls)*				
0	**10**	**10**	**10**	**5**
1-3	**20**	**20**	**20**	**10**
4	**40**	**40**	**40**	**20**
3. FANSIDAR® TABLET				
<2	**Half tablet dissolved in 5mls of water**	**5**		
2-4	**One tablet dissolved in 10mls of water**	**10**		

**** Kinaquine is a brand of Chloroquine. Its concentration is twice that of Chloroquine and so was analysed separately***

2.7 Data analysis

Data set was analyzed using STATA^{R} version 10 software.

2.7.1 Descriptive analysis

- Demographic background information of respondents was described using means and relative frequencies.

- Knowledge of malaria, treatment-seeking attitude and accurate HMM were described using relative frequencies as a way of measuring the first objective of this research.

2.7.2 Inferential analysis

The second objective of this study was measured using Chi-squared test to test the association of knowledge of malaria and treatment-seeking attitude with accurate home management of malaria among the home care givers.

- Univariate logistic regression model was fitted to measure the fourth objective; identifying factors such as knowledge, attitude and socio-demographic variables that influence accurate home management of malaria in U5s among home care givers in the district. Those variables found to be statistically significant were fitted in to the multiple logistic regression model.
- Multivariate logistic regression was used to control for confounders; variables which were associated with accurate home management of malaria in the univariate logistic regression model but were not associated with accurate home management of malaria in the multivariate logistic regression model.

2.8 Ethical considerations

2.8.1 Ethical considerations in the original research

Ethical approval for the original research on exploratory survey of the role of health information recipients and the inequality in access and utilization of treatment for malaria management in young children was obtained from the WHO ethics committee. (***Appendix C***)

2.8.2 Ethical considerations in this research report

Ethical clearance for the protocol of this research report was obtained from the University of the Witwatersrand Ethical Committee for Research on human subjects in November 2007. Ethical approval for the conduct of the secondary analysis was obtained from the Institutional Review Board of the Navrongo Health Research Center in February 2008. (***Appendix C***)

3.0 RESULTS

The first part of this chapter (section 3.1) provides the results of the descriptive and inferential analyses of the total study sample of 708 participants who knew the treatment of uncomplicated malaria in U5s. The second part (section 3.2) compares the demographic profile, knowledge and attitude of 408 women who would give antimalarials with those of 300 women who would not for purpose of emphasis on public health intervention.

The results of the analyses will be presented to reflect the objectives of the study. Table 3.1 summarizes the socio-demographic characteristics of the respondents. The first objective is to describe the knowledge, attitude and practices of HCGs in the treatment of uncomplicated malaria in U5s at home. These are summarized in tables 3.2, 3.3 and 3.4. The second objective is to determine an association between knowledge of malaria and accurate HMM in U5s among home caregivers. The third objective is to determine an association between attitude and accurate HMM in U5s among the home caregivers. These are summarized in table 3.5. The fourth objective summarized in table 3.6 is to identify other factors that influence accurate HMM in U5s among the home caregivers. Tables 3.7 and 3.8 show the differences between the population subgroups with a view to identifying the group of women that need to be targeted with respect to HMM policy recommendations.

3.1 Results of analyses on 708 study participants

3.1.1 General information

Background information of all the participants in the study is shown in table 3.1. Of 708 women included in the analyses, 98%, of them were the biological mothers of the U5s.

Table 3.1 Socio-demographic characteristics of all the respondents (N=708)

VARIABLE	PERCENTAGE (%)	NUMBER (N)
EDUCATIONAL LEVEL		
None	56.4	399
Primary	25.1	178
Junior Secondary School (JSS)	12.9	91
Secondary	4.9	35
Tertiary	0.7	5
RELIGION		
Traditional	25.3	179
Christianity	67.5	478
Moslem	5.8	41
Others	1.4	10
MARITAL STATUS		
Married	92.2	653
Divorced	2.0	14
Separated	1.7	12
Widowed	3.2	23
Other	0.9	6
ETHNICITY		
Nankani	35.6	252
Kassena	58.2	412
Bulsa	3.9	28
Other	2.3	16
OCCUPATION		
None	18.2	129
Farmer	52.0	368
Trader/Civil servant	29.8	211
RELATIONSHIP TO CHILD		
Biological mother	98.1	695
Care taker	0.9	6
Grand mother	1.0	7
AGE GROUPS (YEARS)		
15-24	26.1	185
25-34	48.2	341
≥35	25.7	182
SOCIO-ECONOMIC STATUS (SES)		
Least poor	20.5	145
Less poor	19.6	139
Poor	19.9	141
More poor	23.3	165
Very poor	16.7	118

The mean age (SD) of the home caregivers was 30 (7) years. More than half (56%) of the women had no education and less than 1% had tertiary education. Christianity, made up of different denominational sects is the dominant religion (68%) of the participants. The Majority of the women (92%) were married. About 94% of the women were of the Kassena and Nankana ethnicity; the two main ethnic groups in the district. Farming constituted 52% of the occupation of the women. Socio-economic status (SES) of the women was nearly equally distributed between the five categories: least poor, less poor, poor, more poor and very poor.

3.1.2 Knowledge of malaria

Table 3.2 describes knowledge of the mode of transmission of malaria and knowledge of the symptoms of uncomplicated malaria. About (27%) of the respondents knew correctly that only mosquito transmitted malaria, 55% had partly correct knowledge as they mentioned mosquito and other answers as cause of malaria and 18% had incorrect knowledge because mosquito was not mentioned as the mode of transmission of malaria. Approximately fifty-nine percent (59%) of the women had good knowledge of the symptoms of uncomplicated malaria.

3.1.3 Attitude toward seeking treatment for uncomplicated malaria

Table 3.2 summarizes the treatment-seeking attitude of the participants. About 651/708 (92%) of the younger women received advice from the older women. Approximately 629/651 (97%) of the younger women strictly adhered to the advice given by the older women. Residence in this research refers to the compound where younger women who received advice lived. About 612/651 (94%) of the younger women who received advice lived in the same compound as the older women who gave the advice while 39/651 (4%) of the younger women who received advice lived in different compounds as the older women who gave the advice. The following

advices were received by the younger women: use of herbs-77%, visiting the Health Centre/Clinic-41%, buying drugs-24% and utilizing the services of the CHOs-10%. The percentages of the types of advice did not add up to 100% because the question was multiple responses.

After receiving advice as to where to seek treatment or what treatment to administer, 29% of the women had autonomy of health care decision-making while 71% had no autonomy.

Table 3.2 Knowledge and attitude of uncomplicated malaria among the respondents (N=708)

KNOWLEDGE	PERCENTAGE (%)	NUMBER (N)
Mode of transmission through mosquito bites		
Correct	**26.7**	**189**
Partially correct	**54.7**	**387**
Incorrect	**18.6**	**132**
Symptoms of uncomplicated malaria		
Good	**58.9**	**417**
Poor	**41.1**	**291**
ATTITUDE		
Advice		
No	**8.0**	**57**
Yes	**92.0**	**651**
Strict adherence to advice (N=651)		
Yes	**96.6**	**629**
No	**3.4**	**22**
Residence of younger women (N=651)		
Same compound as old women giving advice	**94.0**	**612**
Different compound from old women giving advice	**6.0**	**39**
Types of advice (multiple response)		
Herbs	**77.1**	**546**
Visit Health Clinic	**40.8**	**263**
Buy drugs	**23.9**	**154**
Community Health Officers (CHOs)	**9.61**	**62**
Autonomy		
Yes	**29.2**	**207**
No	**70.8**	**501**

3.1.4 Knowledge of the treatment of uncomplicated malaria

Knowledge of the treatment of uncomplicated malaria in U5s among the respondents was used as proxy to determine the outcome variable which is accurate home management of malaria in children. The following results in Table 3.3 were drawn from all the respondents who responded to the question about knowledge of home treatment of uncomplicated malaria in U5s. Analysis showed the following were done as the first line of action: 489/708 (69%)-use of herbs, 408/708 (58%)-use of drugs, 173/708 (24%)-sponging, 12/708 (1.7%)-did nothing and 3/708 (0.4%)-prayed/consulted soothsayers. This did not add up to 100% because it was multiple responses.

Table 3.3 Knowledge of the treatment of uncomplicated malaria (N=708)

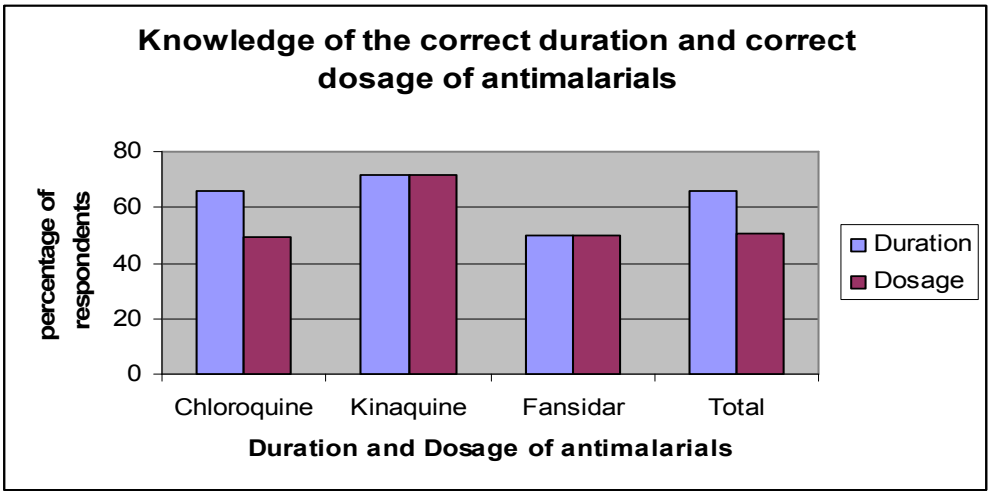
KNOWLEDGE OF MALARIA TREATMENT	PERCENTAGE (%)	NUMBER (N)
1. First line of action (multiple responses)		
Gave drugs	**57.6**	**408**
Did sponging	**24.4**	**173**
Gave herbs	**69.1**	**489**
Did nothing	**1.7**	**12**
Others (praying and consulting soothsayer)	**(0.4)**	**3**
2. Use of drugs (N=708)		
Gave no drug	**42.4**	**300**
Chloroquine	**54.3**	**384**
Kinaquine	**0.9**	**7**
Fansidar	**0.6**	**4**
Paracetamol	**1.8**	**13**
3. Correct dosage of each antimalarial		
Chloroquine	**49.5**	**190**
Kinaquine	**71.4**	**5**
Fansidar	**50.0**	**2**
Total correct dose for all antimalarial drugs (N=395)	**50.4**	**199**
4. Correct duration of each antimalarial		
Chloroquine	**66.2**	**254**
Kinaquine	**71.4**	**5**
Fansidar	**50.0**	**2**
Total correct duration for all antimalarial drugs (N=395)	**66.1**	**261**
5. Accurate HMM among all respondents(N=708)	**28.3**	**201**
6. Accurate HMM among those who gave antimalarials (N=395)	**50.9**	**201**
7. Accurate HMM with CQ among those who gave CQ (N=384)	**47.9**	**184**

**** Antimalarials exclude paracetamol (408 – 13 = 395)***

Among all the participants, 384/708 (54.3%), 7/708 (0.9%), 4/708 (0.6%) and 13/708 (1.8%) would give Chloroquine, Kinaquine, Fansidar and paracetamol respectively while 300/708 (42.4%) would not give any drug. Among the 395 women who would give antimalarials, 190/384 (49.5%), 5/7 (71.4%) and 2/4 (50%) knew the correct dosages of Chloroquine, Kinaquine and Fansidar respectively while 254/384 (66.2%), 5/7 (71.4%) and 2/4 (50%) knew the correct duration of Chloroquine, Kinaquine and Fansidar respectively. Among the antimalarials, the majority 384/395 (97.2%) would give Chloroquine, while 7/395 (1.8%) and 4/395 (1.0%) would give Kinaquine and Fansidar respectively.

Figure 3.1 below shows a bar graph of the percentage of young women with knowledge of the correct duration and correct dosage for the antimalarials as well as the correct dosage and correct duration for the antimalarials combined.

Figure 3.1 Women with knowledge of the correct duration and dosage of the antimalarials (N=408)



3.1.5 Accurate home management of malaria among home caregivers

This is the outcome variable which is a composite of the correct dosage and the correct duration. Accurate HMM among all the women who responded to knowledge of the treatment of uncomplicated malaria was 201/708 (28%). This implied that 72% of all the women did not administer accurate HMM and this included those 300 who did not mention giving any drug. Accurate HMM among the women who responded to knowledge of the treatment of uncomplicated malaria with antimalarial drugs was 201/395 (50.9%). Accurate HMM with Chloroquine was 184/384 (47.9%) among those who responded to knowledge of the treatment of uncomplicated malaria with Chloroquine.

3.1.6 Association of knowledge and attitude with accurate HMM

Table 3.4 shows the result of association between knowledge of malaria and treatment-seeking attitude with accurate home management of malaria among the 708 respondents. Among the respondents who knew correctly that only mosquito transmitted malaria, 30% could accurately manage malaria at home. Among the respondents who had good knowledge of the symptoms of uncomplicated malaria, 62% could accurately manage malaria at home. How accurately the younger woman managed malaria in U5s at home was not dependent on their knowledge of the mode of transmission ($p=0.277$) and knowledge of the symptoms of uncomplicated malaria ($p=0.262$) because the associations were not significant.

Table 3.4 Association of knowledge of malaria and treatment-seeking attitude with accurate home management of malaria in U5s among the women (N=708)

VARIABLE	ACCURATE HOME MANAGEMENT		P-value
	Yes % (n)	No % (n)	
KNOWLEDGE OF MALARIA			
Cause of malaria			
Correct	**30.4 (61)**	**25.3 (128)**	**P=0.277**
Partly correct	**53.7 (108)**	**55.0 (279)**	
Incorrect	**15.9 (32)**	**19.7 (100)**	
Symptoms of uncomplicated malaria			
Good	**62.2 (125)**	**57.6 (292)**	**P= 0.262**
Poor	**37.8 (76)**	**42.4 (215)**	
ATTITUDE TOWARDS SEEKING TREATMENT			
Advice from older women			**P=0.388**
Yes	**90.6 (182)**	**92.5 (469)**	
No	**9.4 (19)**	**7.5 (38)**	
Autonomy of health care decision making			
Yes	**30.3 (61)**	**28.8 (146)**	**P= 0.682**
No	**69.7 (140)**	**71.2 (361)**	

****Chi-squared test of association was used to determine the association***

On attitude toward treatment-seeking when a child had uncomplicated malaria, accurate home management of malaria in U5s among the younger woman was not dependent on the advice they received from the older women (p=0.388) or having autonomy of health care decision-making (p=0.682) because the associations were not significant.

3.1.7 Association of other exposure variables with accurate HMM

Table 3.5 displays the results of the univariate and multivariate logistic regression models which were used to determine the association of knowledge of malaria, treatment-seeking attitude and other exposure variables with accurate HMM among the women. In the univariate

model education, ethnicity and socio-economic status were associated ($p < 0.05$) with accurate HMM while knowledge, attitude, age, occupation and religion were not ($p > 0.05$).

Compared to the women who had no education, those with secondary education were twice more likely (OR = 2.30, 95% CI 1.14; 4.63) and those with tertiary education were approximately eleven times more likely (OR = 10.91, 95% CI 1.21; 98.75) to accurately manage malaria. Ethnic background of the women also influenced accurate HMM. The Nankani women were nearly three times more likely (OR = 2.71, 95% CI 1.92; 3.82) than the Kassena women to accurately manage malaria. Socio-economic status of the women influenced accurate HMM in U5s. Compared to the very poor women, the poor women were 48% less likely (OR = 0.52, 95% CI 0.30; 0.88) to accurately manage malaria. Similarly, the least poor women were 61% less likely than the very poor women to accurately manage malaria (OR = 0.39, 95% CI 0.23; 0.68).

The three significant variables (education, ethnicity and SES) in the univariate model were fitted in the multivariate logistic regression model to control for confounders. They remained significant indicating that there were no confounding variables in the multivariate model. Women with secondary education were 2.5 times more likely than those with no education to do accurate HMM (OR = 2.54, 95% CI 1.16; 5.55). The Nankanis were three times more likely than the Kassenas to accurately manage malaria (OR = 2.99, 95% CI 2.07; 4.33). Compared to the very poor women, the more poor, poor and least poor women were 47% (OR = 0.53, 95% CI 0.31; 0.93), 54% (OR = 0.46, 95% CI 0.26; 0.84) and 57% (OR = 0.43, 95% CI 0.23; 0.79) less likely to accurately manage malaria respectively.

Table 3.5 Logistic regression analysis of exposure variables with accurate HMM (N=708)

VARIABLE	ACCURATE HOME MANAGEMENT	
	Univariate OR (95 CI) p-value	Multivariate OR (95 CI) p-value
KNOWLEDGE		
Cause of malaria		
Incorrect	**1**	
Partially correct	**1.21 (0.77 ; 1.91) p=0.413**	
Correct	**1.49 (0.92 ; 2.46) p=0.120**	
Symptoms of uncomplicated malaria		
Poor	**1**	
Good	**1.21 (0.87 ; 1.70) p=0.263**	
ATTITUDE TOWARDS SEEKING TREATMENT		
Advice from older women		
No	**1**	
Yes	**0.78 (0.45 ; 1.38) p=0.389**	
Autonomy of health care decision-making at home		
No	**1**	
Yes	**1.08 (0.75 ; 1.54) p=0.682**	
EDUCATION		
None	**1**	**1**
Primary	**1.25 (0.85 ; 1.84) p=0.253**	**1.18 (0.78 ; 1.78) p=0.439**
JSS	**0.67 (0.38 ; 1.18) p=0.167**	**0.65 (0.35 ; 1.20) p=0.173**
Secondary	**2.30 (1.14 ; 4.63) p=0.020**	**2.54 (1.16 ; 5.55) p=0.019**
Tertiary	**10.91 (1.21 ; 98.75) p=0.033**	**8.42 (0.80 ; 89.98) p=0.077**
AGE		
15-24 years	**1**	
25-34 years	**1.37 (0.91 ; 2.06) p=0.135**	
≥ 35 years	**1.39 (0.87 ; 2.21) p=0.166**	
ETHNICITY		
Kassena	**1**	**1**
Nankani	**2.71 (1.92 ; 3.82) p<0.001**	**2.99 (2.07 ; 4.33) p<0.001**
Bulsa	**1.26 (0.52 ; 3.07) p=0.606**	**1.59 (0.64 ; 3.94) p=0.313**
Others	**0.88 (0.24 ; 3.14) p=0.837**	**0.51 (0.12 ; 2.09) p=0.349**

*** Underlined p-values were statistically significant**

Table 3.5 Logistic regression analysis of exposure variable with accurate HMM (Continued)

VARIABLE	ACCURATE HOME MANAGEMENT	
	Univariate OR (95 CI) p-value	Multivariate OR (95 CI) p-value
RELIGION		
Traditional	**1**	
Christianity	**0.90 (0.62 ; 1.30) p=0.568**	
Moslem	**0.55 (0.24 ; 1.26) p=0.156**	
Others	**0.56 (0.12 ; 2.74) p=0.477**	
OCCUPATION		
None	**1**	
Farmers	**1.27 (0.81 ; 2.00) p=0.297**	
Traders/civil servants	**1.05 (0.64 ; 1.73) p=0.845**	
SOCIO-ECONOMIC STATUS		
Very poor	**1**	**1**
More poor	**0.66 (0.40 ; 1.09) p=0.104**	**0.53 (0.31 ; 0.93) p=0.026**
Poor	**0.52 (0.30 ; 0.88) p=0.015**	**0.46 (0.26 ; 0.84) p=0.012**
Less poor	**0.68 (0.40 ; 1.14) p=0.141**	**0.70 (0.39 ; 1.25) p=0.230**
Least poor	**0.39 (0.23 ; 0.68) p=0.001**	**0.43 (0.23 ; 0.79) p=0.007**

*** Underlined p-values were statistically significant**

3.1.7 Main source of health care available to home caregiver

In a multiple response analysis, the women mentioned the following as main source of health care in the community: 66% - Health Centre/Clinic, 48% - drug store, 23% - Community Health Officers (CHOs) resident within the communities, 23% - traditional healer, 17% - hospital and 12% - self medication. On source of health care most visited, the following were mentioned: 55% - Health Centre/Clinic, 15% - the CHOs, 14% - drug store, 12% - hospital, 3% - self medication and 1% - traditional healers. With particular interest on the CHOs as the main source of health care in the HMM programme, 63% of the women who visited the CHOs did so because they (the CHOs) were accessible.

3.2 Results of analyses on sub-groups of the total study participants

This second part of the result section compares the 408 women who would give drugs with 300 women who would not give drugs in the HMM in U5s. The aim of doing this is to identify the characteristics that make them different for the purpose of implementing public health interventions targeted at the vulnerable sub-group in the HMM programme.

3.2.1 General information of the study population sub-groups

Table 3.6 shows a Chi squared analysis that compares the background information of the population sub-groups. Among the women who would give drugs, more of the Nanakanas (52%) had accurate knowledge of HMM when compared to 38% who had inaccurate knowledge of HMM, while fewer of the Kassenas (42%) had accurate knowledge of HMM compared to 56% who had inaccurate knowledge of HMM. Among the women who would not give drugs, 70% of the Kassenas when compared to 23% of the Nankanas had inaccurate knowledge of HMM. All respondents who would not give drugs had 0% for accurate HMM as mentioned in the methodology section. The difference of who would or would not give drugs among the two dominant ethnic groups (constituting 94% of the study population) with respect to HMM was statistically significant ($p < 0.021$).

The women who would or would not give drugs differed in the educational status with respect to accurate HMM ($p < 0.006$). Among the women who would give drugs, 28% of those with primary education had accurate knowledge of HMM when compared to 21% with primary education but had inaccurate knowledge of HMM. Eight percent (8%) of those with secondary education had accurate knowledge of HMM when compared to 3% with secondary education and but had inaccurate knowledge of HMM. Two (2%) of those with tertiary education had

accurate knowledge of HMM when compared to 0% with tertiary education but had inaccurate knowledge of HMM. On the other hand, fewer of those with no education (53%) and with JSS education (9%) had accurate knowledge of HMM when compared to 63% with no education and 14% with JSS education and had inaccurate knowledge of HMM. Among the women who would not give drugs, there is a decreasing order of inaccurate knowledge of HMM beginning from the uneducated (54%) to the most educated with tertiary education (0.4%).

The women who would or would not give drugs differed in the socio-economic status with respect to accurate HMM ($p < 0.008$). Among the women who would give drugs, almost twice the number of the very poor (23%) had accurate knowledge of HMM compared to 12% who had inaccurate knowledge of HMM. Although with marginal differences, 24.4% of the more poor and 21% of the less poor had accurate knowledge of HMM when compared to 24.2% of the more poor and 19% of the less poor who had inaccurate knowledge of HMM. On the other hand, 17% of the poor and 14% of the least poor had accurate knowledge of HMM when compared to 21% of the poor and 24% of the least poor who had inaccurate knowledge of HMM.

There was no difference in the age groups ($p = 0.443$), religion ($p = 0.357$), relationship to U5s ($p = 0.368$) and occupation ($p = 0.378$) of the study sub-groups who would give drugs or would not with respect to knowledge of accurate HMM.

Table 3.6 Differences in demographic characteristics of women who would give drugs and those who would not with respect to HMM

VARIABLE	WOULD GIVE DRUGS				P-value
	YES % (N)		NO % (N)		
	Accurate HMM	Inaccurate HMM	Accurate HMM	Inaccurate HMM	
EDUCATION					
None	53.2 (107)	62.8 (130)	0.0 (0)	54.0 (162)	
Primary	27.8 (56)	20.8 (43)	0.0 (0)	26.3 (79)	
JSS	9.0 (18)	13.5 (28)	0.0 (0)	15.0 (45)	**0.006**
Secondary	8.0 (16)	2.9 (6)	0.0 (0)	4.3 (13)	
Tertiary	2.0 (4)	0.0	0.0 (0)	0.4 (1)	
AGE					
15-24 years	21.9 (44)	26.6 (55)	0.0 (0)	28.7 (86)	
25-34 years	50.7 (102)	50.2 (104)	0.0 (0)	45.0 (135)	0.443
≥ 35 years	27.4 (55)	23.2 (48)	0.0 (0)	26.3 (79)	
ETHNICITY					
Kassena	42.8 (86)	55.6 (115)	0.0 (0)	70.3 (211)	
Nankani	52.2 (105)	37.6 (78)	0.0 (0)	23.0 (69)	**0.021**
Bulsa	3.5 (7)	3.4 (7)	0.0 (0)	4.7 (14)	
Others	1.5 (3)	3.4 (7)	0.0 (0)	2.0 (6)	
RELIGION					
Traditional	27.3 (55)	25.1 (52)	0.0 (0)	24.0 (72)	
Christianity	67.7 (136)	65.7 (136)	0.0 (0)	68.7 (206)	0.357
Moslem	4.0 (8)	8.2 (17)	0.0 (0)	5.3 (16)	
Others	1.0 (2)	1.0 (2)	0.0 (0)	2.0 (6)	
RELATIONSHIP TO CHILD					
Biological mother	99.5 (200)	99.5 (206)	0.0 (0)	96.3 (289)	
Caretaker	0.0 (0)	0.5 (1)	0.0 (0)	1.7 (5)	0.368
Grandmother	0.5 (1)	0.0 (0)	0.0 (0)	2.0 (6)	
OCCUPATION					
None	16.4 (33)	13.0 (27)	0.0 (0)	23.0 (69)	
Farmers	55.7 (112)	62.3 (129)	0.0 (0)	42.3 (127)	0.378
Traders/civil servants	27.9 (56)	24.7 (51)	0.0 (0)	34.7 (104)	
SOCIO-ECONOMIC STATUS					
Very poor	22.9 (46)	11.6 (24)	0.0 (0)	16.0 (48)	
More poor	24.4 (49)	24.2 (50)	0.0 (0)	22.0 (66)	
Poor	17.4 (35)	20.8 (43)	0.0 (0)	21.0 (63)	**0.008**
Less poor	20.9 (42)	18.8 (39)	0.0(0)	19.3 (58)	
Least poor	14.4 (29)	24.6 (51)	0.0 (0)	21.7 (65)	

*** Underlined p-values were statistically significant**

3.2.2 Comparison of knowledge and attitude among the population sub-groups

Table 3.7 summarizes knowledge and attitude of the population subgroups. The women did not differ in their knowledge of the mode of transmission of malaria ($p = 0.324$) with respect to accurate HMM. Among those who would give drugs, 30% of the women with correct knowledge of the mode of transmission of malaria had accurate knowledge of HMM when compared to 25% of the women with correct knowledge of the mode of transmission but had inaccurate knowledge of HMM. Similarly, 54% of the women with partially correct knowledge of the mode of transmission of malaria had accurate knowledge of HMM when compared to 61% of the women with partially correct knowledge of the mode of transmission but had inaccurate knowledge of HMM. Lastly, 16% of the women with incorrect knowledge of the mode of transmission of malaria had accurate knowledge of HMM when compared to 15% of the women with incorrect knowledge of the mode of transmission and had inaccurate knowledge of HMM. All respondents who would not give drugs had 0% for accurate HMM as mentioned in the methodology section.

The women did not differ in their knowledge of the symptoms of uncomplicated malaria ($p = 0.978$). Among those who would give drugs, 62.2% of the women with good knowledge of the symptoms of uncomplicated malaria had accurate knowledge of HMM when compared to 62.3% of the women with good knowledge of the symptoms of uncomplicated malaria but had inaccurate knowledge of HMM. Similarly, 37.8% of the women had poor knowledge of the symptoms of uncomplicated malaria but had accurate knowledge of HMM when compared to 37.7% of the women with poor knowledge of the symptoms of uncomplicated malaria and had inaccurate knowledge of HMM.

Table 3.7 Comparison of knowledge and attitude of women who would give drugs and those who would not with respect to HMM

VARIABLE	WOULD GIVE DRUGS				P-value
	YES % (N)		NO % (N)		
	Accurate HMM	Inaccurate HMM	Accurate HMM	Inaccurate HMM	
KNOWLEDGE					
Cause of malaria					
Incorrect	**15.9 (32)**	**14.5 (30)**	**0.0 (0)**	**23.3 (70)**	**0.324**
Partially correct	**53.7 (108)**	**60.9 (126)**	**0.0 (0)**	**51.0 (153)**	
Correct	**30.4 (61)**	**24.6 (51)**	**0.0 (0)**	**25.7 (77)**	
Symptoms of uncomplicated malaria					
Poor	**37.8 (76)**	**37.7 (78)**	**0.0 (0)**	**45.7 (137)**	**0.978**
Good	**62.2 (125)**	**62.3 (129)**	**0.0 (0)**	**54.3 (163)**	
ATTITUDE					
Advice from older women					
No	**9.4 (19)**	**7.3 (15)**	**0.0 (0)**	**7.7 (23)**	**0.420**
Yes	**90.6 (182)**	**92.7 (192)**	**0.0 (0)**	**92.3 (277)**	
Autonomy decision-making at home					
No	**69.6 (140)**	**68.1 (141)**	**0.0 (0)**	**73.3 (220)**	**0.738**
Yes	**30.4 (61)**	**31.9 (66)**	**0.0 (0)**	**26.7 (80)**	

****Chi-squared test of association was used to determine the association***

Receiving advice or not did not differ among the women (p = 0.420). Among those who would give drugs, 91% of the women who received advice had accurate knowledge of HMM when compared to 93% of the women who received advice but had inaccurate knowledge of HMM. Similarly, 9% of the women did not receive advice but had accurate knowledge of HMM when compared to 7% of the women who did not receive advice and had inaccurate knowledge of HMM.

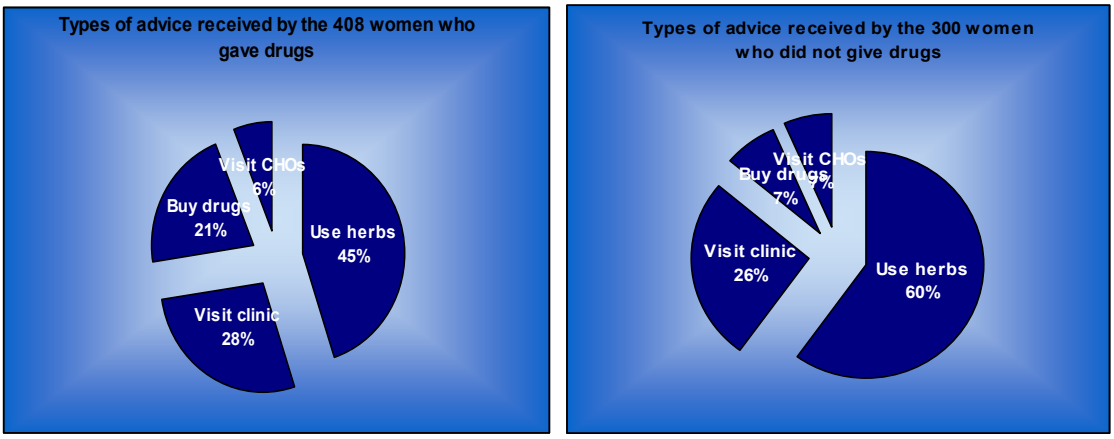
Having autonomy of health care-decision making in the household or not did not differ among the women (p = 0.738). Among those who would give drugs, 30% of the women who had autonomy had accurate knowledge of HMM when compared to 32% of the women who had

autonomy but had inaccurate knowledge of HMM. Similarly, 70% of the women did not have autonomy but had accurate knowledge of HMM when compared to 68% of the women who did not have autonomy and had inaccurate knowledge of HMM.

3.2.3 Comparison of the types of advice received by the population sub-groups

The pie charts below show a pictorial presentation of the type of advice received by those who would give and those who would not. The types of advice received by the women who would not give drugs were more of using herbs (60%) and less of buying drugs (7%) compared to the types of advice received by the women who would give drugs which were more of buying drugs (21%) and less of using herbs (45%).

Figure 3.2 Types of advice received by the population subgroups

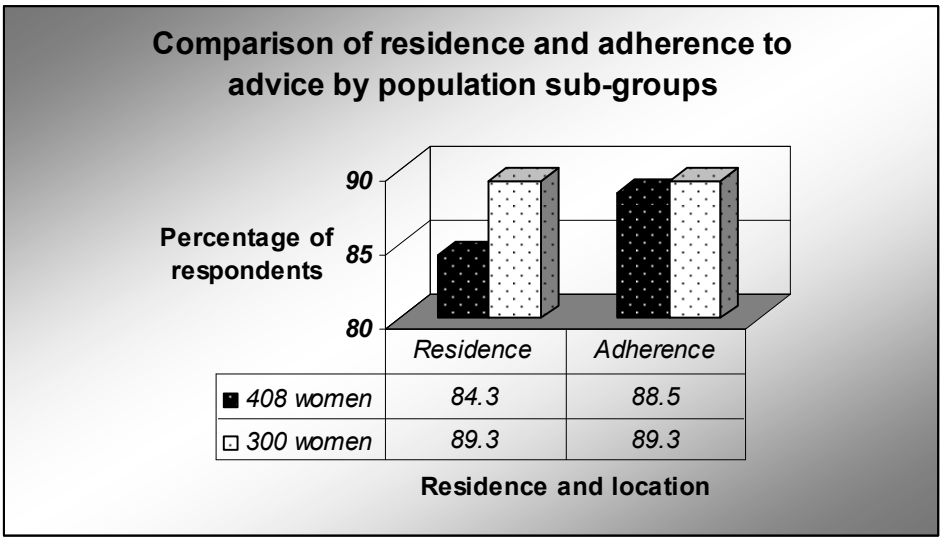


3.2.4 Comparison of the residence and adherence to advice of the sub-groups

Eight-four percent (84%) of the 408 women who would give drugs lived in the same compound as the older women who gave advice while 89% of the 300 women who would not give drugs lived in the same compound as the older women who gave advice. However,

approximately equal number (89%) of the sub-groups strictly adhered to the advice received from the older women.

Figure 3.3 Compares residence and adherence of the population sub-groups



4.0 DISCUSSION

This first part of this section discusses the relevant results of knowledge, attitudes and accurate HMM of the home caregivers as well as the results of inferential statistical analyses of factors associated with accurate HMM in the children. The second part of the discussion focuses on the differences between the sample population sub-groups. Sources of health care will be emphasized generally and at sub-group levels.

4.1 Discussion of the results of the total study sample (N=708)

4.1.1 Knowledge, attitude and accurate home management of malaria

A number of malaria-related symptoms in this study approximate a clinical diagnosis of malaria in children. Though clinical diagnosis appears to be neither sensitive nor specific compared to the confirmatory laboratory diagnosis, using these symptoms as proxy for the clinical diagnosis of malaria is useful in the HMM programme. Mothers/Caretakers in KND have been recipients of malaria control activities and awareness creation aimed at improving their knowledge and treatment practices in the HMM in children since 2000 when African leaders adopted the HMM programme[46]. The findings of this research show that the knowledge of the symptoms of uncomplicated malaria among home caregivers was 62%. This is lower than the 76% previously reported in the district[41]. The reduction may be due to the difference in the way level of knowledge was measured. This research relied on fever among other symptoms as the cardinal symptom of uncomplicated malaria. Ranking of the symptoms was done in an ascending order such that fever was weighted twice as other symptoms only if it was ranked foremost of all the symptoms of uncomplicated malaria. Respondents received a lower score if fever was not mentioned as the foremost symptom.

Contrary to expectations, however, knowledge of mosquito as the only mode of malaria transmission was approximately 27%. The reported low level of knowledge is in disparity to the 80% reported in rural Bolifamba, southwest Cameroun[50]. Poor knowledge of cause of malaria in this research may have resulted from the way in which it was strictly measured; mosquito bites as the only correct knowledge of the mode of transmission of malaria in the multiple choice responses.

The majority (92%) of the home caregivers received advice from the older women who are often considered by community members as more experienced in treating illnesses in children at home. This is higher than the 43% reported among the Bwatiye people of north-eastern Nigeria[52]. Most (77%) of the advice was on the use of herbs which was higher than the 60% reported in Nigeria[52]. The advice-seeking dynamics reported in this research shows that the younger women can be influenced by the older women. This is because 94% of these older women lived in the same compound with the younger women and 97% of the younger women strictly adhered to the advice given by these older women. This is often the case in rural traditional African settings where the older women usually are usually regarded as more experienced than the younger women in managing malaria in U5s.

Household decision-making dynamics among home caregivers who responded to the knowledge of uncomplicated malaria in this research revealed that few women (29%) had autonomy of health care decision-making in the household. In the larger majority of situations (71%), the women had no autonomy of decision-making.

Accurate HMM with all three antimalarials (Chloroquine, Kinaquine and Fansidar) among the 708 women was found to be 28%. Kinaquine is a brand of Chloroquine, but it was analyzed

separately because its concentration was twice that of Chloroquine (Table 2.1). Many studies rarely report combined estimate of accurate management with more than one antimalarial, this research will discuss accurate HMM with Chloroquine which was used by 384/395 (97%) of those who gave antimalarials. This will enable comparison with other studies that reported appropriate treatment with Chloroquine; the most commonly used first line drug before the change in antimalarial drug policy.

Accurate HMM with Chloroquine was 47.9%. This level, though low is higher than 36.4% reported 4 years earlier in the district in a Chloroquine efficacy study conducted in six sentinel sites (including KND) in Ghana between 1998 and 2001 [42]. While 58% of the women mentioned the use of drugs as the first line of action in the home treatment of malaria in U5s in the multiple responses question, 69% mentioned use of herbs. This could be an indication that there may be persistently occurring deeply rooted cultural practices which influence accurate HMM. Evidence of this can be seen in Table 3.6 which shows that the Nankani women were three times more likely than Kassena women (OR = 2.99, 95% 2.07 ; 4.33) to accurately manage malaria. Table 3.6 also demonstrates that there was a difference ($p < 0.021$) in the ethnic composition of the population sub-groups. However, the actual ethnic related cultural practices could not be explored because of absence of such variable in the data. This should be taken into cognizance in further HMM studies in the district. The promptness of initiating treatment within 24 hours of the onset of malaria illness was not available in the data.

Among the antimalarials which included the Artemesinin based Combination Therapy (ACTs) drugs, Chloroquine was the most commonly (97%) used antimalarial among study participants. One undeniable question would be why the respondents did not use the ACTs?

The answer lies in this explanation: though the new Ghana antimalarial drug policy was implemented in December 2005, mid way into the conduct of the original study between June 2005 and June 2006, the ACTs were only actively introduced in the district in June 2006, towards the end of the study.

4.1.2 Association of knowledge and attitudes with accurate HMM

The research question of this secondary analysis is whether there is an association between knowledge of malaria, treatment-seeking attitude and accurate HMM in children among the home caregivers in KND of Ghana in 2005/2006. With respect to malaria related knowledge, the answer to the research question is that there was no significant association between knowledge of mode of transmission of malaria ($p = 0.277$), knowledge of the symptoms of uncomplicated malaria ($p = 0.262$) and accurate HMM among the women (Table3.4). This is in contrast to an intervention study conducted in Nigeria which showed that important determinants of improved malaria treatment outcome in children were knowledge of the cause, symptoms and treatment guidelines among mothers ($p < 0.001$)[47].

With respect to treatment seeking attitude, the answer to the research question is that there was no significant association between receiving advice from the older women ($p = 0.388$), having autonomy of health care decision-making in the household ($p = 0.682$) and accurate HMM. One of the reasons for the lack of association between advice and accurate HMM could be due to the nature of advice received by the younger women as 77% of them were advised to use herbs to treat their children with presumed uncomplicated malaria. Therefore, it was not surprising that such advice did not influence accurate HMM in the children because the use of herbs is not an appropriate method of treating malaria in the HMM programme. One of the reasons why the women could not accurately manage malaria in U5s with respect to autonomy

is that treatment that would have been given by respondents was sub-optimal as only 28% of the women knew the appropriate dose and duration of antimalarials. This phenomenon not only leads to poor treatment practice but also has the propensity to induce drug resistance which constitutes a threat in the global efforts to effectively control malaria.

4.1.3 Association of other exposure variables with accurate HMM

Other factors were explored in determining predictors of accurate HMM among the home caregivers. In the univariate model, education, ethnicity and socio-economic status were associated with accurate HMM. All three variables were also significant in the multivariate model.

After controlling for potential confounders in the multivariate model, women with secondary education were 2.5 times more likely than those with no education to accurately manage malaria. This is consistent with a Ugandan study which suggested that home caregivers with higher educational level were more likely to use the HMM more accurately ($p = 0.009$)[54].

Socio-economic status of the respondents influenced accurate HMM in U5s. Compared to the very poor, the more poor, poor and least poor women were 47%, 54% and 57% less likely to accurately manage malaria respectively. The observed trend in this research is that the higher the SES of the women, the less the likelihood of instituting accurate HMM. This finding is quite surprising considering the fact that anticipated confounders were controlled for. Usually the expectation is that people of higher socio-economic status should be able to accurately treat malaria compared to the people of lower socio-economic status. The research finding is contrary to that observed in a comparative study in Accra, Ghana which showed that the proportion of home caregivers who did poor treatment of malaria in the children was higher in

the poorer community (82% v. 53%) than in the better-off community[62]. One explanation for this can be attributed to the background information that malaria is a disease of poverty[2]. The very poor women are likely to be the most affected as their children suffer more bouts of malaria such that repeated infections in children may confer better treatment outcome on the home caregivers as a result of experience acquired from repeated home treatments.

Ethnic background of the respondents influenced accurate HMM in U5s. The Nankani women were three times more likely than the Kassena women to accurately manage malaria. This may be an indication that there could be some culturally related malaria treatment practice peculiar to the Kassena women which makes them less likely than the Nankani women to accurately manage malaria. Similar finding has been reported in a Kenyan community where antimalarials are contraindicated in children with fits associated with fever[57]. However, the specific ethnic practice needs to be explored in future research using both quantitative and qualitative methodologies.

We, therefore, conclude that there is a significant association between the educational status, socio-economic status and ethnicity with accurate HMM among the women. But these associations will be interpreted with caution because of lack of evidence of causality.

4.1.4 Main source of information and malaria treatment

Concerning the main source of health care available to the community, 66%, 48% and 23% of the women mentioned Health Centre/Clinic, drug store and the CHOs respectively. In the HMM programme, the CHOs are the main providers of information and treatment services to the home caregivers. However, only 15% visited the CHOs. Although the use of the CHO services is low, it is an encouraging practice if the Health Clinics and drug stores were visited.

This is because of the likelihood of the children receiving accurate treatment for malaria in the Health Clinics and the drug stores because of adequate training service providers there receive[46]. Although we have no information on the number of CHOs in the sampled communities, one reason for low patronage of the CHOs could be due to the fact that they are not resident within the community due to accommodation problems. Often times too, they are participating in other health training programs. This pattern might remain so for a while till more CHOs are trained and deployed to the communities.

4.2 Discussion of the differences between the study sub-groups

4.2.1 Differences in the demographic characteristics of the study sub-groups

In relationship to accurate HMM, the subgroup analysis in which women who would give drugs were compared with those who would not showed there was difference in the ethnic composition of the study sample. This could be an indication that there might be some culturally oriented malaria treatment practice inherent among the Kassena women which makes them less likely to do accurate HMM than the Nanakni women. Such has been reported in Kenya where certain communities hold the belief that antimalarials should be withheld from children with certain kind of fever of convulsion[57]. This observation needs to be investigated in further HMM research in the district..

Among the women that knew accurate HMM, those who would give drugs differed in their educational composition compared to those who would not give drugs. Most of the women who knew accurate HMM had primary, secondary and tertiary education while most of the women who had inaccurate knowledge of HMM had no education. This is clearly an

indication of the fact that the higher the educational status, the better the chances of good treatment outcome in the HMM as corroborated in a study in Uganda[54].

The study sub-groups were not similar in the composition of their socio-economic status. What was obvious in the result of the analysis was a clear indication that the very poor were most likely to do accurate HMM than other levels of SES. This was a re-enforcement of the finding in the overall analysis which needs to be further investigated by way of qualitative research methods in subsequent research in the district.

4.2.2 Differences in the knowledge and attitude of the population sub-groups

Table 3.8 shows that there was no difference among the sub-groups in the knowledge of the mode of transmission of malaria and knowledge of the symptoms of uncomplicated malaria with respect to accurate HMM. Similarly, there was also no difference among the sub-groups in advice received from older women and autonomy of health care-decision making with respect to accurate HMM. However, this should not be taken to mean that previous and ongoing efforts been made in the district to inform and educate the people on malaria-related knowledge and practices should be withdrawn or suspended. This is in view of the evidence that similar enlightenment campaigns had markedly reduced the burden of malaria in children[2].

4.3 Strengths and limitations

A notable strength of the primary survey was its choice of exploring the knowledge of the symptoms of uncomplicated malaria among home caregivers. As strategies in the HMM programme are targeted at home caregivers, knowledge of the symptomatology of malaria undeniably constitutes the criteria for which children with presumed uncomplicated malaria

can be treated at home while others presumed to have complicated malaria are referred to the hospital/clinic for urgent treatment. It also demonstrated that education and ethnicity were factors that significantly influenced accurate HMM among the home caregivers. Another strength in the primary survey is the inclusion of other women (grand mothers and caretakers) apart from the biological mothers of the children as home caregivers. This was a wholesome approach in assessing accurate HMM because the exclusion of the non-biological mothers would have resulted in bias in the light of the fact that some biological mothers of U5s do employ caretakers to nurse their children at home. A major strength in this research is its holistic measure of treatment practices by pooling together two components (correct drug dosage and duration of treatment with antimalarials) to describe accurate HMM. This is in contrast most studies which have only emphasized dosage while neglecting duration of treatment with antimalarials.

The most important limitation is that knowledge of treatment was used as a proxy for accurate HMM among home caregivers. This is because the original survey questionnaire did not have information regarding the actual treatment given to children who were ill two weeks preceding the survey. The limitation here is that knowledge of treatment does not necessarily translate to accurate treatment. This is because people do not often practice what they know. Another limitation of this study is that it could not measure the promptness of commencing treatment within 24 hours of the onset of symptoms because of the absence of such variable in the dataset.

In this research, the diagnosis of "malaria" in U5s by the home caregivers was without laboratory confirmation. Therefore, the women self-reported presumed malaria in the children based on the recognition of fever and other symptoms which are not specific to malaria alone.

This is a possible source of bias in the interpretation of the results of this research with respect to certain comparisons that were made with other studies in which laboratory techniques were employed in the confirmatory diagnosis of malaria in U5s before the commencement of home management of malaria.

The use of closed ended questions limited the further exploration of knowledge, attitudes and treatment practices among the home caregivers. This often arises with use of closed ended questions which in themselves are restrictive in eliciting more information. The use of leading closed ended questions with multiple responses is prone to information bias as respondents may guess some answers or they may shy away from choosing answers that reflect their cultural belief system. The use of secondary data provided by the original survey limited the possibility of explaining the meanings of certain findings which needed further exploration because such information were not available in the original database.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are derived from the findings of this secondary research as well as the feasible policy-oriented recommendations that are consequent upon the findings with a view to improving the HMM programme in the district.

5.1 Conclusions

These are the main findings of this secondary data analysis. Approximately 27% of the home caregivers knew correctly the mode of transmission of malaria. Sixty-two percent (62%) of the women were able to recognize uncomplicated malaria in children based on the identification of its symptoms. Among the population sub-groups, the women who would give drugs had better knowledge (cause and symptoms) of uncomplicated malaria than those who would not. The population subgroups also differed in their ethnic background, occupation and relationship to the children.

Twenty-eight percent (28%) of the 708 young women accurately managed malaria with the first line (Chloroquine, Kinaquine) and second line (Fansidar) drugs at the time the original study was commenced (June 2005-June 2006). There needs to be emphasis on informing and educating home caregivers on the appropriate dosage of Artesunate and Amodiaquine combination therapy which has replaced Chloroquine, Kinaquine and Fansidar. This is in view of the fact that the Ghana Health Services implemented the updated national antimalaria treatment policy in December 2005 (half way during the original study period) based on evidence of widespread resistance of P. falciparum to monotherapy with the previous conventional first and second line drugs.

Fifteen percent (15%) of home caregivers utilized the services of the Community Health Officers (CHOs) as their main source of malaria treatment information in the HMM in children. Therefore, a lot more needs to be done to maximize access of the home caregivers to the CHOs who are meant to be the main source of information in the HMM strategy in the district. Education, ethnicity and socio-economic status influenced accurate HMM among the home caregivers. Receiving advice from the older women and having autonomy of health care decision-making did not influence accurate HMM among the home caregivers.

The remoteness (rural background) of the district could be associated with heightened or increased risk of inaccurate HMM according to the literature that rural locations are associated with poor malaria treatment practices[40].

5.2 Recommendations

5.2.1 For the current Home Management of Malaria Programme

In order to improve the effective management of malaria in children through the home management of malaria strategy, strategies addressing the home caregivers, older women and community health officers who are key players in the success of HMM should be considered.

For the home caregivers, we need to:

- Organize talks to discourage the use of monotherapy with Chloroquine, Kinaquine and Fansidar which are no longer first-line and second-line drugs as a result of their ineffectiveness in the treatment of malaria.
- Provide adequate information on appropriate treatment with Artesunate-Amodiaquine therapy which is the current first line drug in Ghana with emphasis on its dosage.

- Improve referral upon identification of complicated malaria to the Health Centre/Clinic for appropriate treatment in order to reduce associated morbidities and mortalities.
- Home caregivers of Kassena ethnic origin and those of higher socio-economic status and lower educational status should be the primary targets of the HMM programme.

For the older women, we need to:

- Involve them as targets in the HMM programme because they could play a significant role as stakeholders in giving the correct advice to the younger women.
- Provide information on the recognition of malaria, instituting appropriate treatment for uncomplicated malaria and referral of complicated cases to the Health Centre/Clinic.

For Community Health Officers and other community-based public and private service providers, we need to:

- Intensify their roles in providing treatment information to women directly or indirectly in the HMM in children. This can be achieved by training and re-training them to meet specific needs of the home caregivers in the HMM programme.
- Should be made to live in the communities they sub serve in order to increase coverage of HMM services and to improve their patronage

5.2.2 For future research on Home Management of Malaria

This research report relied on knowledge of treatment of uncomplicated malaria as a proxy for accurate HMM in children among the home caregivers. The actual treatment given to children at home should be explored in future research. A combination of quantitative and qualitative studies needs to be conducted to explore the reasons for and factors associated with Inaccurate

HMM in children among the home caregivers in the district. Further study need to be done to determine how ethnicity influences malaria treatment practices in the district.

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APPENDIX A: QUESTIONNAIRE OF THE ORIGINAL STUDY

Note: Selected questions for this research are asterisked (*)

AN EXPLORATORY STUDY OF INEQUALITY IN ACCESS AND UTILIZATION OF TREATMENT INFORMATION FOR MALARIA MANAGEMENT IN YOUNG CHILDREN: THE ROLE OF HEALTH INFORMATION RECIPIENTS

SECTION 1: IDENTIFICATION

Name of young woman_____ YOUNGNAM

Relationship to child
Biological mother ……1, Caretaker…….2, Grandmother…….3 YRELACHD

Number of births
		YNUMBIRT

COMPOUND NAME/ID									YCOMPID
PERM ID									YPERMID
DATE OF INTERVIEW									YDATE
NUMBER OF HOUSEHOLDS									YNUMHH
NUMBER OF HOUSEHOLDS WITH CHILDREN UNDER FIVE									YHHUNFIV
HOUSEHOLD NUMBER									YHHNO
NAME OF HOUSEHOLD HEAD									YHHNAME
FIELDWORKER CODE									YFW
FIELD SUPERVISOR CODE									YFS
RESULT OF INTERVIEW: COMPLETE, LISTED INTERVIEWEE								1	YRESULTS
COMPLETE NEW								2	
INCOMPLETE, DIED								3	
INCOMPLETE, MIGRATED								4	
INCOMPLETE, REFUSED								5	
INCOMPLETE, NOT MET AFTER THREE VISITS								6	
INCOMPLETE OTHER_____ (SPECIFY)								7	

SECTION 2: Socio-economic and demographic characteristics of respondent

NO	QUESTIONS	CODING CATEGORY	CODES
1*	How old are you now? **Age in completed years.**	☐☐	YAGE
2*	What is your ethnic origin?	Nankani……...1 Kassena……..2 Bulsa……...3 Other (specify)……4	YETHNIC
3*	What is your marital status now?	Married……..……..1 Divorced……..……2 Separated……..……3 Widowed……..……4 Other (specify)……..…..5	YCURRMAR
4*	Have you ever attended school?	Yes……..……1 No……...2 →	YEVERSCHO 7
5*	What level of education do you have?	Primary……1 JSS/Middle ……2 Secondary……3 Tertiary……..…4 NA……..88	YEDULEV
6*	How many years did you attend at that level?	☐☐ NA……88	YEARSCH
7*	What is your religion?	Traditional……..……..…….....1 Christian……..……..…..…….2 Muslim……..……...3 Other (specify)……..…....4	YRELIGN
8*	What is your occupation now?	None……...……1 → Farmer……..……..2 → Trader/Artisan……..3 Civil servant……..……..…….4 Retired……..……..5 Other (specify)……..……..…...6	10 10 YOCCUP
9	What is your monthly income? **Record to the nearest thousand**	☐☐☐	YINCOME
10	How many under five-year-old children are in this household?	☐☐	YNCHDHH

11	Name of child	DOB	Sex	Relationship to respondent	YCHDNM
1					
2					YDOB
3					YCHDSEX
4					YCHDRELR
5					

Sex : male……M, female……F

***Relationship to respondent:** mother……..1, caretaker……2, grandmother……3

SECTION 3: Knowledge of the signs and symptoms of malaria

12*	What do you think will let a child under five get mild malaria? (**Circle all that apply**)	Growing teeth……1 Eating bad food……2 Mosquito bites……3 Eating sweet food……4 Inheritance……5 Standing in the sun……6 Other (specify)……7 DK……99	YCAUSMAL
13	How would you know when a child under five has malaria? (**Circle all that apply**)	Hot body……1 Vomiting……2 Very hot body……3 Cough……4 Very weak……5 Diarrhea……6 Chills……7 Loss of appetite……8 Weak……9 Body itching……10 Urine changes to yellow……11 Shiver……12 Stomachache……13 Convulsion……14 Others (specify)……15 DK……99	YKNOWMAL
14*	Of all that you mentioned, tell me in order of importance which ones are critical.	| | | | | |	YRANCAUS
15*	Are you able to differentiate between moderate and severe malaria?	Yes……1 No……2→	YDIFMOSV 35
16	What are the signs/symptoms of moderate malaria in children under five years? (**Circle all that apply**)	Hot body……1 Vomiting……2 Very hot body……3 Cough……4 Very weak……5 Diarrhea……6 Chills……7 Loss of appetite……8 Weak……9 Body itching……10 Urine changes to yellow……11 Shiver……12 Stomachache……13 Convulsion……14 Others (specify)……15 DK……99 NA……88	YSIGNMOD
17	Of all that you mentioned, tell me in order of importance which ones are critical.	| | | | | | NA……88	YRANKMOD

18	What are the signs/symptoms of severe malaria in children under five years? (**Circle all that apply**)	Hot body……1 Vomiting……2 Very hot body……3 Cough……4 Very weak……5 Diarrhea……6 Chills……7 Loss of appetite……8 Weak……9 Body itching……10 Urine changes to yellow……11 Shiver……12 Stomachache……13 Convulsion……14 Others (specify)……15 NA……88 DK……99	YSIGNSEV
19	Of all that you mentioned, tell me in order of importance which ones are critical.	[ ] [ ] [ ] [ ] [ ] NA……88	YRANKSEV
20	Where did you get the information about the signs/symptoms from? (**Circle all that apply**)	Radio……1 TV……2 Community based health worker……3 Clinic/health centre……4 Hospital……5 Traditional healer……6 TBA……7 Relative/Friends……8 NA……88	YSOUCINF

SECTION 4: Knowledge of appropriate treatment for malaria

21	What is the appropriate action to take when a child under five has moderate malaria? (**Circle all that apply**)	Use Herbs……1 Consult Traditional healer……2 Consult Soothsayer……3 Buy drugs ……4 See CHO……5 Visit Health centre/clinic……6 Visit Hospital……7 Others (specify)……8 NA……88	YACTMOD
22	Of all that you mentioned, tell me in order of importance which action to take before the other	[ ] [ ] [ ] [ ] [ ] NA……99	YRANIMOD
23	What treatment would you give at home when a child under five has moderate malaria? **(Circle all that apply)**	Sponge child……1 → 27 Use herbs……2 → 27 Give drugs……3 Nothing……4 → 27 Other (specify……5 → 27 NA……88	YTREAHMD

24	What drug (s) would you give?	Chloroquine……..1 Gvither/Artemeter……2 Kinaquine……..3 Fansidar…….....4 Artesanate……....….....5 Artemos……...…….....6 Others (specify)……7 NA……...……..…88	YDRUGMD
25	What is the appropriate dose of the treatment that you would give?	Day1 | Day2 | Day3 | Day4 | Day5 NA……...88 DK……...99	YDOSEMOD
26	For which age group would you give this dosage?	NA……88 DK……99	YDOSEAGE
27	Why would you give that line of treatment? (**Circle all that apply**)	Less expensive……...1 It is effective……...2 It is available……..3 Doctor/chemist prescribed it before……4 Radio adverts……...……...5 Friends/relatives recommended it before……6 TV adverts…….....7 Others (specify)……..8 NA……..……...……88	YLINTRTM
28	What is the appropriate action to take when a child under five has severe malaria? (**Circle all that apply**)	Use Herbs……..……..1 Consult Traditional healer..……..……..2 Consult Soothsayer..……..3 Buy drugs. ……..……4 See CHO……..……...……5 Visit Health centre/clinic……6 Visit Hospital……..……..…..7 Others (specify)……..……...…..8 DK……..……. …...9 NA……88	YACTSEV
29	Of all that you mentioned, tell me in order of importance which action to take before the other	NA……88	YRANIMSV
30	What treatment would you give at home when a child under five has severe malaria? (**Circle all that apply**)	Sponge child……..……..……...1 → 34 Use herbs……..…2 → 34 Give drugs……..……....3 Nothing ……..……..……..……4 → 34 Other (specify)……5 → 34 NA……88	YTRTHMSV

31	What drug (s) would you give?	Chloroquine……1 Gvither/Artemeter……...……...2 Kinaquine……..3 Fansidar…….....…....….4 Artesanate…….....….…….5 Artemos…….....…….....6 Others (specify)……...……7 NA…….88	YDRUGSEV
32	What is the appropriate dose of the treatment that you would give? Day1 | Day2 | Day3 | Day4 | Day5 __ __ __ __ __ __ __ __ __ __ NA…….88 DK…….99		YDOSESEV
33.	For which age group would you give this dosage? __ __ NA……88 DK……99		YDOSEAGS
34	Why would you give that line of treatment? (**Circle all that apply**)	Less expensive……..…1 It is effective……..……2 It is available……..…3 Doctor/chemist prescribed it before……..…4 Radio adverts……5 Friends /relatives recommended it before…..6 TV adverts…..……7 Others (specify……...8 NA…….88	YLINTRTS → Skip to 42
	Q35-41 APPLY ONLY TO THOSE WHO RESPOND NO TO Q15		
35	What is the appropriate action to take when a child under five has malaria? (**Circle all that apply**)	Use Herbs…….…….……..1 Consult Traditional healer..……...2 Consult Soothsayer..……...……..3 Give drugs ……..……..……..……..4 See CHO…….……....5 Visit Health centre/clinic……..…..…...6 Visit Hospital…….……7 Others (specify)……..……8 NA……88	YGNACTML
36	Of all that you mentioned, tell me in order of importance which action to take before the other	__ __ __ __ __ DK……..……..99 NA……..……..88	YGNRANAC
37*	What treatment would you give at home when a child under five has malaria?	Sponge child..……..…….. …1 Use herbs……2 Give drugs……..3 Nothing……..4 Other (specify)……...5 NA……88	→ 41 → 41 → 41 → 41 YGNTREHM

38*	What drug (s) would you give?	Chloroquine……..1 Gvither/Artemeter……...……..2 Kinaquine……...3 Fansidar……...…….....4 Artesanate……...…….....5 Artemos……...…….....6 Others (specify)……...7 NA……88	YGNDRUGM
39*	What is the appropriate dose of the treatment that you would give?	Day1 | Day2 | Day3 | Day4 | Day5 NA……...88 DK……..…...99	YGNDOSEM
40*	For which age group would you give this dosage?	NA……88 DK……99	YDOSEAGG
41	Why would you give that line of treatment? (**Circle all that apply**)	Less expensive……..……...1 It is effective……..…..2 It is available……..…….3 Doctor/chemist prescribed it before……....4 Radio adverts……..…..5 Friends/relatives recommended it before……6 TV adverts……...7 Others (specify)……...….8 NA……88	YGNLINTR
42	Has any under five child in this household had illness in the past two weeks?	Yes……...…..……1 No…….……2 → Section 5	YCHDILL
43	How many of the children under five were ill in the past two weeks.	NA……88	YNUMILL
44	How long was the child ill? **(NOTE if two or more under fives have been ill, ask of the most recent)**	DAYS NA……..88	YLONGILL
45	Did you consult someone?	Yes……...…1 No……2 → Section 5 NA……..……88	YCONSUL
46	Who did you first consult with?	Nurse……..……..1 Doctor…….……..2 TBA……..3 Community Health worker…….…..4 Traditional healer…….5 Soothsayer……6 Mother-in-law……..…….…7 Husband……...8 Father-in-law……..……..9 Drug seller…….……....10 Other specify……..11 Na……..……88	YWHOCONS

47	What were the signs/symptoms? (**Circle all that apply**)	Hot body……..…..……...…1 Vomiting…..……..…2 Very hot body…….……..……3 Cough……..4 Very weak…..…….……5 Diarrhea……..……6 Chills……7 Loss of appetite…….……..8 Weak……..…..9 Body itching……..……...…..10 Urine changes to yellow…….……11 Shiver…….…12 Stomachache…….....…….…..13 Convulsion…….……14 Others (specify)…….…15 NA…….…88	YSIGCONS
48	What was the illness diagnosed to be?	Malaria……..…...…...…1 Diarrhea…….....2 Anaemia……...….....3 CSM……....…4 ARI……...…..5 Others (specify)……...6 NA……..88	Section 5 YDIAGNIL
49	Were you told it was moderate or severe form of malaria?	Moderate malaria…….....1 Severe malaria…….....…..2 No.....3 NA…….....……88	YMODSEV Section 5
50	What advice did you get from the consultation? (**Circle all that apply**)	Use Herbs…….……...…1 Consult Traditional healer..…...……..……..2 Consult Soothsayer..……...……..3 Give drugs ……...……..…..4 See CHO……..…....5 Visit Health centre/clinic…….…....6 Visit Hospital…….……...7 Others (specify)……....…….....8 NA…….…88	YADVCON
51	Can you tell why you were given that form of advice? (**Circle all that apply**)	Illness was moderate…….……..1 Illness was severe…….……...2 Convenient…….…….……3 Less expensive…….……4 Nearby/accessible…….……5 Reliable…….……6 Available…….……7 Most effective…….……8 Other (specify)…….……9 NA……...……..88	YWHYADV

SECTION 5: Types of advice younger women with under-five children sick with malaria receive from older women

52*	Do you receive any form of advice from older women when your under five child has malaria?	Yes……..……1 No……..……2 →	Section 6 YADVCOLD
53*	Does this woman reside in your compound?	Yes…….……1 No……..……..…2 NA…….……88	YWOMRES
	CHECK Q15, IF NO SKIP TO Q 62		
54	What type of advice do you get from the older woman when your under five child has moderate malaria? (**Circle all that apply**)	Use Herbs……..……..1 Consult Traditional healer..……...…..……2 Consult Soothsayer..……..…...……..3 Give drugs ……..4 See CHO……..……..…5 Visit Health centre/clinic……...…6 Visit Hospital……..7 Others (specify)……..……..…..8 NA……....88	YADVTYPO
55	Do you strictly follow the advice given?	Yes……..……1 No……2 → NA……88	57 YADVSTMO
56	In order of importance, tell me which advice you would use before the other.	[ ][ ][ ][ ][ ] NA……...88	YRNADVMO Skip to 58
57	If no, why do you not follow the advice given by the older woman	Old fashion advice……..…1 Wrong advice…….……2 Expensive to use…….……3 Take time to get due to distance…….……...4 Other (specify)…….…….…....5 NA…….…88	YNOADVFO
58	What type of advice do you get from the older woman when your under five child has severe malaria? (**Circle all that apply**)	Use Herbs…….……..1 Consult Traditional healer..……....2 Consult Soothsayer..…….…….....…..3 Buy drugs ……...……..…….....4 See CHO……..…...5 Visit Health centre/clinic……...…6 Visit Hospital…….....…..7 Others (specify)…….…….....8 NA…….…88	YADVSEVO
59	Do you strictly follow the advice given?	Yes……1 No…….……2 → NA……88	**61**
60	In order of importance, tell me which advice you would use before the other.	[ ][ ][ ][ ][ ] → NA……88	RANADVSE **Skip to section 6**
61	If no, why do you not follow the advice given by the older woman? (**Circle all that apply**)	Old fashion advice…….……1 Wrong advice…….……2 Expensive to use……3 Take time to get due to distance……...…4 Other (specify)……...5	YNOADVSO → **Skip to Section 6**

		NA……..……..….88	
62*	What type of advice do you get from the older woman when your under five child has malaria? (**Circle all that apply**)	Use Herbs…….……...……..1 Consult Traditional healer..…….....……2 Consult Soothsayer..…….…..……..3 Buy drugs ……...……..…..……..4 See CHO…….…….…….....5 Visit Health centre/clinic……...…...…6 Visit Hospital…….....…..7 Others (specify)……....8 NA……..…88	YADVSEVO
63*	Do you strictly follow the advice given?	Yes……..….1 No…….……..….2 NA……..88	YADVFSVO 65
64	In order of importance, tell me which advice you would use before the other.	[ ][ ][ ][ ][ ] NA……...88	RANADVSE Skip to section 6
65	If no, why do you not follow the advice given by the older woman? (**Circle all that apply**)	Old fashion advice…….....……1 Wrong advice…….…..…2 Expensive to use……..……3 Take time to get due to distance……..……4 Other (specify)……...……..5 NA……..……88	YNOADVSO

SECTION 6: Source of health care

66*	What is/are the main source (s) of health care available to your community? **(Circle all that apply)**	Drug store……..……1 Self medication…….……2 Traditional healer…….....3 Health centre/clinic…….....4 CHO…….…..5 Hospital…….…6 Others (specify)…….…7	YMAINCARS
67*	Which one do you patronize most?	Drug store……..….1 Self medication…….……2 Traditional healer……...3 Health centre/clinic……..…….....4 CHO…….…..5 Hospital……6 Others (specify)…….…7	YCAREMOS
68*	Why do you prefer that source? (**Circle all that apply**)	Convenient……1 Less expensive……...……2 Nearby/accessible…….…….…3 Reliable…….…….……4 Available……...……5 Most effective……...……6 Other (specify)……...……7	YPREFERC
69	Have you ever attended a child welfare clinic	Yes…….……1 No……..……2	YEVERCWC **Skip to section 7**
70	Do you currently attend child welfare clinic	Yes……..……1 No…….……2 NA…….……88	YDOCWC

71	When was the last time you attended child welfare clinic	Less than a week……..…1 Less than a month……..…….2 Less than three months…….……..3 Less than a six months……4 Less than nine months…….……5 Less than a year…….……..6 More than a year…….……7 DK……..…99 NA…….……88	YLASTCWC
72	What information did you receive from the health provider the last time you attended child welfare clinic	Child immunization…….……1 Exclusive breast feeding……..……...…..2 Malaria signs /symptoms……...…..…….3 Diarrhea……..…….…….4 ARI…….……..5 Nutrition…….…..6 Hygiene……...…..7 No information……8 Other (specify)……..9 NA……..……...88	YINFOLAS
73	What health information and education is usually provided at child welfare clinics	Child immunization…….……1 Exclusive breast feeding…….……..2 Malaria signs /symptoms…….……3 Diarrhea……..…….4 ARI……..5 Nutrition…….……..6 Hygiene……...…..7 No information……8 Other (specify)……..9 NA……..…88	YINFORPRO
74	Have you ever used any of these information without asking any other person of relative	Yes…….……...1 No…….……2 NA……..88	YINFOUSE

Section 7: Autonomy on health care decision-making

75	List the relations of child resident in compound. (**Circle all that apply**)	Child's father……..……1 Uncle……..…..…..…..2 Great grandmother…….…3 Grandmother…….……4 Great grandfather…….……..5 Auntie…….…….……...6 Grandfather…….……7	YCHDRELD
76	If your under five child is ill, who are those that you often inform? (**Circle all that apply**)	Child's father……...……...……1 Compound head……..……2 Grandmother…….……..3 Mother-in-law…….……4 Father-in-law……...……..5 Others (specify)……...…..……..6	YINFILLC

77	Who is the first person that you inform?	Husband……..……1 Compound head……..…..…2 Grandmother……..3 Mother-in-law……4 Father-in-law……..5 Others (specify)……..6	YFIRSINF
78	Why do you inform that person? (**Circle all that apply**)	Provides money for health care…….…1 Consults soothsayer……...…2 Experience in diagnosis……..…...3 Others (specify)……..……4	YWHYPER
79	Who gives you information on the type/cause of illness? (**Circle all that apply**)	Husband……..…..……..…1 Compound head……..…2 Grandmother……..3 Mother-in-law……..…4 Father-in-law……..……...5 Myself……...…6 Others (specify)……...…..7	YPERADIL
80	Who decides what form of treatment you should give? (**Circle all that apply**)	Husband……..……1 Compound head……..……2 Grandmother……..……..……..3 Mother-in-law……..……...……4 Father-in-law……..……..……..5 Myself……..……..……6 Others (specify)……...…..7	YDECITRT
81*	Can you give treatment to your child without consulting any member of the compound?	Yes……1 No……..2 → 83	YTRTNOCO
82*	If yes, under what circumstances? (**Circle all that apply**)	Moderate illness……..…1 Experienced illness before……..…2 Educated mother……..…3 Others (specify)……..4 NA……..…….88	YCIRCUMS Section 8
83*	If no, under what circumstances? (**Circle all that apply**)	Severe illness……..…...……1 Never experienced illness…...……...……2 Uneducated mother…..……...……...……3 Others (specify)……..4 NA……88	YNCIRCUM

Section 8: Household assets

1. HOUSING		CODE	
1.1	Does this household have a modern design? Yes...1 No….2	YMODD	
1.2	What is the main material for the wall? Concrete…1 mud…2 bricks…3	YWALLMAT	
1.3 Does any building in this household have a zinc roof (excluding animal compounds)? Yes…1 No…..2		YZROOF	
2.1	What are the most frequently used cooking utensils in this household? Earthbowls…1 Aluminium pans…2 Earth/aluminium…3 Plastic pans…4 Others…5	YUTENSIL	
2.2 What are the toilet facilities for this household? Free range…1 Pit latrine…2 KVIP…3 Pan latrine…4 WC...5 Others…6		YTOILET	
2.3 What type of source drinking water does this household have? Standing pipe…1 borehole…2 Stream…3 Well…4 Other…5		YSOWATER	
3. OTHER POSSESSIONS		TOTAL NUMBER	
3.1	How many functioning bicycles do these household members own?		YBIKE
3.2	How many functioning vehicles are owned by household members (car, tractor, truck, and motorbike)?		YVEHIC
3.3	How many wooden/iron beds are in this household?		YBEDS
3.4	How many functioning radio sets alone are in this household?		YRADIO
3.5	How many functioning radio with tapes are in this household?		YRADOTAP
3.6	How many functioning TV sets are in this household		YTV
3.7	How many functioning sewing machines are in this household?		YSEW
3.8	How many electrical lamps (bulbs) and lanterns are in this household?		YELECT
3.9	How many functioning traditional lamps are in this household?		YTRADL
3.10	How many functioning coalpots or kerosene stoves are in this household?		YCPOT
3.11	How many functioning electric or gas cookers are in this household?		YCOOKI
3.12	How many functioning refrigerators/deep freezers does this household have		YFREEZER
3.13	How many functioning DVD/VHS players are in this household?		YDVDVHS
3.14	How many cattle do you have in this household?		YCANIMAL
3.15	How many sheep do you have in this household?		YSANIMAL
3.16	How many goats do you have in this household?		YGANIMAL
3.17	How many pigs do you have in this household?		YPANIMAL
3.18	How many donkeys do you have in this household?		YDANIMAL

THANK YOU FOR YOUR TIME

APPENDIX B

Table showing knowledge, attitude and practices related questions in the questionnaire

1. MALARIA-RELATED KNOWLEDGE	QUESTION(S)
Knowledge of cause of malaria	12
Knowledge of the symptoms of uncomplicated malaria	13, 14 and 15
2. ATTITUDE	
(ADVICE FROM OLDER WOMEN FOR UNCOMLICATED MALARIA)	
Advice from older women	52
Residence of older woman if advice was sought	53
Type of advice from older women	62
Do you strictly follow advice from older women? (Yes/No)	63
(AUTONOMY OF HEALTH CARE DECISION MAKING)	
Ability to give treatment without consulting member(s) of the compound?	81-83
3. KNOWLEDGE OF TREATMENT FOR UNCOMPLICATED MALARIA	
Knowledge of treatment to give at home	37
Knowledge of specific drugs to give at home for treatment of uncomplicated malaria	38
Knowledge of the dose of specific appropriate drug depending on age of a child	39 and 40
Duration of treatment with specific appropriate medication	39

APPENDIX C

In case of reply the number and date of this letter should be quoted.

My Ref. NHRCIRB/Ex001/06
Your Ref. No.



Institutional Review Board
Navrongo Health Research Centre
Ghana Health Service
P. O. Box 114
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February 11, 2008

Dr. Soter Ameh
C/0 Dr. Patricia Akweongo
Navrongo Health Research Centre
Navrongo, Ghana

Dear Dr. Ameh,

Re: Submission of Protocol for Ethical Clearance

Title of Proposal: "Home Management of Malaria in Under 5 Children in the Kassena-Nankana rural district of Ghana: Knowledge, Attitude and Practices of Home Care Givers".

I am happy to inform you that the Navrongo Health Research Centre Institutional Review Board (NHRCIRB) has approved the above proposal, which is part of your MSc. in Population Field Epidemiology program at the University of Witswatersrand.

The NHRCIRB has determined that the above proposal meets the criteria for exempt review and does not require further review by the IRB, since it involves analysis of data from a study that has already been approved by the IRB.

You are requested to safeguard the privacy of study participants in your analysis and presentation of the data.

If you have any questions or need further clarification, please contact Mr. Thompson Apempale, the IRB Administrator or Ms. Paulina Tindana.

Yours sincerely,

Dr. Cornelius Debpuur
(Vice-Chair, NHRCIRB)

In case of reply the number and date of this letter should be quoted.

My Ref. : NHRCIRB036/03/05
Your Ref. No.

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Fax + 233-742-22320

Email: irb@navrongo.mimcom.net

March 21, 2005

Dr. Patricia Akweongo
Navrongo Health Research Centre
P. O. Box 114
Navrongo

IRB No. NHRCIRB036

Dear Madam,

Approval of 'An Exploratory Study of Inequality in Access and Utilization of Treatment Information for Malaria Management in Young Children" protocol

I wish to inform you that the Navrongo Health Research Centre Institutional Review Board has reviewed the above-mentioned protocol and has granted approval for the commencement of the study.

The Board is convinced that the study does not pose more than minimal risks to its study participants and that there are adequate measures to ensure confidentiality of participant information. The Board is also of the view that the proposed study is relevant as it has the potential of assessing the quality of health information that finally gets to the intended targets under the health service.

However, the boarded noted some typographical errors that it would like you to address in order to the give the document additional clarity.

On Page 2 of the protocol, the last sentence of the first paragraph should read "As a result, proven and cost-effective malaria drug therapies are not adequately utilized and delays **(delete 'to)** in seeking appropriate care in moderate to complicated malaria cases is commonplace."

On Page 4, specific objective 4, a word is missing after 'identify'.

Again on Page 4, under 'Theoretical and Operational Definitions of Terms', there is the need to include a definition of health providers. While health providers include both modern and non-modern, the proposal seems to be focused on modern health providers. This should be spelt out in the definition of terms.

Page 5, line 1 should read "….which provides a database of all compounds and individuals in the district on **(not in)** a 90 day cycle **(not circle)**."

Still on Page 5, paragraph 4, the last sentence should read " A detailed (**not detail**) narrative from the mother of the child and other household members on the illness and decisions and power structure will be (**not e**) obtained."

Again on Page 5 paragraph 6, the first sentence should read, "Whereas the focus of this research is (**delete 'on how'**) to explore the roles of family… of delivering the information."

In the Consent forms section, under "Purpose of the Study" the third sentence should read "A random sample of ...in this community was drawn (**not 'done'**) and you happened to be one of those selected."

The corrections should be made and the final version submitted to the IRB Administrator by 25th March 2005.

You are reminded to report all unexpected adverse events related to this study to the NHRC IRB within three working days verbally and within one week in writing. You are also to submit a preliminary report of the study by September 18th, 2005 and a final report by March 18th 2006.

If you have any questions, please contact Mr. Raymond Aborigo or Paulina Tindana, the NHRC IRB Administrators, at the Navrongo Health Research Centre.

The Board wishes you all the best in this study.

Sincerely,

Dr. Joseph Amankwa
(Chair, NHRC IRB)

THE CHAIR
Navrongo Health Research Centre
Institutional Review Board
BOX 114, NAVRONGO UE/R

Cc: The Acting Director, NHRC

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Ameh-Soter

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER M071033**
PROJECT	Home Management of Malaria in Under 5 Children in Kassena-Nankana Rural District of Ghana: Knowledge, Attitude and Practices of Home Care Givers
INVESTIGATORS	Dr S Ameh-Soter
DEPARTMENT	School of Public Health
DATE CONSIDERED	07.10.26
DECISION OF THE COMMITTEE*	APPROVED UNCONDITIONALLY

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 07.10.30 **CHAIRPERSON** .....
(Professors PE Cleaton-Jones, A Dhai, M Vorster, C Feldman, A Woodiwiss)

*Guidelines for written 'informed consent' attached where applicable

cc: Supervisor : Dr R Kellerman

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10005, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES