

**KNOWLEDGE ATTITUDES AND PRACTICES ABOUT
MALARIA TREATMENT AND PREVENTION IN
UGANDA:**

A LITERATURE REVIEW

Final Report

Prepared for Ministry of Health

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TABLE OF CONTENTS

List of acronyms	2
INTRODUCTION	3
GENERAL KNOWLEDGE AND ATTITUDES ABOUT MALARIA	6
General knowledge about malaria	6
Knowledge about causes of malaria	6
Misconceptions about causes of malaria	6
Knowledge about symptoms of malaria	7
Attitudes towards malaria	8
Sources of information about malaria	9
CASE MANAGEMENT	11
Health seeking Behavior-care taker practices	11
Gender roles and health seeking Behavior	13
Case management-health provider practices	14
Use and knowledge of anti-malarial drugs	16
Cost of malaria treatment	17
Choice and source of treatment/drugs	17
Challenges to case management	18
INTERMITTENT PRESUMPTIVE TREATMENT (IPT)	21
Introduction	21
Knowledge and malaria in pregnancy and attitude about IPT	21
Availability and use of IPT in pregnancy	22
Burden of malaria in pregnancy	23
Challenges in provision and use of IPT	24
VECTOR CONTROL	25
Introduction	25
Knowledge and attitudes about vector control methods	25
Use of vector control measures	26
Mosquito net ownership and use	28
Bed net use during pregnancy	30
Reasons and attitude for non use and non ownership of nets	31
Perceived benefits and reasons for sleeping under nets	31
Cost and source of nets	32
Treatment and washing of nets	32
Preference for net shape and colour	33
Indoor residual spray for malaria control	33
Challenges to promotion and use of mosquito control methods	34
Challenges to promotion and use of ITNs	34
Challenges to subsidized net distribution	34
Challenges to net treatment and re-treatment	35
Challenges to indoor residual spraying	35
Opportunities for additional research	36
References	39

LIST OF ACRONYMS

AMREF	African Medical Research Foundation
ANC	Antenatal Care
BASICS II	Basic Support for Institutionalizing Child Survival II
IEC	Information Education and Communication
IMCI	Integrated Management of Childhood Illness
CDD	Community Drug Distributors
CDV	Community Drug Vendors
CMS	Commercial Market Strategies
CQ	Chloroquine
DDHS	District Directorate of Health Services
DISH II	Delivery of Improved Services for Health II
DOT	Directly Observed Treatment
FGD	Focus Group Discussion
GoU	Government of Uganda
HCP	Health Communications Partnership
HBM	Home Based Management of Fever/Malaria
HSD	Health Sub-District
HMIS	Health Management Information Systems
IPT	Intermittent Presumptive Treatment
IRS	Indoor Residual Spray
ITN	Insecticide-Treated Net
LC	Local Council
LLTN	Long Lasting Treated Nets
MoH	Ministry of Health
NMCP	National Malaria Control Program
OPD	Out Patients Department
PSI	Population Services International
RBM	Roll Back Malaria
SP	Sulphadoxine-Pyrimethamine
UDHS	Uganda Demographic and Health Survey
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

INTRODUCTION

This literature review has been carried out for the Uganda Ministry of Health National Malaria Control Program (NMCP) with technical assistance and guidance provided by The Health Communication Partnership (HCP). Research material about malaria control and prevention in Uganda from 1994 to the present was accessed from a number of resource centres, libraries and research institutions throughout Kampala and from selected internet sources. This review of recent studies of prevailing knowledge and attitudes about malaria is presented in four sections alongside the main elements (with the exception of epidemic preparedness) of the National Ministry of Health Malaria Control Program (NMCP): Case Management, Vector Control, and Intermittent Presumptive Treatment (IPT). Throughout the review, emphasis has been placed on the determinants of behaviour of caregivers and common attitudes and practices of community members regarding malaria control and prevention.

The review indicates that communities' knowledge about malaria has generally improved over time with figures higher in urban areas and in the southern parts of the country as compared to rural areas and some parts of the northern regions of Uganda. In addition, most of the literature reviewed notes that communities generally feel that malaria is a serious health problem in their respective areas; seem to possess fairly high levels of knowledge of the major symptoms of malaria; and understand that children under five years are at a particular risk of infection. At the same time, however, there are still misconceptions among some communities about the causes of malaria and relatively low levels of knowledge of the symptoms of severe malaria. Additionally, knowledge about malaria in pregnancy is very low, and much lower among males than females.

While there is evidence of improved case management, much of the reviewed literature indicates that there is still a high preference for home treatment of malaria; sometimes resulting in inadequate drug use. There remains a common tendency for consumers to use traditional medicine concurrently with modern medicine and to visit health centres, private clinics and hospitals for malaria treatment only after home treatment has failed. However, The Home Based Management of Fever (HBM) follow up monitoring and survey reports generally indicate improved case management, especially among children under five through the use of trained Community Drug Distributors (CDDs) and standardised colour coded combination anti-malarial drug therapy for specific age groups. The Delivery of Improved Services for Health (DISH) II health facility tracking survey (DISH II, 2002B) has also indicated improved case management and provision of preventive treatment through training of health providers.

While most of the research indicates a general preference for blister-packaged anti-malaria drugs there is an apparent knowledge gap about first line anti-malarial drug policy recommendation among community members with Chloroquine (CQ), which is still widely used alone as the first line treatment.

The use of Intermittent Presumptive Treatment (IPT) among pregnant women remains generally low and depends on the availability of ANC services and SP at health facilities.

The reviewed research indicates that consumers often value courteous and convenient service, facilities with steady supply of drugs, long opening hours and affordable rates.

Most community based studies reviewed indicate that the use of commercial methods of malaria prevention is low¹, with figures much lower in rural areas mainly due to: cost, availability, accessibility, ignorance and lack of knowledge regarding the available outlets for such services. The use of non-commercial methods of control is more pronounced in rural areas than urban areas.

The use of nets-especially Insecticide Treated Nets (ITNs) is very low, although quantitative data indicates that the numbers of people using ordinary nets and ITNs are steadily increasing. The use of nets to prevent malaria in pregnancy and among children below five years is equally very low. There are also reported inconsistencies in the use of nets partly due to: attitudes that malaria is seasonal, sleeping arrangements, negative attitudes towards nets, and lack of adequate number of bed nets in the households. The reviewed studies indicate that community members felt that there were gains to be realised by using nets, and more gains if such nets were treated including; extra and prolonged protection from mosquito bites and malaria fever. Studies show that the knowledge and use of other malaria vector control measures like Indoor Residual Spray (IRS) are only in a few urban areas or institutions.

The opportunities for training health providers in malaria case management have increased somewhat with the scaling up of the HBM strategy and other capacity building programs like Integrated Management of Childhood Illness (IMCI) and DISH II support for health provider training among others. Additionally, the literature notes increased in-house capacity building for nursing aides in all districts of the country, although periodic technical and managerial support supervision is still generally low, health provider deployment in public health units is still inadequate, and the HMIS system at the lower levels is still developing.

The HBM monitoring studies and reports show that community members are generally supportive and appreciate the use of CDDs in the treatment of children below five years with fever/malaria-though communities also strongly felt that older children and adults should also be catered for under the HBM strategy. The number of under five children handled within 24 hours, including those appropriately handled is increasing since the launch of HBM initiative.

Improved case management is often compromised by: stock outs of anti-malarial drugs at health centres and CDDs, inadequate support supervision, poor motivation for CDDs, inadequate staffing at health facilities, poor caretaker handling at public health facilities, and lack of adequate knowledge among some health providers about the anti-malaria drug policy. At the conclusion of this literature review is a summary of challenges to

¹ Commercial methods of malaria prevention refer to use of modern materials and services largely available on the market such as: nets, IRS, mosquito repellants/coils and mosquito sprays. Non commercial methods of malaria prevention refer to the use of traditional methods such as slashing the compound, burning of herbs/plants, closing of windows/door before nightfall e.t.c.

malaria prevention and control as noted in the reviewed literature in addition to recommendations for areas of additional research.

GENERAL KNOWLEDGE AND ATTITUDES ABOUT MALARIA

1.1 General knowledge about malaria

General awareness of malaria is high in most parts of Uganda. A baseline survey in five districts from all regions of the country (Net Mark, 2001) indicated 99% level of awareness. Similarly, Commercial Market Strategies (CMS) study (Okello, 2001) carried out in Mukono, Jinja and Arua indicates 99% level of awareness. A study by Kilian (2002) on malaria related knowledge and behaviors in three districts in western Uganda also indicate significant improvement in general knowledge about malaria. The Home Based Management of Malaria/Fever (HBM) baseline (2001) and follow up survey (2003) and PSI (2003) tracking survey also indicate similar levels of awareness about malaria.

1.2 Knowledge about the cause of malaria

A number of studies have shown that community members' knowledge about the cause of malaria has increased from figures as low as 40-50% in the early 1990s in most parts of the country to as high as 80-90% by 2001 in several districts.² The Net Mark survey (2001) indicates that 92% of the respondents in the five districts knew that mosquitoes cause malaria, although only 21% knew that mosquitoes are the only cause of malaria. The study by CMS (Okello, 2001) indicates that 77.6% of the respondents in the three districts knew that mosquitoes cause malaria. A study done in Kampala by Makanga (1997) shows that 84% of the respondents interviewed knew that mosquitoes transmitted malaria.

The HBM follow up survey by MoH/WHO/BASICS II in nine districts of Uganda indicates that the majority of caretakers (91.1%) knew how malaria is transmitted (Fapohunda, B.M, *et al* 2004). There also are reported significant improvements in the knowledge of community members in a study by Kilian (2002) in the three districts of western Uganda. A study conducted by Njama, *et al* (2003) in Kampala city also indicated that 90% of the caregivers knew that mosquitoes cause malaria although they equally indicated other causes of malaria. In a study done in Moyo district (Leku, 2000) indicated that 50% of the community knew that the mosquito caused malaria, while 42% had misconceptions and 8% did not know of any cause for malaria. The Uganda ITN voucher scheme pilot project survey (Kilian, 2004) also indicates high levels of knowledge among primary school children who were part of the study in Mbale (76-82%) and Mbarara (83-87.5%) district.

² In the MoH, UNICEF and WHO (1993) study, only 35% of households in Rukungiri district knew that malaria was transmitted by mosquitoes, compared with 23% in Apac and 71% in Kampala. Other studies in Arua (Deboru, 1993) show that only 37% of the respondents knew how malaria is transmitted. Okware' *et al* (1996) in a study in Mukono and Tororo indicated 40% rate of knowledge on cause, while Mpigi had 50%.

1.3 Misconceptions about causes of malaria

Most of the studies reviewed about people's knowledge of malaria have indicated that some community members still have misconceptions about causes of malaria. Kalisa (1997), in a study in Hoima district reported that community members' misconceptions about the cause of malaria included; Bedbugs, poor nutrition, maize and mangoes. A study done in Iganga (Namusoby *et al*, 1998) observed that other perceived causes of malaria were: drinking dirty water, raw fruits, poor sanitation, cold environment, splenomegally, worms, and Tsetse fly. More or less the same responses were observed in Mpigi district in a study by Luanniale and Rajais (1996). These misconceptions certainly have implications for community's malaria preventive behaviors and practices. A study done by Njama, D *et al* (2003) in Kampala city also indicated that 90% of the caregivers knew that mosquitoes cause malaria although they equally indicated other perceived causes such as drinking unboiled water (36%) and respiratory illnesses (14%).

A study done in Moyo district (Leku, 2000) indicated that 42% of the respondents had misconceptions about the cause of malaria. Riisa (2000), in a study conducted in Mpigi reports that 92% of the surveyed respondents knew that malaria is transmitted by mosquitoes, though several of the respondents also mentioned other causes of malaria, including sleeping with an infected person (20%), eating maize (27.2%), eating mangoes (22.8%), drinking un-boiled water (33%) and witchcraft (8.8%). In a baseline survey by Net Mark (2001) in five districts, it is noted that although 92% of the respondents knew that mosquitoes cause malaria, only 21% knew that mosquitoes are the only cause of malaria, while 71% erroneously thought that there were several other causes of malaria such as: drinking dirty water, being in the rain, dirty surroundings, and contact with an infected person. The AMREF (1996) and DISH II (2002A) studies in Uganda make similar observations about misconceptions held by community members on the cause of malaria.

1.4 Knowledge about symptoms of malaria

Similarly, knowledge about signs and symptoms of malaria is relatively high with most respondents indicating awareness of key symptoms including raise in temperature/hot body followed by other symptoms like vomiting, loss of appetite and restlessness. The GTZ/UM/MOH survey assumed that the households had good knowledge of the symptoms of malaria if they mentioned at least fever plus headache or other pain but poor knowledge if they mentioned fever plus general weaknesses or dizziness. In Fort portal (urban Kabarole), 59.1% of households were considered to have good knowledge of the symptoms of malaria as compared with 43.1% in the rural area of Kabalore (Kilian, 1994). A later study by Kilian (2003) shows improvements in knowledge about the symptoms of malaria in the same area.

While general knowledge of malaria symptoms is relatively high, reviewed research indicates that symptoms of severe malaria are not well known among community

members. (See Njama, 2003; Ariyo, 1997; Rissa, 2000, Fapohunda, 2004; Njama, 2003)³. The less common symptoms, which require close observation and medical interpretation like jaundice, anemia and splenomegally, were also not well known. Convulsions as a sign of severe malaria were not widely mentioned by the respondents in most studies reviewed. A study done by Njama, D *et al* (2003) in Kampala city also indicated that caretakers had a good understanding of how to recognize malaria, with 89% reporting hot body. However, in the same study, the understanding and recognition of severe malaria was very low among the caretakers, with only 20% mentioning convulsions as a sign of severe malaria, 25% lethargy/weakness, and 26% anorexia.

Twebaze (1998) makes similar observations based on a study in Rakai district that mothers (as caretakers) appeared not to easily recognise anaemia unless told by health-workers. In the same study, it is indicated that although altered consciousness and convulsions were recognised signs (by some caretakers) that the child was unwell, they were often thought to be traditional diseases best managed by traditional means. Surprisingly in the same study (Twebaze 1998); some of the health workers interviewed had the same belief about managing convulsions as traditional sickness. Twebaze (1998) also reports that although splenomegally was fairly recognised by elderly women, most mothers did not think splenomegally was due to malaria, instead they thought that splenomegally caused malaria.

The DISH II (2002A) qualitative study also reported similar findings where convulsions, jaundice or anaemia and splenomegally were not associated with malaria and were often believed to be traditional illnesses, requiring traditional remedies. This was also common among health providers interviewed in the six districts. The study concludes that for such an observation to be found among health workers is rather discomfoting, and efforts should be made to orient health workers and caretakers to think of malaria first when handling all forms of malaria presentations. A qualitative study by Nsungwa (2004) has also made similar observation about mothers in Kasese district. Nuwaha (2002) in study about people's perceptions of malaria in Mbarara district reported that some community members felt that convulsions were due to supernatural causes and required traditional treatment.

The HBM monitoring and evaluation survey carried out in 2003 by MoH/WHO/BASICS II indicates that caretakers knowledge about signs of severe malaria that require immediate care at the health facility is generally low in both HBM and non HBM districts with figures below 50% in most districts. However, convulsions as a sign of severe malaria were more known in the HBM districts (45%) than the non intervention districts

³ A study done by Njama, D *et al* (2003) in Kampala city also indicated that caretakers had a good understanding of how to recognize malaria, with 89% reporting hot body. However, in the same study, the understanding and recognition of severe malaria was very low among the caretakers, with only 20% mentioning convulsions as a sign of severe malaria, 25% lethargy/weakness, and 26% anorexia. Results from another study in peri-urban Kampala (Makanga, 1997), indicate that at least 84% of the survey respondents mentioned one of the following symptoms (as indicative of malaria); raised body temperatures, sweating, and vomiting. Other researchers such as Namusoby, 1998; Luanniala and Rajais (1996), Langi and Oryema (1994), Isabirye and Wendo (1998) among others have also made similar observations in their studies. However the study by Leku in Metu sub-county in Moyo district puts level of knowledge about hot body as major symptoms of malaria at 50%: vomiting (27%) and other symptoms (23%).

(22%). The proportion of respondents who knew lethargy as a sign of severe malaria was very low (13%) in HBM and non HBM districts. The limited knowledge of signs of severe malaria, including convulsions, indicates an area that requires strengthening largely through health education and communication (Fapohunda, B M, *et al*, 2004). The study cautions that if caretakers are unable to differentiate between signs of mild and severe illness, a precursor for taking appropriate action, the ability of the HBM program to improve case management of severe cases and reduce mortality levels will be impaired

1.5 Attitude towards malaria

Community members' attitude towards malaria as a disease is important in understanding their health seeking behavior and use of preventive methods. Some of the studies reviewed have indicated that communities now regard malaria as a dangerous disease that can kill and affects more children under five years than the adults. Studies reviewed also indicate that most community members strongly felt that malaria can be prevented. Such positive attitudes are essential opportunities for behavior change campaigns. In a study done in Mpigi district (Rissa 2000), 87.5% of the community knew that malaria can be prevented while others thought otherwise. In a study in Moyo district, it is indicated that 72% of the community members thought that malaria can be prevented (Leku, 2000). The CMS survey (Okello, 2001) in three districts of Uganda noted that majority of respondents (98%) believed that malaria was dangerous and could cause death. A study done by Rissa (2000) in Mpigi indicates 95.4% of respondents looked at malaria as a severe problem that could kill. Other qualitative studies have indicated that malaria in pregnancy is a normal thing (Mangeni, 2003, Mufubenga, 2004). Other studies have also indicated that communities generally observed that malaria was a seasonal problem in their areas⁴. While malaria is seasonal in most parts of the country, this perception could be linked to inconsistent use of malaria preventive methods as reported in most of the studies reviewed.

The CMS survey (Okello 2000) noted a strong perception among community members (75%) that children under five were more vulnerable to malaria than older children or adults; and only 10% of the respondents felt that pregnant women were also more vulnerable to malaria. In the same survey, no major differences were observed between rural and urban areas. In a related survey by Net Mark (2001) in five districts of Uganda it was noted that 82.5% of the respondents perceived that pregnant women were more vulnerable to malaria, while 97% thought that children below five years were more vulnerable to malaria (these were prompted responses). A qualitative study about IPT accessibility and use in Busia district (Mangeni, 2003) reported that most of the respondents including males observed that the most vulnerable groups to malaria were children under five years and pregnant women. Respondents also mentioned the elderly

⁴ A study by Leku (2000) in Moyo district indicated that 56% of the respondent observed that malaria was a seasonal problem which was more common during the rainy season. The CMS survey (Okello 2001) also makes a similar observation with 87.6% of the respondents saying that mosquitoes were many during the rainy season. Earlier studies such as Bakika (1994) indicate that 60% of the respondents in her study in Mpigi district perceived malaria as a seasonal illness. Similar observations have been raised in another study by Ario (1997) in a study in Tororo and Leku (2000) in a study in Moyo district. The AMREF 1996 survey on availability of nets in four districts of Uganda indicates that 46.9% of the respondents observed that malaria was year round problem, and the others said it was seasonal (AMREF, 1996).

persons as one of the other vulnerable groups due to malaria. Similar perceptions have also been reported in a qualitative study done by DISH II (2002).

1.6 Sources of information about malaria

While consumers' sources of information about malaria were varied, radio was indicated to be the main source of malaria information (Net Mark, 2001; Net Mark, 2001; Okello, 2001; Mangeni, 2003; Wanyama, 1997; Namusobya, 1998; Okware, 1996 and Batega 2003A) followed by health providers, relatives, drug dealers and health posters. Twebaze (1998) also indicated aggressive marketing by drug producers/distributors on radio as possible sources of information. News papers were a source of information for mainly urban residents. Information about traditional herbal treatments for malaria was mainly obtained from the older generation relatives, friends, and herbalists in the villages. (Twebaze, 1998; Mangeni, 2003). These observations demonstrate that the radio, health providers and relatives are communication opportunities that can easily be used to reach the target audience.

CASE MANAGEMENT

2.1 Health seeking behavior-caretaker practices

Generally, in all studies about health care seeking practices, there is a high level of preference for home treatment outside of the formal health system, as first level of treatment⁵. Ordinary provisional stores, dukas and drug shops are favorite sources of drugs for home treatment across the country. The MoH Integrated Management of Child Illnesses (MoH-IMCI, 2000) Multi Country Evaluation study indicated that the majority of malaria cases are managed outside the formal health services with shopkeepers (38%) being the predominant sources of care, followed by drug stores and private clinics (41%). It is reported in the same survey that most of the mothers had used western medicine. The HBM baseline survey indicates that over 80% of the under five children with fever were managed at home (Wanyana, *et al* 2002).

The RBM 2001 baseline survey by MoH/WHO showed that the percentage of under five year old children whose caretakers sought treatment within 24 hours was as low as 7.3% and for those that did so; the first action was self medication (47.6%), while only 24.9% went to the health unit (Lutalo, S.K.K, *et al*, 2001). Other authors such as Nshakira *et al* (2002) and Lubanga (1997) also point to the preference of home treatment for malaria. However, a study done by Njama, D *et al* (2003) in Kampala city also indicated that 40% of the respondents observed that if their children had fever they would go to the health clinic, self treatment at home(36%) or drug shop and go to the hospital (23%).

The 2003 HBM follow up survey conducted in 9 district of Uganda indicates an increase in knowledge of appropriate health seeking behavior among caretakers for children under five with malaria. The same follow up survey (Fapohunda, B.M, *et al* 2004) noted that on average four of five women in the surveyed households knew that children with malaria should receive care within 24 hours. The proportion of caretakers of under fives, who took any action in the first 24 hours of the onset of fever, was 39.2% up from 7.3% in 2001. The HBM follow up survey (2003) further reports that proper health seeking behaviour for treatment of malaria is improving with 60% of surveyed caretakers taking action within 24 hours in HBM districts and 52.7% in the non HBM districts (Fapohunda, B M, *et al* 2004). This compares favorably with 47.7% of care takers taking action within 24 hours reported in the 2001 HBM baseline survey (Wanyana, *et al* 2001) and 39.2% as reported in the MoH/WHO 2001 Roll Back Malaria (RBM) program monitoring and evaluation survey (Lutalo, S.K, *et al* 2001).

⁵ In a survey carried out by MOH, UNICEF and WHO (1993), in districts of Apac, Rukungiri and Kampala revealed that the first course of action was buying anti-malarias from ordinary shops and drug-shops for home-treatment and self medication. In Apac District, 67% practiced home-treatment and self-medication, while 61% households in Kampala and Rukungiri practiced home-treatment and self-medication. Lubanga (1992) observed that 90% of mothers attending malaria clinic in Mulago hospital gave some treatment at home before bringing the children to hospital. The treatment at home involved giving modern and traditional herbal medicine. Makanga (1997), has observed that over 50% of Kampala peripheral (households engaged in home treatment before seeking medical attention else where. Lunniale and Rajais (1996) in a study in Mpigi observed that the first treatment choice for malaria is home treatment often with herbs and western medicine, with about 90% of the mothers beginning treatment at home.

The majority of caretakers for children under five obtained treatment from private clinics (35.5%) and formal health facility (29.1%), drug store (13.5%), CDDs (10.3%) and others (11.6%). This compares favorably with data from the RBM monitoring and evaluation survey which indicated that of those who took action within 24 hours, 47.6% resorted to self medication, 24% went to health facilities, 15.6% chose to go to drug vendors and 1.7% consulted traditional healers (Lutalo, S.K, et al 2001). Accessibility to health providers is also improving with the introduction of the HBM program with 54.2% of children obtaining treatment from providers less than one kilometer in HBM districts as compared to 40% in non HBM districts (Fapohunda, B.M, *et al* 2004).

By 2000, most studies (Leku, 2000; Rissa 2000; Ario, 1997, Batega 2003A; Najjemba, 1998) indicate that for most of the communities, Chloroquine was still being used as the main stay for treatment of malaria at home. This is largely because generic and brand name CQ is stocked in almost all neighborhoods, provisional stores/shops in the country (as compared to other anti-malarial drugs) and is relatively cheap (ranging between US\$ 200-1500 per dose)⁶. This is also largely due to lack of knowledge on the new recommended anti-malarial drug therapy-Chloroquine and SP. A qualitative study (Nsungwa *et al*, 2004) carried out in Kasese district shows that sometimes mothers' interpretation of fever or hot body sometimes transcends malaria. Some mothers interpreted some severe fever as not meant for anti-malarial treatment, yet some interpretations of symptoms by mothers regarding severe fevers did include symptoms that can be classified as severe malaria e.g., "stomach stone" which could be splenomegally. Therefore mothers were likely to delay treatment of such conditions and instead opt for traditional treatment.

In a study concerning childhood malaria treatment in Rakai district, Twebaze (1998) reported that brand name blister packed anti-malarial drugs were preferred because they were thought to be *trendy, different, and more potent than generic anti-malarial drugs*. A more recent study done in three districts of western Uganda by Kilian *et al* (2003) shows that women (primary caretakers) overwhelmingly prefer (90.5%) prepackaged anti-malarial drugs and (87.5%) were even more willing to pay more (on average US\$ 300/ USD 0.17) for pre-packed medication. In the same study, about two thirds of the women thought that they themselves would be able to make the decision to buy such a pre-packed anti-malarial drug without first seeking permission from their husbands. This points to the fact that women play a critical role at the home based management of malaria and they should be the primary targets for improving case management at the first level of treatment at home. The same study also notes that about 60% of the women observed that they would want to stock such a product at home instead of getting it only when the child becomes ill with malaria (Kilian, *et al*). This study has pointed out two important implications for improving case management of malaria fevers at community

⁶ A study done in Moyo district reports that about 80% of the households obtained CQ from the shops, while 20% used leftovers from previous treatments. About 20% of the community members studied by Leku (2000) regularly kept CQ in the houses by the time of the study. Kilian (2003) in a study in western Uganda has also observed that between 60-80% of the caretakers in the study obtained anti-malarial treatment from the private sector.

level: 1.) there is need to have as many community members as possible educated in basic presumptive diagnosis and treatment of malaria using commonly-but recommended pre-packed first line anti-malarial drugs; and, 2.), there is need for cascade skills to be given to CDDs and other community health volunteers to enable them pass on basic skills to care takers about presumptive treatment of malaria at home.

A review of research of care seeking practices indicates that treatment patterns appear to be in a hierarchy with the first and commonest type of treatment being offered at home, the second stage at a health facility and the third stage/level of treatment consisting of care from hospitals and health units with admission facilities. A number of studies have highlighted the fact that most families in Uganda believe in the home treatment of malaria. Reasons given for this practice include the following: lack of adequate finance for formal medical consultation and treatment; perceived lack of severity of malaria attack; distance from health facility; availability of home stocked drugs⁷ and herbs; convenience of home treatment for most caretakers (who are most often women); ease of use of traditional herbs, and support of treatment offered by other household members. At the home level of treatment, patients were mostly given common anti-malarials (CQ), followed by SP, analgesics (paracetamol and aspirin), concurrently with herbs and sometimes-other antibiotics (Makanga, 1997; Lunniale and Rajais, 1996; Namussobya, 1998). The use of combination therapy at home level of treatment is still low (Meinert and Nsabagsanyi, 2002).

The second stage of treatment is mostly private clinics, drug-shops, health centers and sometimes traditional healers. This second stage/level of treatment is normally accessed when there are failures at the home treatment level or when the illness becomes more severe. Of all health facilities at this level (Leku 2000; Riisa, 2000; Lunniale and Rajais, 1996), private clinics are preferred to public health centers because: 1) they always have drugs, 2) treatment is faster, 3) client gets more attention from the service provider, and 4) health providers are more friendly. .

2.2 Gender roles and health seeking behavior

Bakika (1994) noted that first course of treatment at home largely involved decisions by mothers and caretakers, while second level treatment outside the home involved decisions of fathers and male guardians. Kilian (2003) in a survey done in western Uganda and a qualitative study about done for the DISH II (2002A) project, has also pointed out that most of the decisions regarding homecare treatment of malaria are made by mothers and caretakers. Several other studies have indicated that mothers were the major caretakers of children and other household members who had malaria. Also, studies on the HBM monitoring (Batega, 2004) have indicated that community members felt that women who were mothers and resident in the area were more likely to be better CDDs than other social groups. The DISH II (2002A) qualitative study also reported that mother made

⁷ There is a reported tendency by some households to stock malaria drugs at home or use part of the prescribed drugs and keep the balance at home. These are later used when members of the household fall sick

most of the decisions regarding home treatment of malaria fever. Elderly women relatives were also consulted at this level of treatment.

A more recent study done in three districts of western Uganda by Kilian *et al* (2003) show that women (primary caretakers) overwhelmingly prefer (90.5%) pre-packaged anti-malarial drugs and (87.5%) were even more willing to pay more (on average USh 300 or USD 0.17) so as to acquire such pre-packed medication. In the same study, about two thirds of the women thought that they themselves would be able to make the decision to buy such a pre-packed anti-malarial drug without first seeking permission from their husbands. This points to the fact that women play a critical role at the home based management of malaria and they should be the primary targets for improving case management at the first level of treatment at home. The same study also notes that about 60% of the women observed that they would want to stock such a product at home instead of getting it only when the child becomes ill with malaria (Kilian, *et al*). A qualitative study by DISH II (2002A) also observed that for malaria in pregnancy majority of pregnant women seek advice from senior females, while some, especially those who have some income, make their own decisions. Male decisions were often ultimate and were mainly sought for financial matters. In order to preserve marital harmony, women sought permission from their husbands or parents-in-law before seeking care outside of the home.

Gender relations are one of the reasons why mothers as caretakers do not seek early formal malaria treatment. Women in most cases have to seek for permission from their husbands or some have to first be supported financially by the husbands before seeking for treatment outside the home. Mothers made most of the decisions regarding home treatment of malaria including assessing the symptoms and diagnosis. Twebaze (1998) and Namusobya (1998) show that most fathers only got involved in the second and third stages of malaria treatment outlined above, and when there were monetary considerations to be met. Elderly women such as mothers-in-law, grandmothers, often advised mothers/caretakers about the use of herbs and supportive treatment (e.g. wet sponging, giving drinks etc). All HBM monitoring and follow up reports have indicated a critical role women are playing as CDDs in community efforts to control CDDs (Batega, 2003B; Batega, 2004; Fapohunda, 2004).

2.3 Case management-Health provider practices

In a study carried out among 463 children under five in districts of Busia and Tororo about use of anti-malarial drugs for children's fevers in health units (Nshakira, N, *et al*, 2002), it is reported that on day one of the study health workers prescribed CQ for 94% of the children, but only 34% of the recommended doses followed guidelines, while 66.75 of the children were prescribed an injection of CQ. By day three of the study follow up, only 28% of the children had received CQ at the optimal dose recommended by the then national anti-malarial drug policy. In addition, more than half of the children (55%) enrolled in the study received a prescription of CQ and antibacterial drugs. In total, about 75% of all the medicines given to the enrolled children were bought from shops within the community. The high preference for injections is also reported in another study by Kaliisa (1997).

An appropriate drug combination for malaria fever as per Uganda Malaria Treatment Policy, 2002 is CQ and SP combination therapy. Findings from the HBM 2003 follow up survey indicate that 37% of children under five who had malaria two weeks before the survey received appropriate treatment in the HBM districts and 7% in the non HBM districts received appropriate drugs. In the HBM districts, the proportion of febrile children who received appropriate treatment ranged from 27% in Kamuli district, 37% in Kanungu, 40% in Kumi to 44% in Kiboga (Fapohunda, B.M, *et al*, 2004). A comparison of estimates of appropriate treatment of malaria from the HBM baseline (2001) and follow up survey (2003) reveal statistically significant increases in the use of appropriate anti-malarial drugs in all the HBM districts, while the changes in the non HBM districts were low (2%) and insignificant.

In another study by K2-Consult on behalf of the DISH II (2002A) project it is reported that health workers in the government health units were more informed than those in the private sector. However, health workers did not appreciate the danger signs and symptoms for severe and complicated malaria. They also confessed that they often do not treat malaria according to the provided guidelines because of drug stockouts and uncooperative patients (i.e. patients who demand for particular types of medication which may not be available or recommended for the diagnosed level of illness) Most frontline health workers did not have up to-date MoH policy guidelines about treatment of childhood fever/malaria. The same study (DISH II, 2002A) observed that herbalists or traditional healers had a limited role in the management of childhood malaria. Malaria illness was thought to be best managed by Western drugs. Therefore, treatment is often sought first at private vendors. Community drug vendors (CDVs) know most of the common anti-malarials and their corresponding correct doses. However, they were often dispensed inappropriately due to lack of client funds. CDVs knew of SP, but did not know correct dose schedules. Furthermore, they thought SP to be too strong for children presenting with mild malaria or fever

The HBM 2003 follow up survey reports that advice was commonly given on the dosage and length of time to give drugs in both HBM and non HBM districts. In the HBM districts, caretakers were equally likely to receive information on dosage and duration of drug administration from CDDs or health facilities. In the non HBM districts, caretakers were most likely to receive messages on dosage and duration of drug administration in health facilities than from community sources such as community resource persons. Advice on danger signs, referral, giving more fluids, and increasing feeding after illness was far less likely in both HBM and non HBM districts. A similar study by Batega *et al* (2004) noted that CDDs are most likely to counsel caregivers on continued feeding and increased fluids during the illness (49 percent), messages that are also a key element of the C-IMCI strategy. Although 77 % (36 of 47 CDDs) identified a child not getting better after treatment with Homapak as a condition requiring referral, only 13 percent of CDDs reported that they counsel on referral if there was no improvement in the child. The possible explanations for the discrepancy between the level of knowledge among CDDs reported above and the low level of counseling reportedly provided is that a gap exists

between the quite high levels of knowledge among CDDs and their capacity or propensity to counsel caregivers.

In order to improve case management, the HBM programme's cardinal element is the use of color coded-age specific treatment. According to the HBM implementation guidelines, the Red Homapak is for children 2-24 months, while the Green Homapak is for children between 24 and 59 months. The findings of the 2003 HBM follow up survey indicate that majority of CDDs in the HBM district areas were adhering to the treatment regimen. Few CDDs were giving incorrect treatment. On average, 14% of the children 2-23 months of age received the green Homapak which is intended for older children, while 15% of children 24-59 months of age received Red Homapak (Fapohunda, B.M, et al 2004). This is an area that requires strengthening through support supervision, refresher training, and necessary job aide's materials. Such observations have also been reported in sociological analysis of the HBM acceptability, accessibility and compliance by Batega (2003B).

2.4 Use and knowledge of recommended malaria treatment

Studies reviewed indicate that there is also a high preference for home treatment of malaria often resulting in inadequate treatment and /or the use of drugs left over from previous treatment episodes. This is a clear indicator of under dosing. Some studies (Adome *et al* 1996; Namusobya, 1998; Isabirye and Wendo, 1998; Wanyama, 1997) have shown that some consumers were taking drugs for periods considerably shorter than specified treatment periods- some as short as one day. Reasons given by consumers for such drug use include: feeling recovered, failure to improve in expected time, feeling worse, forgetfulness, unpleasant side effects (especially vomiting and itching for Chloroquine), multiple prescriptions and therefore difficulties in remembering instructions, unclear instructions from drug providers, sharing of drugs at home, and sometimes lack of money to purchase all the prescribed drugs.

Namusobya (1998) in a study in Iganga also observed a high incidence of self-medication amongst male adults in the treatment of malaria. Wanyama (1997) and Bakika (1994) have reported cases of overdosing among consumers, with tendencies of combining anti-malarial drugs with antibiotics. The commonest route of malaria drug administration is oral, followed by a combination of oral and injectables, and lastly injectables only. Wanyama (1997) reports that, out of 230 respondents, 60% took medicine orally, 34% used both orals and injectables, 1.7% used injectables exclusively, and, 2.7% used others.

A study about urban malaria in Kampala city (Njama D *et al* 2003) carried out in 2002 also indicated that caretakers' knowledge regarding anti-malarial therapy is very low, with only 29% of the surveyed respondents knowing the correct dose of CQ and only 19% knew that CQ was best administered orally with knowledge higher among those with high levels of education. In the same survey (Njama, D *et al*) it is reported that 51% of the caretakers thought that CQ [alone] was the best treatment for malaria and 12% indicated acetaminophen as the best treatment. Mangeni (2003) reports a high tendency for pregnant mothers with fever to always combine herbs with western medicine at the home and health facility level of treatment. The same study reports that

the common anti-malarial drugs used to treat malaria in pregnancy were: SP and CQ, though some women also mentioned using septrin and paracetamol as anti-malarial drugs (Mangeni 2003).

A study by DISH II (2002) also reported a similar situation that most respondents knew about the existence of SP; however, they did not know its dosage schedules. SP was perceived to be too strong for treatment of malaria in pregnancy.

Kilian (2003) has further indicated that between 81% of the rural mothers and 70% of urban mothers knew the correct dosage of CQ treatment for an adult, and between 37% and 30%, respectively, knew the correct dosage for a three year old child. There appears to be a knowledge gap about community members' knowledge and uptake regarding first line anti-malarial combination therapy in light of the previous, and currently revised anti-malarial drug therapy.

2.5 Cost of malaria treatment

The CMS survey (Okello 2001) indicates that the average cost of treating one malaria episode was Ush 4114 (USD 2.20) excluding transport and income lost due to the disease. Generally, higher treatment costs of malaria were observed in the southern region of the country (average Ush 5000) than in the northern region of the country (average Ush 1000). Also, treatment costs of malaria were reported to be higher among urban respondents than the rural respondents. Leku (2000) in a study done in the northern district of Moyo established the average cost of treatment of one episode of malaria at Ush 500-1000. Rissa (2000) in a study in Mpigi district established that the average cost of treatment of one episode of malaria at Ush 8000= . The CMS study (Okello 2001) established that the annual per capita expenditure on malaria treatment was Ush 6,856 (USD 3.70). Kilian (2003) in a study in western Uganda reported that the majority of caretakers obtained their treatment from the private sector where one Chloroquine tablet was costing between Ush 30-50 and dosed Chloroquine treatment estimated at Ush 200.

The HBM 2003 follow up survey reports an average cost of anti malarial drugs was Shs: 1420, ranging between Shs: 950 in Kamuli districts to Shs. 2,100 in Masaka district with minor variations between HBM districts (Shs. 1,720) and non HBM districts (Shs. 1,140/=) for each episode of malaria (Fapohunda, B.M, *et al* 2004).

2.6 Choice of source of malaria treatment/drugs

The factors that influence the choice of source of treatment/drugs for consumers are: distance to the source of drugs, expectations of low cost of drugs at particular source, advice from friends and relatives, history of relationship with drug source (e.g., rate of successful treatment with drugs procured from that source), the presence of a good provider at the source, quick service, steady availability of drugs and sometimes, the presence of qualified providers. Luanniale and Rajais (1996) have summarized these

factors by concluding that consumers tend to value courteous services and convenient location.

There are indications from other studies that, whereas government units had qualified personnel and were relatively cheaper, opening hours were short, drugs were not often available, and staff were not always friendly. Leku (2000), and Lunniale and Rajais (1996), observed that some of the determinants of the choice of treatment facility include; appearance of the place and personality of the providers. Positive attributes preferred by caretaker and patients were: kindness, good behaviors, nice talk, clean and well qualified providers. Negative qualities identified among providers were: rudeness, shouting and a 'do not care' attitude (Mufubenga *et al* 2004, Mangeni, 2003).

In an evaluation about the effectiveness of a community based CQ distribution program in Bushenyi district, western Uganda, Nuwaha *et al* (2003) have noted that knowledge of availability of community drug distributors and free treatment appeared to have influenced health seeking behavior by making it less likely for caretakers to use private clinics and drug shops but did not influence the use of public health facilities or traditional healers. Another study on urban malaria by Njama D *et al* (2003) indicated that the condition of the child (48%), perceived cost (39%) and time of the day (9%) were the major factors that influenced respondents decisions to seek care from formal health facilities.

2.7 Challenges to case management

Reviewed literature indicated a number of factors that present challenges to effective and prompt case management of malaria. Key amongst these were: lack of knowledge of signs and symptoms of severe malaria, poverty, consumer preference for injections, inadequate IMCI training of health workers, drug stock outs, CDD drop outs, problems related to CDDs, and incorrect treatment advice by CDVs.

2.71 Lack of Knowledge of signs and symptoms of severe malaria

Several studies have pointed out that most care takers lack adequate knowledge about symptoms of severe malaria. This is one of the challenges to promoting case management of sever malaria fevers. Twebaze (1998), Nsungwa (2004) Fapohunda, et al (2004). A study by DISH II (2002 A) reported that some health workers did not appreciate the danger signs and symptoms for severe and complicated malaria.

2.72 Poverty and embarrassment prevent health service access

Other challenges to prompt and appropriate case management range from general poverty among some caregivers to periodic stock outs of recommended drug therapy especially at public health facilities. Sometimes, people fear going to hospitals (if referred) because of poverty and the fact that if they are admitted, because they will need bed sheets, blankets, cups etc. which they do not have at home, and so they decide to stay at home (Kalisa 1997). This often results in a delay in treatment or a resort to traditional medicine. Bakika also notes that lack of finance at time of recognizing illness, long distance to

health unit, and lack of knowledge about malaria drugs (1994) lead to self medication and most likely poor drug use.

2.7.3 Consumers Insist on Injections

Another barrier to appropriate case management identified by Kalisa (1997) is a relatively widespread belief that injections are the most effective means of treatment for malaria. Caretakers sometimes delay treatment until when they reach health facilities where they are sure they will get injections. Health facilities which are less likely to give injections are bypassed. The preference for injections has also been reported in other studies by Batega, 2003A, and Nshakira, 2002.

2.7.4 Inadequate Provider IMCI Training and Stockouts of Malaria Drugs

Lack of adequate training in IMCI and detection and treatment of severe malaria also presents a barrier to effective malaria case management. The HBM follow up survey (2003) in nine districts of Uganda by MoH/WHO/BASICS II indicates that more than 50% of the health workers managing children at health facilities were not trained in IMCI and severe case management. The consequence for the HBM is that these health workers are unlikely to have the requisite skills for supervising and supporting CDDs in case management, or managing referral cases from the community (Fapohunda, B M, *et al* 2004).

Mufubenga (2004) among others noted frequent drug stock outs at health facilities were one of the challenges affecting prompt case management. The MoH/WHO 2001 RBM program monitoring and evaluation report reported that only 13.3% of the surveyed health facilities had no stock outs of nationally recommended anti-malarial drugs. The majority of health facilities surveyed had significant periods when they did not have a full complement of recommended anti-malarial drugs (Lutalo, S.K.K, *et al.* 2001).

In another study by Kilian *et al* (2003) one of the biggest challenges for the introduction of a pre-packed, unit doses anti-malaria treatment for children in the public as well as the private sector is to guarantee the availability of the right sized packs at the right time and right place, as only this will give good coverage and impact on malaria related morbidity and mortality. In circumstances of stock outs, even under the best circumstances, alternative but appropriate courses of action need to be known by care takers, or readily given by health providers or CDDs.

2.7.5 Problems related to CDDs

Though case management is reported to be improving partly through the HBM strategy, this achievement is being compromised by CDD drop outs, lack of motivation for the CDDs, delayed presentation of sick children to the CDDs and also frequent stock outs of Homapaks (Batega, *et al* 2004; Matovu, 2003; Fapohunda, B.M *et al*). The study by Batega *et al* (2004) notes that significant ruptures in supplies of Homapaks were seen at all levels of the system and these pose a serious problem for the HBM program. CDD stock outs have a profound affect on the continuing functioning of the individual CDD. Many reported difficulties in re-establishing their position as a source of Homapaks in the

community and there was an apparent loss of motivation in others. In addition to stock-out of Homapak, the study identified shortfalls in regards to IEC materials, guidance for CDD attrition and replacement, re-fresher training, supervision and provision of modest supplies needed by the CDD.

The low level of community motivation for and general support to the CDDs also hinders the effectiveness of CDDs. The communities are supposed to motivate the CDDs and also support them in areas of replenishing Homapak stock and delivering returns to the health centers among other forms of support. Evidence from a study by Batega (2004) done for BASICS II shows that 19 CDDs (40%) reported that they received some kind of assistance from the community members in the form of taking the register to the health center, lending bicycles to the CDDs to go to collect Homapak or helping to carry severely ill children to the health center. Twenty-eight CDDs (60%) said they had not received any kind of assistance from community members. Support from communities for CDDs was almost evenly divided across gender, with 57% of males and 43% of females reporting that they had received support of some type. This particularly indicates that this message was not strongly emphasized for the community members during social mobilization for the HBM program or was equally not taken seriously by the community members. Future messages need to emphasize this responsibility for the community members and leaders.

2.7.6 Inadequate Advice by CDVs

The DISH II (2002A) qualitative study also point out a key challenge among CDV who are one of the major source of anti-malarial drugs in the community. The study observed that CDVs knew most of the common anti-malarials and the correct Chloroquine dose. However, they did not commonly sell the correct Chloroquine doses to caretakers. Drugs were dispensed according to the available funds of the patient or family not according to the correct dosage. Caretakers who had little money were reported to take less of the effective drugs in the packages they procure. Therefore, although drug vendors know the correct drug dosage, many of their patients leave without taking the proper dosage.

INTERMITTENT PRESUMPTIVE TREATMENT (IPT) DURING PREGNANCY

3.1 Introduction

In line with WHO recommendation, the MOH in 1998 initiated a policy stipulating a comprehensive strategy to control malaria during pregnancy. Under this policy all asymptomatic pregnant women should receive 2 doses of SP as an Intermittent Presumptive Treatment (IPT), while mothers with malaria signs and symptoms get effective case management according to national guidelines (Malaria in Pregnancy National Policy, 2000 MOH). Most research however indicated a relatively low level of knowledge about the severity and risks of malaria in pregnancy, the safety of IPT, and the importance of IPT to ensuring healthy pregnancies.

3.2 Knowledge of malaria in pregnancy and attitude towards IPT:

In the survey carried out in 17 districts by MOH/WHO/UNICEF (Mufubenga P *et al* 2001) the prevalence of malaria in pregnancy ranged between 15-55.4% among ANC attendees while the prevalence of severe anemia during pregnancy was 18%. In the same survey, of 2316 pregnancy records examined at health units, malaria related pregnancy outcomes observed included; still births (3.4%) with incidence highest in northern and central Uganda; abortion (4.2%) with incidence highest in western and central Uganda; and low birth weight < 2.5 kgs (12.3%) with incidence highest in northern Uganda (22.4%) and among teenagers.

Generally there is low level of knowledge regarding malaria in pregnancy with the levels much lower among men. However, a study by Mangeni (2003) and Mufubenga (2001, and 2004) reveals that a good number of pregnant women and mothers studied perceived that fever during pregnancy was dangerous although some incorrectly believed that fever during pregnancy was a normal thing and nothing should be done about it. These studies further reveal that most of the women studied had heard about preventive treatment of malaria during pregnancy, however many of them did not have a practical experience with it. Despite low levels of knowledge and use of IPT, most of the respondents perceived IPT to be useful in preventing malaria and recommended that IPT distribution should go hand in hand with provision of ITNs to pregnant mothers (Mangeni, 2003).

Another qualitative study by DISH II (2002) indicated that malaria in pregnancy is recognized and classified in the local languages with terminologies that represent broad symptom complexes. Several community members perceive mild fever (malaria) and general weakness as a normal sign of pregnancy, but they also recognize that severe malaria can be fatal in pregnant women. The majority of respondents associated malaria with mosquitoes both in pregnant and non-pregnant people. However, some respondents perceived malaria to be sexually transmitted or to be caused by the foetus in the womb. Whereas mild fever was perceived as a normal sign of pregnancy, which would heal by itself, severe malaria was recognized as a dangerous illness that can lead to miscarriages, premature delivery, stillbirths or the eventual death of a baby.

Furthermore, malaria in pregnancy was believed to affect the baby more than the mother. Mangeni (2003) in a qualitative study about IPT and ITN use in pregnancy in Busia district reports that respondents observed that malaria related problems in pregnancy include miscarriages, malaise, anemia, back and joint pains, labour complications, maternal and child death. Among focus group participants, low birth rate was seldom mentioned as a result of malaria in pregnancy, as was knowledge of the implications of low birth weight babies.

Some mothers have a negative opinion of treatment of malaria during pregnancy. A survey conducted in 17 districts of Uganda indicates that 30% of the women studied had a strong belief that fever is part and parcel of pregnancy, and that some anti malarial drugs are very dangerous to the foetus (Mufubenga P *et al*, 2001). Mangeni (2003) has also reported the same observation as one of the attitudes of community members

towards IPT services in Busia district. A later study in Mubende district by Mufubenga (2004) has also indicated that a good number of women studied considered IPT as a good measure to prevent malaria during pregnancy, treat a sick foetus or treat unsuspecting mother. However some considered SP to be very strong and likely to cause miscarriage, kill the mother or make her very weak. Such mothers thought that it was not wise to take SP for malaria in pregnancy control.

The DISH II (2002) qualitative study also reports that most respondents knew about the existence of SP, however, they did not know its dosage schedules. SP was perceived to be too strong for treatment of malaria in pregnancy. Health workers (midwives) knew the signs and symptoms of malaria, its transmission process, the drugs used and its importance among other illnesses, but they did not appreciate the danger signs and symptoms for severe and complicated malaria. Surprisingly, in the same study health workers reported that SP was too strong for pregnant women and should be reserved for severe cases, contrary to the Ministry of Health policy guidelines. Several of the health workers and caretakers were unaware of Intermittent Presumptive Treatment (IPT), and most health workers did not know the generic name (SP) of Fansidar.

3.3 Availability and use of IPT in pregnancy

The provision and uptake of IPT services largely depends on the availability of ANC services at health units. However, evidence from the Uganda Demographic Health Survey (UDHS, 2001) indicates that only 42% of pregnant women in Uganda make 4 or more visits for ANC during pregnancy, while half of pregnant women make one to three visits which is below the MoH recommendation.

In a survey by MOH/WHO/UNICEF in 17 districts of Uganda; out of the 122 health units surveyed, only 66.7% offered ANC at least five days a week (Mufubenga P, *et al* 2001). Within the same study, 77.5% of the health units had SP- the recommended drug for IPT, 47.5% of health units reported frequent stock outs and in most units, available stock was not even enough to cover IPT and case management for the projected numbers in the remaining procurement periods. Also at the time of the survey, only 42.2% of health units had malaria in pregnancy control guidelines. Lack of such guidelines could affect the provision of high quality and prompt IPT and malaria in pregnancy case management.

A health facility tracking survey by the DISH II project in 11 districts (DISH II, 2002B) indicates that only about 50% of clients attending ANC clinics received all the recommended preventive treatment including malaria prophylaxis. However, clients were more likely to receive preventive treatment including malaria prophylaxis at 28-36 weeks gestation than at the 17-24 weeks pregnancy. The same survey (DISH II, 2002B) indicates that 64% of the clients seen by trained providers received SP during the correct time according to the MoH guidelines as compared to only 42% of the clients seen by providers who had not received in-service training. This study highlights the significance of capacity building for service providers towards strengthening and scaling up IPT services including malaria in pregnancy control.

A baseline survey about malaria in pregnancy carried out in Mubende district (Mufubenga, *et al*, 2004) has shown that 45.3% of pregnant women or mothers interviewed had taken preventive treatment against malaria during the present or completed pregnancy. Of the women who had completed their pregnancies, 52% reported to have taken IPT at least once during their recent pregnancy, 26.9% twice and 2.6% three times. This study also shows that the majority of the women who had taken IPT took SP (99%) as IPT while, only 1% took CQ as IPT. This survey further reveals that of women who reported to have taken SP as IPT during pregnancy, the majority (98.6%) took 3 tablets per dose, while 2.6% took 2 tablets, 1.2% took 4 tablets and 1% took 1 tablet.

Further (Mufubenga, *et al*, 2004) noted that, among those pregnant women who took the 1st dose of IPT, only 35.1% took it within the recommended 12-24 weeks period, while among those who took the 2nd IPT dose of IPT the majority (78.8%) took it within the recommended 25-36 weeks period. This study further notes that IPT uptake during pregnancy, just like ANC utilization, was influenced by maternal age. Older women and women with higher parities tend to be complacent and overly confident that they have enough experience with pregnancy and are subsequently not at risk. Health education in malaria and pregnancy should seek to change these attitudes.

The studies done by Mufubenga *et al* (2004) and Mangeni (2003) have also shown that most pregnant women did not take preventive measures against malaria on their own initiative. When pregnant women fell sick, most indicated they would go to the health centre for treatment, go to the traditional birth attendant, buy medication from clinic or pharmacy, take herbal mixture, and/or take pain killers. Some women in the study thought that by going for immunization it was also protection against malaria in pregnancy (Mufubenga, *et al*, 2004). Other preventive measures taken to prevent malaria in pregnancy-though to a much lesser degree-included: cutting grass around the home, draining stagnant water, smoldering herbs and limited use of mosquito repellents.

The MoH/WHO 2001 RBM program monitoring and evaluation survey measured the utilization of IPT with either SP or weekly CQ intake for pregnant women. The survey findings indicate that only 8.6% of the pregnant women or those who had delivered within the previous six months had received CQ prophylaxis, while none had received SP as IPT (Lutaalo, S.K.K, *et al*, 2001).

3.5 Challenges in provision and use of IPT

The MOH/UNICEF/WHO national IPT survey observes that in general, there was limited use of IPT guidelines among health providers, and for those who used them, there was difficulty in identifying the most vulnerable groups from the ANC attendees, especially by lower level staff (Mufubenga, *et al*, 2001).

The other identified challenge is that lack of Directly Observed Treatment (DOT) may compromise the uptake of IPT by some pregnant women. This is common among private health units especially mission health centers where there is centralized dispensing of

drugs at pharmacy such that SP relocation from pharmacy to ANC clinics for Directly Observed Treatment (DOT) is not allowed (Mufubenga, *et al*, 2001). In order to improve IPT compliance, the study by Mufubenga (2001) emphasizes the use of DOT wherever pregnant women come for IPT. The same study (Mufubenga 2001) noted that of the staff who were involved in ANC only 23.8% and 12% had undergone in-service training on reproductive health life saving skills and malaria case management respectively. Most of the private practitioners tend to miss out on such trainings. Mangeni (2003) has also reported lack of adequate skills among providers at several public health centers that are supposed to dispense ANC and IPT services. Accessibility by pregnant women to such health facilities (in terms of distance and associated costs) was also a challenge to effective and prompt delivery and uptake of IPT services.

By 2001 the national IPT policy had not been uniformly articulated in all district plans e.g., only 33.3% of the districts surveyed had IPT and ITN activities in their work plans respectively (Mufubenga, *et al*, 2004). In the same study of the health manager at the local government health facilities also observed that the essential drugs kit from government contained too little SP to cover presumptive and clinical cases.

Other reasons that several health facilities were not providing IPT services include;

- Ø Inadequate staffing at lower health facilities
- Ø Lengthy public procurement system, causing delays in delivery of essential drugs for IPT
- Ø Support supervision of health units was not adequate and only 47% of the health units had received technical support supervision as per the (IPT) guidelines due to lack of adequate staff, transport and allowances (Mufubenga, 2001).
- Ø Some mothers have a negative opinion of treatment of malaria during pregnancy (30%) with a strong belief that fever is part and parcel of malaria, and some anti malaria drugs are very dangerous to the foetus
- Ø Poor planning for IPT by relevant district authorities leading to frequent stock outs

VECTOR CONTROL

4.1 Introduction

This section of the literature review describes community members' knowledge, attitudes and practices regarding malaria vector control methods. The reviewed literature indicates that the most known method of vector control is the use of mosquito nets. Therefore, this review mainly covers the use of ITNs. The other methods of vector control such as IRS are rarely known by the community members, and as shown in the literature review, have been largely under-researched and also under-emphasized in many malaria control interventions. Interestingly, the HBM follow up survey (2004) indicates that about 40% of the community members in the surveyed 9 districts still thought that bush clearance was an effective method of malaria prevention. Riisa (2000) in a study in Mpigi district and Mangeni (2003) in a qualitative study in Busia district have also reported such attitudes from community members.

There are no studies accessed in this review that have analyzed the cost effectiveness of different malaria control activities within the Ugandan context. However, Goodman *et al* (2000) noted that cost effectiveness studies in low income countries indicate that improvement of case management is the most effective intervention costing USD 1-8, compared to the provision of ITNs (USD 19-35), two rounds per year residual spraying(USD 32-54) and chemoprophylaxis for children (USD 3-12) assuming the health system already exists. In a comparative study done in neighboring Kenya (Guytt H.L, *et al*, 2002) about the use of IRS and ITNs it is shown that sleeping under an ITN reduced the risk of infection by 63% and sleeping in a room sprayed with insecticide reduced the risk by 75%. The economic cost per infection case prevented by IRS was USD: 9 compared to USD: 29 for ITNs. This Kenyan study recommends the use of IRS as a more effective and cheaper option in communities with low and seasonal risks of infection.

The Uganda ITN voucher pilot project report (Kilian, 2004) observes that the use of ITNs is the preferred method of malaria prevention and that the introduction of Long Lasting Insecticide Treated Nets (LLIN) which do not need re-treatment for at least three years has the best cost effectiveness and prospects for sustainability.

4.2 Knowledge and attitudes about vector control measures

In a study conducted in Mpigi (Rissa 2000), 66.9% of the community knew that malaria can be prevented while others thought otherwise. Most of those interviewed believed bush clearance and drainage as main vector control methods. Mention of insecticide sprays, mosquito coils, ITNs and IPT as vector control methods was very low. A related study in Moyo district (Leku 2000) indicates that knowledge of traditional methods of prevention was high. The CMS survey (Okello, 2001) carried out in three districts of Uganda observed that 17% of the rural respondents had no idea of how to prevent malaria. Further, in the urban areas 48.3% of the respondents knew the use of bed nets as the best way to prevent malaria as compared to 24.6% of the respondents from the urban areas.

Keeping the home and surroundings clean was known by 17.5% and 20.1% of the urban and rural respondents respectively as effective vector control methods. Interestingly, the same study notes that 11.2% of the rural respondents also thought that drinking clean water was the best method of preventing malaria as compared to only 2.1% from the urban areas. In the same study, insecticide spray was largely mentioned by urban respondents as the best way to prevent malaria.

Another study in Kampala (Njama *et al*, 2003) reported only 25% of the surveyed respondents using bed nets in Kampala city. A qualitative study by DISH II (2002) also observed that though there is generally good knowledge of environmental preventive actions against malaria, most actions were rarely practiced. In a study by Riisa (2000) in Mpigi district, mosquito net use was very low and focus group discussions revealed that several of the community members believed that, with clearing of bush, taking away empty tins and general spraying, there would be no need to use mosquito nets. This same

study also observes that people feared using mosquito repellants like mosquito coils thinking that such repellants could cause cancer and chest problems.

The study by Riisa (2000) noted a prevailing belief that malaria control is a government responsibility by community members and some believed malaria control is unachievable. Qualitative data collected through focus group discussions in Mpigi district indicates that most community members in group discussions expressed disappointment that the government had failed to continue with the spraying system of malaria control (Riisa 2000). In the same study it was clear that community members preferred malaria vector control methods that did not involve expenditure on their part.

Though communities considered nets useful, their acquisition and use is not often a priority. Insecticide Treated Nets (ITNs) were not well known. Among those who knew about ITNs, prolonged use was considered unsafe (DISH II, 2002). The HBM follow up survey (Fapohunda, B.M, *et al* 2004) found limited knowledge of effective preventive strategies in the surveyed 9 districts with 62% mentioning mosquito nets although only 1 in 5 (20%) caretakers specifically mentioned ITNs as an effective means of preventing malaria.

In the HBM follow up survey respondents in HBM districts (29%) were slightly more likely to report ITN use than respondents from non HBM districts (20%). Other methods of malaria prevention mentioned were bush clearing (40%), removing stagnant water around house (25%), closing doors or windows (22%), insect spray or mosquito coil (19%) and personal hygiene (17%). This survey generally indicates that “clearing bush” was more often cited than ITN use although it has no significant effect on malaria transmission. The PSI tracking survey (2002-2003) indicates a significant reduction in the percentage of people who believe that they are at high risk of getting malaria from 59% (urban) and 68% (rural) in 2002 to 40% (urban) and 46% (rural) in 2003. In contrast, the overall belief that respondents were capable of preventing malaria is very high both in rural and urban areas with over 90% reporting that they believe they can prevent malaria.

4.3 Use of vector control measures

Knowledge about prevention of malaria is fairly high, with figures higher in urban areas (see Ario, 1997; Okello, 2001; Riisa, 2000; Net Mark, 2001A) However, despite high levels of knowledge and positive attitudes towards prevention of malaria, the use of preventive methods is generally low, with several community members using non-commercial methods of prevention more than the commercial methods of prevention. Some prevention methods such as IPT were little known especially among males (Mangeni, 2003; Riisa, 2000; Ario, 1997; and Leeku, 2001).

Riisa (2000) also observes that in Mpigi district, the most common practices of prevention reported were bush clearance (64%), clearing empty tins (53.7%) and Chloroquine prophylactic treatment (47.1%). Other methods such as mosquito nets, insecticide spray, window screening and mosquito coils were not commonly used, with only 3.7% of respondents using mosquito nets. The CMS survey (Okello 2001) noted

that the use of commercial methods like mosquito nets and insecticide sprays was generally higher among urban households (46%) than rural households (16.55). In the same study, the use of other practices to prevent malaria involved: cleaning the house and surrounding area (28.7%), closing windows and doors before nightfall (22%), use of insecticide spray (28%), and mosquito coils (24.7%). However a fair number of the rural respondents (24.4%) didn't use any method of protection from malaria.

Generally, the use of protection methods was very low in the northern district of Arua as compared to the southern region districts of Mukono, Jinja and Mbarara, with 42.7% of the respondents from Arua not using any protection against mosquitoes (Okello, 2001). Leku (2000) in a study in Moyo district reported that only 12% of the surveyed households in Metu sub-county were protecting themselves at the time of the study, with fewer numbers using mosquito nets⁸.

Makanga (1997), in a study carried out in peri-urban Kampala established that the presence of mosquito screens and ventilators was not protective against the presence of mosquitoes. This could be due to the high mosquito density in the area, such that enough mosquitoes enter through the doors. At the time of this study, it was established that 81% of the respondents were using some control measures. The most commonly used control measure was the mosquito coil (56%) although with complaints that mosquito coils are no longer effective, are irritating and cause choking. Mosquito sprays were the second commonest control method mentioned (48%), while the use of the bed net was third 34%. Makanga (1997) concludes that, those with high levels of education and stable incomes mostly used mosquito control methods. Even general perceptions about malaria prevention, can affect preventive behaviour and practice. Namusobya *et al* (1998), in a study in Iganga observed that 36% of the respondents thought that malaria cannot be prevented. In this same study, whereas 89.5% had heard about mosquito nets, only 6.5% used them. The DISH II (study) also reported similar attitudes by community members that malaria prevention was unachievable. The PSI tracking survey (2002-2003) has indicated that knowledge that ITNs offer protection against malaria is significantly lower among non – users. Increasing knowledge about ITNs capacity to prevent malaria among non-users is an important variable to influence.

In PSIs study, only 69% of the non – users are aware of ITNs. Awareness of ITNs was higher among non-users in urban (83%) compared to those in rural (69%). Users of ITNs have high knowledge regarding the necessity of re-treating nets (73% urban, 65% rural) compared to non-users (44% urban, 31% rural). In this same study, a significantly higher proportion of users knew that ITNs offer protection against malaria. Similarly net users (91% urban/ 82% rural) are more likely to think dipping nets in insecticide is important versus non-net users (73% urban/ 57% rural). (PSI, 2003)

4.4 Mosquito net ownership and use.

⁸ In another study in Arua municipality, Deboru (1993) reports that, whereas some people knew how malaria is transmitted, of these 29% were using mosquito coils, 6.4% bed nets, 1.8% insecticides, and 47% were using no protection at all. The major reasons given for this low level of utilisation of malaria control measures was lack of funds to purchase mosquito coils, bed nets and insecticides, and ignorance

The Uganda Demographic and Health Survey (UDHS, 2000-2001) indicated that net ownership in Central Uganda was 15.3%, eastern Uganda 15.4%, Northern Uganda 14.6% and western Uganda 5.5%. The UDHS (2000-2001) puts net ownership in urban areas at 32.9% and 9.2% in rural areas, and the **overall national average of net ownership at 13.0%**. The CMS survey of 700 respondents (Okello, 2001) noted that only **22.4% of households had nets**, with incidence highest in the southern districts of Mbarara (27.2%) and Mukono (25.9%) and lowest in northern district of Arua (13.3). Mosquito net use was highest in urban areas (45.5%) as compared to only 16.5% of respondents with nets in rural areas. In households where some people slept under mosquito nets, it was primarily the adults and not children. This survey also established a likely relationship between access to malaria education messages and use of nets, where 82% of households with net had seen/heard malaria education messages.

The impact of use of nets has been demonstrated by evidence gathered by several studies on the relationship between net use and prevalence of malaria. For example, the CMS (Okello 2001) survey reports that there were fewer incidents of malaria (6.4%) among children below five in households with nets, than among children in households without nets (32%). Another study by Njama D *et al* (2003) in Kampala district and Spencer *et al* (2004) in Bundibugyo district also established a lower incidence of malaria among children who used nets.

The Net Mark (2001A) study in five districts (Kampala, Masaka, Soroti, Hoima and Mbarara) indicates that 34% of the households reported owning a mosquito net, and half of these owned more than one mosquito net. Net ownership was lowest in Masaka (19%) and highest in Soroti (44%), and only 29% of the households surveyed had heard about treating nets and only 4.0% of the households owned a treated net (ITN). The Net Mark (2001B) qualitative study indicates that several traders had never heard about treating nets and that there were no traders in the study sites selling net treatment tablets or solutions. The PSI tracking survey (2002-2003) has indicated that in 2002, mosquito net ownership was significantly higher in urban (66%) than in rural (31%), which is also observed in 2003 (76% and 44% respectively). The overall net ownership has improved significantly between 2002 and 2003. Although net ownership is high, the percentage of the population with Insecticide Treated Nets (ITNs) is much lower. As expected more urban respondents have ITNs. Only 21% (2002) and 29% (2003) of the rural population and slightly more than half of the urban population who owned nets had slept under them the night preceding the interview survey, which indicates that not all people having nets in households are using them, all the time.

In a baseline survey carried out in Kumi district in the early phase of a program to provide ITNs and other malaria control activities (2002), it was established that 24% of the households in the district possessed at least one mosquito net, and of these, only 40% possessed treated mosquito nets (Collins, 2002). The MoH/WHO 2001 RBM monitoring and evaluation survey established that about 17.6% of the households surveyed had a mosquito net, although, only 9.8% of the nets had been treated/re-treated in the last six months.

The Uganda ITN voucher pilot project report (Kilian, 2004) has reported that subsidized distribution of ITNs through the voucher system in Mbale and Mbarara district increased ownership of ITNs from 22.9% before the pilot to 40.9% during the pilot time with higher figures in Mbale than in Mbarara district. In a survey conducted in Mbarara municipality about use of nets (Nuwaha, 2001) among 643 households surveyed, 55% of the households had at least one net.

A qualitative study by DISH II (2002) project noted that Insecticide Treated Mosquito Nets (ITNs) were not well known by caretakers but the existence of ordinary nets was generally known. Communities reported that nets were rare and were mainly used by heads of households. Several of the studies reviewed have elaborated that nets were not being used due to cost, safety concerns, availability and lack of appreciation of their importance in the control of malaria. The RBM evaluation survey indicates that only 11.8% and 13.1% of the children under five years and pregnant women respectively slept under a mosquito net during the night preceding the survey; among those who slept under ITNs only 2.0% were children under five and only 2.3% were pregnant women (Lutalo, *et al*, 2001).

The HBM 2003 follow up survey shows that about 27% of the surveyed household had at least one mosquito net, with a marginal variation between HBM districts (28.8%) and non HBM districts (26%). This level of (at least one mosquito net) ownership shows progressive increase from 19.2% in 2001 (Wanyana *et al*, 2001) HBM baseline survey, and 13% level of ownership as revealed by UDHS 2000/2001. The percentage of mosquito net ownership is very high for Kumi district (61.2%) and Lira district (48.8%), while it is very low in Kanungu district (9.2%). Equally, the level of mosquito net ownership is high in urban areas (40.2%) when compared to rural areas (26.7%). However, ownership of ITNs in all the surveyed households is very low (5.0%) in both HBM and non HBM districts (Fapohunda, B.M *et al* 2004). Similarly, the percentage of under five children who slept under any mosquito net is very low (19%), and much lower for children under five who slept under ITNs (4.3%) with no variations between HBM and on HBM districts. A survey done by Kampala City Council (KCC, 2002) in five parishes among 400 households also indicates that about 45% of the households in study areas had at least one net, although average net ownership per household was 2. In the same study (KCC, 2002) only 11.5% of the households had at least one treated net, and only 47% of the households with at least one net had children sleeping under the mosquito net, although figures were higher (90%) for the households with more than one net.

The Net Mark (2001) study reported that net use is not consistent throughout the year with less than half of the survey respondents with nets using them year round and the others using the nets intermittently/seasonally. The nets were mainly used during and after the rains when the mosquitoes were numerous and when risk of malaria infection was high. In the same study adults above 40 years and children under five were sleeping under bed nets preferentially. The PSI tracking survey (2002-2003) also reported intermittent use of nets in the surveyed households. The PSI tracking survey indicates that only 21% (2002) and 29% (2003) of the rural population and slightly more than half

of the urban population who owned nets had slept under them the night preceding the interview survey, which indicates that not all people having nets in households are using them, all the time.

The AMREF (1996), Net Mark (2001A and B), DISH II (2002) and Okello (2001) studies conclude that for ITNs to be successfully introduced in Uganda there is need for large scale efforts to increase public awareness of the connection between mosquito bites and malaria and the preventive role of ITNs. Considerable change in consumer attitudes is needed if they are to pay market price for ITNs emphasizing that a single attack of severe malaria frequently costs much or more than one ITN might help to overcome the obstacle of perceived disproportionate financial burden of ITNs. The public health impact of the use of ITNs will only be realized if more and more people begin using them consistently and have them treated regularly. In order to facilitate this, distribution system for treatment and re-treatment of net needs to be introduced in all areas of the country.

4.5 Mosquito net use during pregnancy

As part of the Roll Back Malaria Initiative, Uganda seeks to have 60% of the children under five years and 60% of the pregnant women sleeping under ITNs by 2005 (MoH/MCP, 2003. Policy and Strategy for Insecticide Treated Nets). Reviewed research indicates, however, that the use of nets during pregnancy is very low. A baseline survey of ITNs in five districts of Uganda by Net Mark (2001) established that only 21% of the pregnant women in the total sample slept under a mosquito net and further, only 2% of the pregnant women in the total sample slept under a treated mosquito net (ITN) on the night prior to the study (Net Mark, 2001).

Mangeni (2003) in a qualitative study in Busia district also observed that while several of the respondents in focus group discussions knew about prevention of malaria using mosquito nets, very few mentioned that they or their pregnant spouses were using such nets for prevention of malaria in pregnancy. The PSI tracking survey (2002-2003) reported differences between rural and urban women indicating that in urban areas more pregnant women (46%) and children under five (30%) slept under ITNs compared to the rural 12% and 18% respectively

Another study conducted in Mubende district (Mufubenga *et al*, 2004) established that only 6.4% of the women interviewed reported to have used a mosquito net at one time during the current or recent pregnancy, with those using ITNs only 1.1%. In the same study, incidence of net re-treatment was also very low among net users. This study further reports that for some, net use during pregnancy was either initiated late or was irregular. While the majority started using the nets in the first three months of the pregnancy, 18% began in the second 3 months, and about 10% in the last three months of their pregnancy. Generally health education and quality of ANC services had influence on net use during pregnancy.

4.6 Reasons and attitudes for non use of nets or non ownership

In studies of bed net use, the major reason for not using nets was cost. Other cited reasons included the following:

- Ø Unavailability of nets in the community and lack of information about outlets selling nets.
- Ø Difficulty in hanging the net, little space in the house and poor sleeping conditions and positions.
- Ø Negative perceptions about nets such as: that mosquitoes still can bite through the net, dislike for the net among some household members, some households are resistant to malaria or not bothered by mosquitoes, sleeping under net is uncomfortable and causes heat while sleeping, sleeping under the net can cause suffocation to children (Okello, 2000; Rissa 2000; Net Mark 2001A, Collins, 2002; Kaliisa, 1997; DISH II, 2002; Njema *et al* 2003).

In a qualitative study conducted in Busia district, Mangeni (2003) reported that non use of nets was due to: lack of adaptability for various sleeping habits, a hindrance to sexual relations and alcoholism. This was further explained by respondents who indicated that young children's sleeping habits are unpredictable and difficult to control making the use of net with such children very difficult, i.e. 'children slept anyhow, throwing hands and feet left and right'. Nets were also said to be an inconvenience to proper and free sexual intercourse between spouses. Women respondents also observed that offensive habits of their husbands like alcoholism affect proper and consistent net use. Additionally, respondents felt that the nets were often difficult to move in and out of which caused problems for those who needed to attend sick children or maintain the security of livestock in the middle of the night.

The CMS survey (Okello, 2001) reports that about 50% of respondents found no problems with sleeping under nets with most of these from rural areas. However, 26% of respondents said sleeping under a net was too hot, 10% said nets do not allow enough air. Others mentioned problems like: mosquitoes still bite through the net, difficulty in getting out of net at night, and takes much time to tuck the net each night.

Collins' (2003) assessment on the use of ITNs also makes similar observations with cost being the main reason for non use, followed by availability factors. Several studies have also pointed out the important role health communication can do to improve peoples willingness to use ITNs. Collins (2003) observed that the baseline survey carried out in Kumi district 2002 pointed out significant knowledge gaps regarding outlets of ITNs in the district and none were aware of re-treatment services.

4.7 Perceived benefits and reasons of sleeping under nets

In studies conducted by AMREF (1996), Net mark (2001), and Okello (2001) respondents indicated several benefits of mosquito nets, including, preventing mosquito bites and preventing malaria. Other benefits mentioned were: to keep warm, comfort, avoid other insect bites, and avoid rats and snakes.

4.8 Source and cost of nets

Several of the studies reviewed have indicated that the majority of respondents who had nets purchased them from ordinary shops and open markets. A CMS study by Okello (2001) reported that 65% of the surveyed respondents obtained their nets from ordinary provisional stores/dukas, 19.1% from open market, 2.0% from health centers and 8.3% from other sources (Okello, 2001).

A study done by Kampala City Council (KCC, 2002) in five parishes also indicates that the dominant source of nets were the ordinary shops (57%), followed by hawkers (36%) and then other sources (7.0%). The Uganda ITN voucher pilot project study in Mbale and Mbarara district (Kilian, 2004) observed that before the project implementation community members obtained nets from general shops (48%), open market/hawkers (37%), drug shop/pharmacy (6%) and health facility (2%). The same pilot project study report observes that before the pilot project was implemented, only 19% of the shops had ever sold mosquito nets and only 11% were doing so at the time of the study. The proportion of shops selling nets remained low after the pilot with 15% of the shops in total selling nets, 1/26 in Mbale district and 7/28 in Mbarara district (Kilian, 2004). These findings seem to indicate that the voucher system project did not stimulate net sales beyond the project and the redemption of vouchers was generally low; 58.7% for Mbale district and 23.3% for Mbarara district, with several of purchased ITNs under the voucher system going to households which already had at least a net.

The average perceived appropriate cost price range is Shs: 4000-8000, although 30.7% of rural respondents suggest Ush 4000 and below. Perceived appropriate price for ITNs was Shs 5000 or less for most respondents. The Net Mark (2001A) and Kampala City Council (2002) surveys report that on average, households were paying as much as Ush 10,000 (USD 5.5) per net respectively. The Baseline survey carried out in Kumi district in 2002 reports an average price of Shs. 9000, although the preferred cost price respondents were willing to pay is USh: 5000 (Collins, 2002).

A study by Tekla Les (2003) on opportunities and obstacles for commercial expansion of ITNs in Uganda indicated a preferred average cost price of Ush; 5,000/=. A study done by Kampala City Council (KCC, 2002) in five parishes also indicates that the average cost price of nets was between SHS: 8,000 – 10,000=. The Net Mark (2001A) study indicates that most of the nets were obtained from the general shops, open markets and a few from vendors, textile shops and pharmacies.

4.9 Washing and Treatment of Nets

The review indicates that the majority of surveyed households in Mukono, Jinja and Arua districts which owned nets, washed their nets once a month (40%), 16.8% washed them

twice a month, 11.2% every two months, 6.2% every three months, and 25.9% washed their nets every week (Okello, 2001). This study and others indicates that nets tend to be washed more often than six times per year, an important consideration for ITN programs.

Generally, knowledge about treatment and re-treatment of nets is low throughout Uganda and very few treat or retreat their nets. The Net Mark (2001A) study only 29% of the households surveyed had heard about treating bed nets. Only 4.0% of the households owned a treated net. The Net Mark (2001A and B) studies have pointed out that few (12%) of the surveyed respondent's nets had been treated and for those that had been treated, respondents indicated on average that their nets were retreated twice a year. Reviewed research indicates that treatment and re-treatment of nets is very low for reasons ranging from cost factors, to lack of knowledge about the need for re-treatment, availability of treatment and re-treatment chemicals and sundries, lack of knowledge about outlets providing such services, prohibitive distances to such outlets and negative perceptions about using treated nets (Net Mark, 2001; AMREF, 1996; Collins, 2002).

Reviewed research reports indicate that for those who did treat their nets, net treatment solution or tablets were typically obtained mainly from community projects, followed by clinics, general shops and pharmacies The Net Mark (2001B) qualitative study indicates that several traders had never heard about treating bed nets and that there were no traders in the study sites selling bed net treatment solutions. Therefore, promoting the use of treated nets still requires strengthening communication messages about the need for such a practice.

4.10 Preferences for net shapes and colour

The CMS survey reports that a rectangular shaped net was preferred by most respondents as compared to conical and triangular shapes, while most popular colour was white (Okello 2001). The AMREF (1996) study indicated slightly higher preference for square nets (52.3%) as compared to round nets (40.7%) because to the respondents, square nets were easy to hang and covered the bed better, while round nets were easy to hang. There was also a higher preference for white nets because they were bright and more beautiful, even though respondents indicated dark colored nets were less likely to show dirt. Similar preferences have been reported by other studies like Net Mark (2001 A and B) where in addition consumers preferred large double bed size nets and light colors.

4.11 Indoor residual spraying (IRS) for malaria vector control

There is little researched data on the use of Indoor Residual Spraying (IRS), community attitudes and perceptions of IRS as a vector control practice in Uganda even though IRS is one of the vector control methods emphasized in the National Malaria Control Program (NMCP). The use of IRS has largely been under emphasized in many local government programs on malaria control. Where IRS is being applied, it is largely limited to major health and educational institutions where large numbers of people sleep in wards or dormitories.

IRS is considered to be a cost effective public health intervention given its ability to protect a large number of people for the relatively low cost of spraying. Some districts such as Kumi, Bugiri and Tororo among others are reported to be using this strategy for malaria control in selected institutions and through the commercial sector. (Collin, 2003; Batega, 2003A). However, the little available research indicates that coverage levels for use of IRS are extremely low and only in initial stages of development.

A study of the decentralization of malaria control activities in Bugiri and Tororo district (Batega 2003A) reports that the use of IRS was very low in both districts with coverage less than 0.1% of total households in the district. The primary reason indicated for low use of IRS was cost (estimated at Shs. 20,000 per house); lack of information on availability of IRS in district; and lack of adequate and trained manpower in public and private sector to offer the same service (Batega, 2003A). The same study further notes that there was very limited collaboration between the public and private sector in the provision of IRS in Tororo district, while none of such collaboration existed in Bugiri district.

4.12 Challenges to the promotion and use of mosquito control methods

4.12.1 Challenges to the promotion and use ITNs

Kalisa (1997) notes that general poverty and sleeping conditions do not permit the acquisition and consistent use of nets. Sleeping arrangements and conditions do not make the use of nets favorable to households where most members sleep on the floor, especially mud floors. Several other studies (Collins, 2003; Okello, 2001, Net Mark, 2001, DISH II, 2002) have pointed out high cost as a major challenge to the sustainable promotion and marketing of use of ITNs.

Malaria Consortium East Africa (MCEA, 2003) has reported that the nature and quality of health service at health facilities is essential in influencing attitude changes among consumers and promoting positive behavior change for malaria prevention. Observations made at Bobi Health Centre III in Gulu district show that promotion of client friendly services and disciplining health providers known to be rude to clients led to an increase in number of pregnant women attending ANC services, and eventually uptake of IPT and ITNs.

Tekla (2003) has identified several obstacles to the expansions of commercial market strategies for ITNs in Uganda mainly due to limited or low purchasing power of community members due to general poverty in most areas. Additionally, retailers also present a barrier as some retailers interviewed in this study observed that there were limited profits to be realized from the sale of nets, and 70% of the surveyed retailers observed that they did not know where to get regular net or ITN suppliers even if they had wanted to sell them.

In Tekla's study (2003), some of the retailers indicated having experienced a failed net market and had opted out of business especially in areas where ITNs were being sold

from health centers at subsidized fees. Some retailers have borne the brunt of disgruntled communities who perceive retail prices as overly inflated once subsidized prices have been introduced.

Studies also indicate that commercial marketing of ITNs is being compromised by low turnover and low capital among the rural or peripheral dealers are able to afford only small quantities of nets at anyone time. Some of the peripheral traders pointed out that sale of nets were seasonal and this discouraged them. Some of the retailers in this study also observed that the net procurement price was unpredictable due to inconsistent supplier pricing and conflicting radio announcements about the purchase prices.

These findings point to gaps that need to be addressed in order to scale up access and use of ITNs for malaria prevention through increased access to information on ITNs distributors, building the capital base of rural retailers, establishing consistent supplier pricing, harmonizing commercial marketing with subsidized distribution of ITNs, and improving delivery of ITNs to rural points.

Challenges to Malaria Prevention and Control in Uganda

The following sub-section summarizes challenges to malaria prevention and control highlighted in the reviewed research, particularly as it is influenced by knowledge, attitude and behaviours at the community level.

4.12.2 Challenges to subsidized nets distribution

Despite frequent radio advertisements and community sensitization efforts regarding malaria and bed nets, some subsidized net distribution programs do not reach the intended beneficiaries. Several of the community beneficiaries did not know about the scheme. This may point to the need for more emphasis on interpersonal channels of communication. (Collins, 2003)

Some research has also indicated that subsidized ITN programs face several obstacles including:

- Program staff distributing disproportionate numbers of nets to friends and family
- Unclear method of sustaining ITN subsidies
- Many pregnant mothers buy the net much later during pregnancy and some keep the net for the newborn, thereby receiving little benefit for the control of malaria in pregnancy outcome (Collins, 2003).
- For some of the ITNs subsidized programs, the redemption rates were too low (Kilian, 2004)

4.12.3 Challenges to net treatment and re-treatment services

- The price of net treatment at an average 1,000/= seems to remain beyond the affordability of many villagers (Collins, 2003).
- Access to treatment services is still limited due to knowledge about the service, service outlets and distance to treatment points.
- Private agents and dealers are reluctant to take on the task of commercial treating of nets themselves due to anticipated low turnovers, and negative perceptions about treatment chemicals.
- Lack of knowledge and understanding of the rationale for treating mosquito nets with insecticide by community members

4.12.4 Challenges to indoor residual spraying

- Expectations for IRS in institutions were high but practical experience the among health workers was low.
- Experience from a similar project in Kumi district shows that cost recovery was a slow procedure taking up human resources and transport (Collins, 2003).
- Lack of adequate training and practical guidance and supervision compromises the outcome of IRS. In Kumi district, Collins (2003) reported that buildings to be sprayed were not adequately prepared, occupants of some buildings were not given adequate warning (food stuffs, personal belongings were left around uncovered) instances.
- Sustainability remains a problem if demand for IRS is not high enough and district capacity remains low (Collins, 2003; Batega, 2003A).

5.0 Opportunities for Additional Research

While considerable research of prevailing knowledge, attitudes and practices regarding malaria prevention and control has been conducted throughout Uganda, several gaps in available research were identified during this literature review process. While epidemic preparedness was not included in this literature review, there is limited research regarding the level of community participation in epidemic preparedness and response. Additionally, there remains a considerable gap in understanding of the motivating factors for preventive action and treatment of malaria. Generally, very little is known about the uptake of the new and recently revised malaria drug policy and community members' knowledge and uptake of the MoHs recommended first line anti-malarial combination therapy and factors influencing adherence to dosage recommendations.

Specifically, identified gaps are summarized below for each of the key focal areas of malaria prevention and control:

5.1 Case Management Research Gaps:

- 1) What motivates people who complete a full course of the appropriate treatment to do so?

- 2) What are people's general understanding of combination therapy and its importance?
- 3) What are people's outcome expectations (positive and negative) concerning taking SP and Chloroquine together (E.g. social outcomes, physical outcomes, personal outcomes)?
- 4) How capable do people feel about taking the correct treatment for the correct amount of time, at the correct time (self-efficacy)?
- 5) How effective is SP and CQ **combination** considered to be by service providers? By parents and other adults? How safe? What is the definition of 'too strong' for adults, for young children?
- 6) What do people understand about drug resistance?

5.2 Malaria in pregnancy:

- 1) What motivates women who correctly complete IPT to do so?
- 2) What are men's and women's outcome expectations concerning IPT? Malaria during pregnancy?
- 3) What are men's and women's perceptions and beliefs about the effectiveness of IPT and ITN use during pregnancy?
- 4) What social barriers exist for women to take IPT?
- 5) What motivates women to take IPT as prevention vs. treatment?
- 6) How capable do women feel they are to prevent malaria during pregnancy (level of self efficacy)?
- 7) What are the social, personal, and environmental/physical barriers experienced by women to the use of ITNs and IPT during pregnancy?

5.3 ITN use:

- 1) We know quite a bit about the barriers and rewards associated with net use. However, we know little about ITNs/LLITNs. What are the barriers and rewards associated with ITN/LLITNs use and re-treatment?
- 2) What are people's perception concerning the need to treat mosquito nets with insecticides? Do they think the insecticide is effective? Safe? Necessary?
- 3) What are the physical/material, social and personal barriers to treating nets with insecticides?
- 4) How capable to men and women feel to treat nets with insecticides?
- 5) Among those who sleep under ITNs, what prompts them to do so? What motivates them? How do they feel they have benefited?
- 6) Among those who retreat their nets, what prompts them to do so?
- 7) What do people know about re-treatment?
- 8) What are people's beliefs concerning mosquito biting behavior? Are they aware that malaria mosquitoes bite primarily at night and indoor? (DB feels this is known)

5.4 IRS:

- 1) What are peoples' perceptions of IRS? It's safety? Effectiveness?
- 2) What advantages do people see to IRS? What disadvantages?

5.5 Malaria in general:

- 1) What do people think is the best way to prevent malaria? Why is this method(s) considered the best?

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