RECOGNITION OF MALARIA, TREATMENT SEEKING BEHAVIOUR AND PERCEPTION OF THE CAUSES AND EFFECTS OF MALARIA AMONG WOMEN ATTENDING ANTENATAL CLINIC IN MUDZI DISTRICT IN ZIMBABWE.

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Submitted to the School of Public Health and Family Medicine in partial fulfilment of the requirements for the award of a Master of Public Health degree

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DECLARATION

I, Mercy Kamupira, hereby declare that the work on this dissertation is based on my original research and has not, in whole or in part, been submitted towards another degree, at this university or elsewhere. The university is empowered to reproduce either the whole or any portion of the contents for the purposes of research.

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ABSTRACT

Introduction

Malaria is an important public health problem with a high morbidity and mortality in more than 90 malaria endemic countries in the world. The burden of malaria is quite high especially among pregnant women and children under five years of age. There has been little focus on the factors that influence women's responses to malaria control strategies. It is important to establish whether the control measures, health education and the treatment options are available to and utilised by women. They are the caretakers of young children who are particularly vulnerable to severe malaria, and in need of prompt response to the illness, while women themselves are at great risk of severe anaemia and other complications during pregnancy. The purpose of the study is to better understand the role of women in the control and management of malaria at the household level, particularly with respect to women's awareness of transmission, prophylaxis, symptoms, complications, treatment and control of the disease and to provide recommendations to make malaria control programs more gender sensitive and therefore more effective.

Objectives

The overall objective of the study was to assess women's knowledge, practices and beliefs regarding malaria and how these affect their response to malaria. Specific objectives include the determination of women's knowledge of the causes of malaria, its spread and methods of malaria control. In addition, this study seeks to establish women's awareness of malaria symptoms and complications and the usual care of suspected malaria cases as perceived by women, including self-treatment and the use

of health services. Finally, sources of information and teaching methods on malaria available to and utilised by women and the barriers to successful malaria control as perceived by women will be explored.

Study design

The initial study was an exploratory qualitative study. This was followed by a descriptive cross-sectional study. The study population included women between the ages of 18 and 49 years attending antenatal clinic at Kotwa District Hospital, Mudzi District in Zimbabwe. Interviews were done to 170 consecutive women attending antenatal clinic from the 17th December 2003 to 14 January 2004.

Results

The study indicates that among pregnant women attending antenatal clinic at a rural district hospital in an area that is endemic for malaria in Zimbabwe, the majority consider malaria as a worrying health problem in their area. However most women do not consider it their responsibility to prevent malaria with only a third (34%) acknowledging that the whole community should be responsible for preventing malaria. Although 87% of the women were aware of ways of preventing malaria only 49% said they were actively using some method to prevent their household from malaria. The women's level of education was the significant predictor of knowledge of prevention methods, current use of prevention tools, and knowledge about prophylaxis.

The most frequently cited reason why the women were not protecting their households was lack of money (57%). All the women were aware of some signs and

symptoms of malaria with fever and headache being the most frequently mentioned symptoms. Over 70% of the women knew that pregnant women could get malaria but only 24% of these were aware of the increased susceptibility of malaria in pregnancy.

Regarding the home care of suspected malaria cases, the most frequent treatment was tepid sponging (46%). 46% of the respondents had used homemade remedies for fever, however, 1% of the women said they used traditional medicines to treat malaria. 28% kept anti-malarials at home and of these only a third knew the right dose. A majority of the women had heard about chloroquine holders in the community and 39% of the women had visited them to consult and get medication. Most women (68%) said they heard information about malaria from health workers and the main message was on prevention. Most women said they wanted to know more about the treatment of malaria and would like to get this information from health workers.

Conclusion

Women play a critical role in the prevention and management of malaria in their households. The study highlighted the women's knowledge about malaria, their treatment-seeking behaviour as well as the factors that prevent them from fully implementing the recommended malaria prevention measures. This information is valuable to malaria control programmes as it highlights the areas that need special attention in order to make malaria control programmes more acceptable and accessible to women and to the community as a whole.

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ABBREVIATIONS

ANC Antenatal clinic

BRTI Biomedical Research and Training Institute

CDC Centers for Disease Control

DMO District medical officer

HIV Human immunodeficiency virus

IPT Intermittent preventive therapy

ITN Insecticide treated nets

KAP Knowledge, attitude and practices

MMR Maternal mortality rate

NGO Non- Governmental Organisation

RBM Roll Back Malaria

SAMC Southern Africa Malaria Control

WHO World Health Organisation

ZNHP Zimbabwe National Health Profile

Chapter 1: Literature Review, Study Purpose and Objectives

1.1. Problem statement

Malaria is an important public health problem with a high morbidity and mortality in more than 90 malaria endemic countries in the world. Despite widespread drug and non-drug interventions against malaria in malaria endemic areas, many countries in the world are still battling to control malaria. In addition, despite efforts over the years, no efficient vaccine has been found, and until there is a safe and effective vaccine, the primary approach taken will be that of application of control measures (Agyepong et al. 1995). Malaria control programmes emphasise early diagnosis and treatment, vector control and antenatal prevention and treatment of malaria.

The 1986 Ottawa Charter for Health Promotion highlighted the role of strengthening community participation in the setting of priorities, making decisions, planning strategies and implementing them for the achievement of better health in a community (Coulson et al. 1998). Malaria control programmes should therefore be more effective if they involve the community. Within the community itself, it is argued that if women are educated about the signs and symptoms of malaria and informed about the available services, they have great potential as family health promoters as they are the caregivers. However, women's ability to participate in interventions is affected by their acceptance of the interventions, their understanding of the illness and vector behaviours as well as other social, economic and cultural factors. Up to now there has been little focus on the factors that influence women's responses to malaria control strategies.

The burden of malaria is especially high among pregnant women and children under five years of age. It is important to establish whether malaria control measures, health education and the treatment options are available to and utilised by women. They are the caretakers of young children who are particularly vulnerable to severe malaria, and in need of prompt response to the illness, while women themselves are at great risk of severe anaemia and other complications during pregnancy. It is therefore important to assess women's current knowledge, attitudes and practices regarding malaria.

1.2. Background to study

1.2.1 The Global Malaria Epidemic

Malaria is one of the most important tropical diseases and has had a great impact on the health, social and economic development of populations (Taylor & Strickland, 2000; Hanson et al. 2004; Centers for Disease Control (CDC), 2004). Malaria transmission occurs in about one hundred countries in Africa, Asia, Latin America and the Caribbean and Pacific islands (Taylor & Strickland, 2000). About 2.4 billion people inhabit these countries, which is about 40% of the world's population (WHO, 2002a). Each year there are 300 to 500 million cases of malaria and an estimated one million deaths mostly in African children under the age of five years (WHO, 2002a; White, 2003). 40% of all fevers in the last two decades were due to malaria (Amazigo, 2003). The annual burden of disease measured in disability-adjusted life years lost is 44 million (WHO, 2002a).

1.2.2 Causes of Malaria

The disease is caused by protozoan parasites of the genus plasmodium with four distinct species that infect humans namely: *P. falciparum, P. vivax, P. ovale and P. malariae* (White, 2003). These plasmodium species have a life cycle that involves a vertebrate host and an arthropod vector and they have different life cycles and clinical manifestations. The vector is various species of the female Anopheles mosquito. There are about 400 species of the Anopheles mosquito and 45 of these are important in the transmission of malaria (White, 2003). The vectors have varying behaviours and ability to transmit the disease.

The transmission of malaria is determined by the density of the vector, the number of mosquito bites in man and the life span of the mosquito (White, 2003). *Anopheles gambiae*, which is one of the most prevalent vectors in Sub Saharan Africa occurs in high densities, lives for a long time and bites humans frequently thus making it a very effective vector (White, 2003). Transmission occurs at altitudes less than 2000 metres, at temperatures between 20 and 30 degrees Celsius and at a mean relative humidity of at least 60% (Taylor & Strickland, 2000). No transmission occurs at temperatures less than $16^{O}C$ or greater than $33^{O}C$ because the sporogony (parasite development in the infected mosquito) stage cannot occur at these temperatures (Taylor & Strickland, 2000). The number of secondary cases resulting from a primary case is not known precisely but is thought to be fewer than ten (White, 2003).

1.2.3. Malaria epidemiology

The percentage of children between the ages of 2 and 9 years with an enlarged spleen (spleen rate) reflects the endemicity of malaria. The spectrum varies from

hypoendemic (parasite rate between 0-10%), mesoendemic (10%-50%), hyperendemic (50%-75%) and holoendemic (>75%) (White, 2003). Much of tropical Africa is holoendemic or hyperendemic for *P. falciparum* with people getting repeated infections in their lifetime (ibid). Malaria epidemiology can be described as either stable or unstable (ibid). Stable malaria occurs in regions with a high malaria transmission. Because of premunition, in these areas adults do not develop severe malaria and if they do get malaria, it is not life threatening (White, 2003). In these areas the main clinical effect is severe anaemia in children aged 1-3 years. Unstable malaria on the other hand, occurs in areas where the transmission rate is low, erratic, seasonal and focal (White, 2003). In these areas inhabitants do not develop a state of premunition and all age groups can develop malaria and severe and cerebral malaria are common (White, 2003).

Malaria epidemics can also occur. These epidemics are usually because of changes in the behaviour of humans or ecological changes. Human behaviour changes include migration and resettlement. Ecological changes include natural disasters or dam building projects with irrigation. These changes can result in increase in susceptible hosts or introduction of new vectors (White, 2003).

1.2.4. Clinical features of malaria

The clinical features vary according to the plasmodium species that is causing the disease. Common symptoms are headache, fever, chills, joint pains and generalized body weakness. Signs that can occur are; jaundice, hepatomegaly, splenomegaly and altered level of consciousness. *P. falciparum* is the most lethal species owing to its marked invasiveness and rapid multiplication.

1.2.5 Susceptibility to malaria

In human beings, age and gender determine the susceptibility to malaria (WHO, 2002a).

1.2.5.1 Age as a determinant of susceptibility to malaria

Over 90% of the malaria disease burden is in Sub Saharan Africa, causing 10-80% of childhood fevers and 10-30% of infant deaths in this region (Howson et al. 1996). Children and infants are more susceptible to malaria in high transmission regions than adults (White, 2003; Centers for Disease Control (CDC), 2004). A child who survives malaria death in childhood develops a state of premunition, which is a form of immunity that controls the magnitude of the infection but does not prevent the infection from occurring (White, 2003). In adults, pregnant women are at high risk. In pregnant women the risk is determined by parity and maternal immune status (Howson et al. 1996). Primigravid women have a higher risk of recrudescence of pre-existing malaria infection and placental infection with subsequent low birth weight babies (Howson et al. 1996). Studies have shown that HIV infection impairs antimalarial immunity. The impairment is greatest in the most immunosuppressed women and this could explain the increased susceptibility to malaria seen in pregnant women with HIV infection (Mount, et al. 2004)

1.2.5.2 Gender as a determinant of susceptibility to malaria

Few studies on malaria present data disaggregated by gender and those that do, concentrate more on the reproductive effects of malaria (Howson et al. 1996). Between the ages of 1 to 4 years there appears to be no difference in parasite density and disease prevalence between male and female children (Howson et al. 1996). In early childhood, females have a relative advantage in parasite clearance but this

disappears with the onset of the reproductive years owing to the parasite's evasion of the host immunity or depressed cell-mediated immunity during pregnancy (Howson et al. 1996). Malaria has the greatest impact on pregnancy in areas of unstable and epidemic transmission because adult females in these areas do not have a significant level of immunity and are therefore at risk of spontaneous abortions, premature delivery, stillbirths and death due to the complications of these (WHO, 2002b; Nahlen, 2000). In areas of stable transmission women might be semi-immune but are still at risk of severe anaemia with asymptomatic infections (WHO, 2002b).

The bulk of the malaria burden is in Sub Saharan Africa. More than 30 million African women become pregnant in malaria endemic areas each year. About 23% of the maternal deaths in Africa can be attributed to malaria in hospital studies and the proportion in community studies is 18% (Brabin & Verhoeff, 2002). The World Health Organization (WHO) 20th Expert Committee recommends the commencement of prophylactic treatment at the onset of quickening in the second trimester (WHO, 2002b). The drug used should be efficacious, preferably taken as a single dose and should be safe in pregnancy (WHO, 2002b). The recommended drug is the pyrimethamine-sulfadoxine combination under observation at the antenatal care clinic (ANC) and at the full curative dose. This should be taken at least twice during pregnancy at intervals of one month apart (WHO, 2002b). This intervention is termed intermittent preventive therapy (IPT).

In a cohort study that was done in Kenya (Van Eijk et al. 2004), it was shown that the use of intermittent preventive therapy resulted in a reduction in placental malaria. The prevalence of placental malaria was reduced in women who had used intermittent

preventive therapy and the birth weight was increased in a dose dependent manner. One dose of intermittent preventive therapy was associated with an adjusted mean increase in birth weight of 54g (95% confidence interval (CI) 12-120g; p = 0.11) and two or more doses with an adjusted mean increase of 128g (95% CI 42-213g; p = 0.004) compared with the birth weights of infants of mothers who were not on intermittent preventive therapy. These benefits have been noted even in settings with a high human immunodeficiency (HIV) infection rate.

Although the aetiology of anaemia in pregnancy is multi-factorial with malaria, hookworm and iron deficiency being common causes, there is still a strong association between malarial infection of the placenta or peripheral blood and haemoglobin levels. This confirms that malaria is still a major cause of anaemia even when other factors are present (Cot & Deleron, 2003). Malaria prophylaxis taken during pregnancy not only protects the mother but the unborn child. In a study done by Merchant et al (2004), 507 pregnant women were recruited into the study in the rural Kilombero valley of Tanzania where there is intense perennial malaria and therefore high prevalence of maternal anaemia during pregnancy. The mortality rate of infants born to women with severe anaemia pregnancy (Hb <8g/dl) was three times that of women who did not have severe anaemia in pregnancy (Hazard Ratio = 3.1, 95% CI 1.1-9.1; p=0.04)

The following table shows how the risk of exposure to the vector and hence the risk of malaria varies through out the life of a woman (Howson et al. 1996).

Table 1: Risk of malaria in the life of a woman

Age	Stable transmission region	Unstable transmission region	Risk of exposure to vector
Below 5 years	Congenital malaria, low birth weight, increased risk of neonatal death, and death below the age of 5 years	Congenital malaria, low birth weight, increased risk of neonatal death, and death below the age of 5 years	In utero transmission; bites from the mosquito in the absence of preventive measures like bed nets
5-18 years	Develop premunition, get repeated non fatal infections	Premunition not developed, get infrequent but often severe and fatal infections	Bites from the mosquito in the absence of preventive measures
Above 18 years	Child bearing age, risk of severe anaemia during pregnancy if no prophylaxis is taken, resulting in maternal morbidity and adverse foetal out comes	Risk of severe malaria during pregnancy, maternal mortality and morbidity and adverse foetal outcomes	Exposure to the vector in fields, bites from the mosquito in the absence of preventive measures like bed nets

1.2.6 Malaria Control

Understanding human behaviour and vector behaviour is integral to the control of malaria. The prevention and control of malaria involve the reduction of the contact between the vector and the human being. This can be done in various ways described by Taylor and Strickland (2000).

1. Mosquito breeding can be prevented or reduced by water level management such as drainage and elimination of water collections. This regulation is important because mosquitoes cannot fly more than 4 kilometres and usually remain within 2 kilometres of their breeding site.
2. Mosquito larvae can be destroyed using larvicides, larvicidal oil, larvivorous fish and decreasing the salinity of the water.

3. The adult mosquito can be destroyed using insecticide indoor residual sprays, which were a major advance in malaria control.
4. Measures can be put in place to prevent mosquitoes feeding on humans using bed nets impregnated with insecticides and insect repellents, protective clothing and insect repellents applied to the skin.
5. Early diagnosis and treatment of malaria cases help to eliminate the parasite from the human host.
6. Susceptible hosts can be protected by chemoprophylaxis.

All the above measures have been widely applied in malaria endemic areas but despite this, malaria is widely distributed. There are several possible reasons for this. First, there is failure to effectively reduce vector and human contact because of inadequate clearance of mosquito breeding sites. Second, there is inadequate coverage with insecticide-treated bed nets and with drugs for treatment and for chemoprophylaxis (WHO, 2002a). This inadequate coverage is a result of two main factors: affordability of the control tools and inadequate information among the recipients of these services. Last, there is the development of drug resistance and resistance to the insecticides (WHO, 2002a).

In addition to the above, despite the known effects of malaria in pregnancy, malaria control during pregnancy has not been very successful. The reasons are unclear (Nahlen, 2000). The possible reasons are: lack of good co-ordination between antenatal care and malaria control programs, lack of compliance and chloroquine resistance (WHO, 2002b). The African Summit on Roll Back Malaria in 2000 in Abuja came up with a goal of 60% coverage of pregnancies at risk of malaria by the

available control tools by the year 2005 (WHO, 2002b). They recommended three strategies to be implemented in malaria endemic areas. These are intermittent preventive therapy (IPT), insecticide-treated nets (ITN) and case management of malaria illness. This is supposed to be a clinic-based approach since 70% of pregnant African women attend antenatal clinic at least once during their pregnancy (WHO, 2002b).

1.2.7 Malaria control and gender

The WHO launched a new global initiative on 13 March 1998 known as Roll Back Malaria (RBM). This aims to reduce malaria deaths by 50% by the year 2010 mainly through control measures and early diagnosis and prompt treatment of malaria (Amazigo, 2003). Many malaria control programmes concentrate on the role of women in preventing antenatal transmission of malaria and fail to recognise their role beyond this reproductive one. Studies have shown that 80% of malaria cases are treated at home, mostly by women (Amazigo, 2003). For example, a study done by Njama et al (2003) in an urban slum in Uganda showed that 89% (n=307) of the primary caregivers of children were mothers, 7% were grandmothers and 4% were fathers and other relatives. This has implications for malaria control. Community participation in the control of malaria will only be effective if women are involved because they are the caretakers of young children, and in a family setting are usually the ones who take care of the sick family members. However, women face barriers to treatment, such as cost and access to health facilities.

In order to develop effective malaria control programs it is therefore essential to consider gender differences and inequities before implementation. Gender can be

defined as socially constructed differences between men and women, which vary over space and time and are reflected in different duties and entitlements (Hoffman, de Pinho & Cooper, 1998). Every society in the world assigns gender roles to men and women. Gender is important because it determines the structure of everyday life; the nature of risks people are exposed to, the availability of resources, particularly financial, and the quality of health care sought (Doyal, 2001).

The effects of malaria go beyond the female sufferer and include spontaneous abortions, low birth weight due to intra-uterine growth retardation and pre-term delivery, stillbirths and neonatal deaths (Amazigo, 2003). Malaria, like most tropical diseases is associated with poverty because poor people cannot purchase bed nets and might not be able to afford prophylactic measures. World Bank statistics have shown that 70% of the world's poor are women. (World Bank, 1993). The converse is also true in that malaria causes poverty through the expense of treatment. This makes it important to consider the role and the needs of women in health promotion in the control of infectious diseases (WHO, 2002b).

Exposure to the vector is linked to the different roles of women and men. In most countries men migrate to the cities to look for employment opportunities in industry (Amazigo, 2003). This leaves women solely responsible for the production of food in the fields. In Africa women perform about 60-80% of all agricultural labour, making them important contributors to food security and nutrition but adversely increasing their exposure to the vector.

Although women play an important caregiver role within their families and in society as a whole and are usually the first to notice ill health in a child, they may suffer from lack of access to resources, as the male remains the dominant figure in decision-making. Even in situations whereby the husband is away, the women may have to consult other male members of the family. Gender also determines access to information, time constraints and whether modern or traditional care is sought (Doyal, 2001).

Understanding gender is now accepted as important in the control of infectious diseases (Vlasoff, 1997). The World Health Organization, Tropical Disease Research and the Social Economic Research in 1989 recommended the undertaking of research projects in the biomedical and social aspects of tropical diseases in women (Kaur, 1997). Malaria was one of the six diseases identified in addition to leprosy, leishmaniasis, filariasis, Chaga's disease and schistosomiasis (Kaur, 1997).

1.2.8 Malaria in Zimbabwe

Zimbabwe is a low-income country situated in southern Africa (Southern Africa Malaria Control, 1998). It is a landlocked country with Zambia in the north and northeast, South Africa in the south, Mozambique in the east and Botswana in the west (see figure 1). It has a subtropical climate with cool dry winters and hot wet summers. The total population is about 12.6 million with an annual growth rate of 1.9% (United Nations, 2001). 45% of the population is under 15 years of age and 27.9% are women between 15 and 49 years (United Nations, 2001). 85% of Zimbabweans have access to formal health care (Southern Africa Malaria Control,

1998). The adult literacy rate is 85% with the rate for males being higher than that for females (Zimbabwe National Health Profile (ZNHP) 1998, 2000).

50% of the population live in malarious areas where the main vector is *Anopheles Arabiensis* (Southern Africa Malaria Control, 1998). The type of malaria transmission in Zimbabwe varies between malaria free zones, unstable and stable zones. Peak malaria transmission time is between December and April (Southern Africa Malaria Control, 1998). Malaria accounts for 11.3% of all outpatients department conditions second to acute respiratory tract infections, which account for 26.8% (ZNHP 1998, 2000). Among inpatients, 12.8% of all patients are malaria cases. Malaria accounts for 11% of all deaths, third to pulmonary tuberculosis and acute respiratory infections. 8.3% of all inpatient days are due to malaria and each case has an average hospital stay of 2.9 days. Malaria is the major cause of maternal deaths, constituting about 16.7% of all maternal deaths in Zimbabwe (ZNHP 1998, 2000).

Zimbabwe has established a national malaria database. Statistics from Roll Back Malaria in Southern Africa (2002) have shown that 64.5% of under fives in Zimbabwe receive treatment within twenty-four hours of onset of malaria symptoms. In 2000, 81.9% of women were receiving chemoprophylaxis during pregnancy (Roll Back Malaria (RBM) in Southern Africa, 2002). The drug commonly used was chloroquine. 56.3% of all households in malarious areas were sprayed and 60% had some form of prevention measures such as mosquito nets, indoor residual spraying and screens (RBM in Southern Africa, 2002). However, despite these measures, the incidence of malaria has increased from 71.5/1000 in 1994 to 139/1000 in 1998 (ZNHP 1998, 2000). There are several possible reasons for this increase such as poor

quality of care, poor treatment seeking behaviour, drug resistance and possibly the changing epidemiology of other infections, particularly HIV (RBM in Southern Africa, 2002).

In 1998 WHO formed a new initiative that aimed to strengthen the already existing malaria programmes, Roll Back Malaria (RBM). It was suggested that for the RBM initiative to be successful, malaria control delivery systems needed to be strengthened at the district level. Countries were advised to take a step-wise approach to RBM and focus on a number of front-runner districts for the first two to three years of implementation and then once these had been strengthened and outcomes or impact had been achieved, to expand to other districts. In Zimbabwe implementation has begun and ten districts have been chosen to be the RBM districts, based on malaria prevalence (see figure 2). Mudzi District is one of these RBM districts.

1.2.9. Description of study community

This study was done at Kotwa District Hospital in Mudzi District (see figure 3), which is one of the RBM districts in Zimbabwe. The district population estimates based on the 2002 preliminary census results are shown in table 2 below.

Mudzi district is in the Mashonaland East province. Shona people whose main dialect is Zezuru inhabit it. There are minorities with other dialects such as Tonga. Mudzi is an area of mixed religion with Christianity dominating. The district lies in farming region five, which is a hot and dry region, with little rainfall received in the wet season December to April. There are four major rivers in the area, namely, the Mudzi

River, Nyadire River, Mazowe River and a river along the Nyamapanda-Mozambique border. There are no wetlands or artificial lakes in the district.

Table 2: Mudzi District population statistics[1]

Category (years)	Estimate	%
<1	4 615	3.5%
1-4	16 867	12.9%
5-9	24 430	19.0%
10-14	22 048	17.0%
Women 15-49 years	29 703	22.0%
Total <15	67 960	52.1%
Total 15+	62 554	47.9%
Total district population	**130 314**	**100.0%**

There are few civil servants in the district. The majority of the populations are subsistence farmers and illegal gold panners. The main crops grown in the area are maize, cotton and groundnuts. Most men in the district are involved in gold panning and the women mainly do household chores and subsistence farming. To the north east of the district is Mozambique. Some residents of the district migrate to Mozambique to look for employment or to buy and sell. There are also some people who migrate into the district from other areas mainly for gold panning.

[1] The 2002 preliminary census results were obtained from the District Information Statistics.

Africa- (Zimbabwe highlighted)

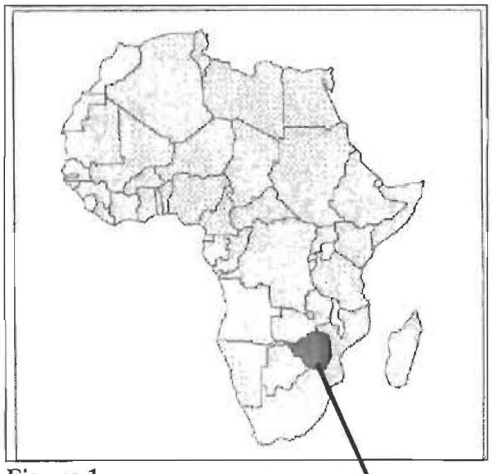

Figure 1

Malaria Top 20 Districts 1998(ZNHP, 1998)[2]

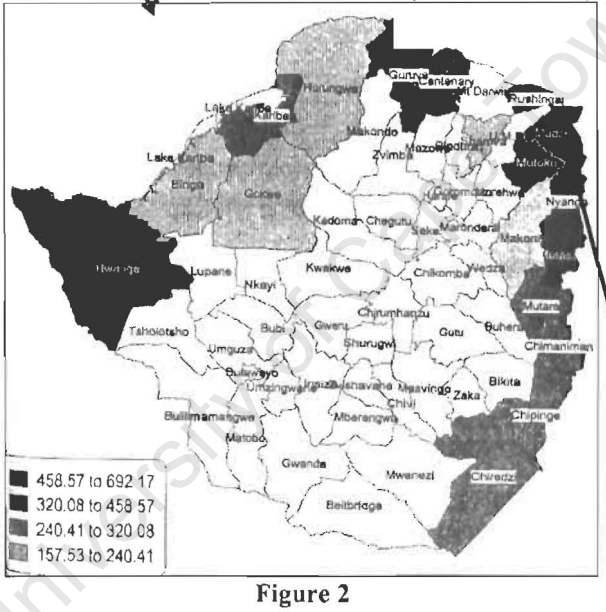

Figure 2

Mudzi District (ZNHP, 1998)

Figure 3

[2] Malaria Top 20 Districts from the Zimbabwe National Health Profile, 1998. The information is provided as incidence of malaria per 1000 people in the district.

Regarding health infrastructure, there are 20 functional rural heath centres in the district and one district hospital. Of the 20 that are functional, 7 are government run, 3 are mission run, and the rural district council runs ten. There is a serious shortage of staff in the district; as a result trained nurses staff only 6 of the 20 health centres. The others are run by nurse aids. Other non governmental organisations working in the area involved in health or health related activities include World Vision, which is working in 6 wards in the district and cares for AIDS patients by providing drugs for opportunistic infections. Population Services International runs a sexually transmitted infections (STIs) clinic called 'Corridors of Hope' at a rural Health centre at the Zimbabwe-Mozambique border at Nyamapanda. The rural heath centre is open daily and on Mondays, Wednesdays and Fridays is open between 6 and 10 pm for the treatment of STIs, targeted mainly at truck drivers. There is one pharmacy in the district and several trade stores.

Malaria occurs throughout the year in the district with a peak between December and April. The population of the entire district is affected by malaria although there are some more severely affected areas. Malaria is the most common health problem in the district. About a third (33.58%) of all the deaths (90/268) that occurred at the hospital in 2002 were due to malaria[3].

[3] The hospital clerk compiled the 2002 causes of death from the T9 forms.

The district is currently employing several strategies to prevent malaria[4]. These are listed below:

1. There is indoor residual spraying in targeted areas. The chosen areas depend on the previous year's incidence of malaria. The aim is to achieve 95% coverage of these areas.
2. Insecticide-treated nets are provided to children under five years of age and pregnant women. The target is 50% coverage of all pregnant women and 20% coverage of the under fives. WHO has supplied 1000 insecticide-treated nets to the district. These nets are distributed to the health centres and are being sold for Z$5000 to pregnant women and parents of children under five. The demand for the subsidised nets is very high because the price of the nets in the shops is Z$36 000, which is too expensive for most residents.
3. There are village health workers and school health masters who have been designated as "chloroquine holders". These are trained in malaria diagnosis, are educated about the common symptoms of malaria and given chloroquine tablets to disperse free of charge to community members. They present monthly reports to the rural health centre. This system serves to speed up treatment.
4. The district ensures the adequate supply of antimalarial drugs, chloroquine, quinine and fansidar, in all its health centres.
5. There are several health education initiatives such as the distribution of pamphlets (see appendix 5), billboards at strategic points and dissemination of information during indoor residual spraying.

[4] Personal communication with the district medical officer, Dr Mashaka.

6. The district has a well-equipped laboratory at the district hospital that is run by a laboratory technologist. Blood samples of suspected malaria cases are also sent from the neighbouring clinics. At Nyamapanda, 25 kilometres from the hospital, there is a malaria sentinel site that is run by a microscopist. Chloroquine is still the first line choice because the Nyamapanda sentinel site, which does chloroquine sensitivity studies, has shown 95% chloroquine sensitivity in the district.

Implementation of all the above strategies is done by a district health executive that comprises:

1. District Medical Officer
2. District Environmental Health Officer
3. District Nursing Officer
4. The hospital matron
5. The District Health Services Administrator

In the community there is a malaria control committee that assists in the control of malaria. The community chooses the members of such committees. The role of the committee is to identify community members such as unemployed youths who can be employed to help spray. They also help to sensitise the community about spraying. However, there is no effort by the district to balance membership according to gender.

There are, however some obstacles. It is difficult to achieve 95% coverage with indoor residual spraying because of lack of chemicals and transport money. The target of 50% coverage of all pregnant women and 20% of under fives is difficult to achieve because of insufficient insecticide treated nets.

1.3. Purpose of this study

The Zimbabwe National Malaria Control Programme has put several control measures in place. Despite this, malaria remains one of the major public health problems in Zimbabwe because of its associated high morbidity and mortality. The incidence has been increasing since the year 1996, with a heavy toll on children under five years and pregnant women.

The purpose of the study is therefore to better understand the role of women in the control and management of malaria at the household level, particularly with respect to women's awareness of transmission, prophylaxis, symptoms, complications, treatment and control of the disease and to provide recommendations to make malaria control programmes more gender sensitive and therefore more effective.

By examining whether the malaria control measures described above are accessible and acceptable to women in the Mudzi district, this study aims to obtain relevant information about barriers to malaria control as perceived by women. This study hopes to capture the often-ignored factors that affect women's health seeking behaviour with respect to malaria. The research could contribute to the development of gender sensitive malaria control programmes.

1.4. Objectives

1.4.1 Overall objective

To assess women's knowledge, practices and beliefs regarding malaria and how these affect their response to malaria.

1.4.2 Specific objectives

1. To determine women's knowledge of the causes of malaria, its spread and methods of malaria control
2. To determine women's awareness of malaria symptoms and complications.
3. To identify sources of information and teaching methods on malaria available to and utilised by women.
4. To establish the usual care of suspected malaria cases as perceived by women, including self-treatment and the use of health services.
5. To establish the barriers to successful malaria control as perceived by women.

Chapter 2: Subjects and Methods

2.1 Study design

The initial study was an exploratory qualitative study in the form of focus group discussions and in-depth interviews with key informants. This was followed by an observational, cross-sectional and analytic study.

2.2 Study Population and sampling

The study population included women between the ages of 18 and 49 years attending antenatal clinic at Kotwa District Hospital, Mudzi District in Zimbabwe. The following exclusions were made from the study:

- Women less than 18 years of age because parental consent is necessary to interview these.
- Women who did not reside in the district and had come as visitors.

Initially, purposive sampling was done at the district to select eight members for a focus group discussion. Later, after the design of the questionnaire, interviews were done with consecutive women attending antenatal clinic from the 17th December 2003 to 14 January 2004. Where a woman returned to the clinic within the period of study, a repeat interview was not done.

2.3 Sample size

The sample size for the qualitative component of the study was eight women. The sample size for the quantitative component of the study was calculated using STATA version 8. An estimate of the percentage of women who know about chemoprophylaxis during pregnancy was used as the key outcome measure. This was estimated to be 70%. The acceptable margin of error around this estimate was 5%. A

95% confidence level and power of 90% were used in the calculation. The sample size required for the study was therefore 190.

2.4. Measurement

Data collection was done using three methods.

- In-depth interviews

The researcher did in-depth interviews with the district medical officer and the nursing sister who is responsible for community health activities and environmental health.

- Focus group discussion

This discussion addressed all the objectives of the study. The main aim of the focus group discussion was to help generate questions to be incorporated in the questionnaire. After the focus group discussion session, the researcher transcribed the findings and generated questions that were used in the questionnaire.

- The questionnaire

The instrument used for data collection for the quantitative component of the study was a structured questionnaire administered by the researcher.

2.4.1 Design and use of questionnaire

The questionnaire had six sections. Section A elicited the demographic characteristics of the respondents. Section B consisted of questions on the knowledge of causes of malaria, its spread and methods of malaria control. This was to meet the first objective. Section C was about awareness of malaria symptoms and complications (Objective 2). Section D consisted of questions on the sources of information available to the women, to answer the third objective. Section E had questions that

enquired about the care of malaria cases (Objective 4). Finally, section F enquired about the perceived barriers to successful malaria control (Objective 5).

2.5. Validity and reliability of instruments

The researcher was the facilitator in the focus group discussion.

To assess the face validity of the questionnaire, the researcher and health workers discussed the questions to evaluate whether they made sense. Some of the questions in the questionnaire were extracted from previous questionnaires (Commercial Market Strategies, 2001; Agyepong et al.1995) on the subject and tested in the pilot study.

2.6. Pilot Study

The questionnaire was pretested on a sample of 5 women attending antenatal clinic at the district hospital. This helped to highlight areas of inconsistent responses, ambiguous questions and how exhaustive the options given for each question were. Piloting also gave an idea of how long the interview was going to be.

2.7. Data cleaning and statistical analysis

During the period of data collection, daily checks for completeness and coding errors were done after the interviews. There were some open-ended questions in the questionnaire and these were coded prior to data entry. Data from 170 participants were analysed in this study. The data were entered using the Epi-Data processing package. Data analysis was done using STATA version 8.

2.7.1. Continuous variables

In this analysis the continuous variables were checked for normality. If they were normally distributed the mean and standard deviations are reported. For those that were not normally distributed the median, range and inter quartile ranges are reported. The continuous variables in this study are: age, estimated gestational age, total number of pregnancies, number of antenatal visits, number of living children, number of children under the age of five, and number of deaths of children under the age of five years, the amount of money available in the house per month and the household size. Age was further categorised. Gestational age was also categorised into trimesters. Number of pregnancies was also categorised into primigravidae for those with a first pregnancy and multigravidae for those with a second or later pregnancy.

2.7.2. Categorical variables

Most of the variables in the research were categorical and presented as proportions per category.

2.7.3 Bivariate and multivariate analyses

Chi-squared tests were done to check for significant associations between the categorical variables. The STATA command below was used.

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tab variable1 variable2, chi2 column row
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The categorical variables that were hypothesised to contribute significantly to the women's responses were investigated the chi-square analysis. These are:

- Age (categorised)
- Gravidity (primigravidae versus multigravidae)
- Level of education (categorised)

- Gestational age (in trimesters)

Logistic regression analysis was then done to derive the best predictors for knowledge about control measures, use of prevention measures, awareness of malaria prophylaxis and the use of malaria prophylaxis based on the five risk factors namely: age, gravidity, level of education, gestational age and the number of antenatal visits.
Results were considered to be significant if the p value was less than 0.05, or if the 95% confidence interval excluded the null value.

2.8. Ethical considerations

This study was a non-invasive study involving the interviewing of women aged between 18 and 49 years. Before the onset of the study ethics approval was sought from the University of Cape Town Research Ethics Committee as well as from the Provincial Medical Directorate of Mashonaland East Province. The provincial and district medical officers of the selected areas of study as well as the clinic staff were informed about the research.

Each participant was informed about the purpose of the study and was asked to participate on a voluntary basis by giving verbal consent. There were no inducements. The participants were informed about their right to withdraw at any time during the interview and that refusal to participate and withdrawal from the interview was not going to influence the medical care that they obtained from the clinic. Only women aged 18 years and above were recruited into the study as these are legally regarded to be competent. At the hospital the interview was carried out in a private room. The

questionnaires were anonymous, that is, there were no personal identifiers. This was done to maintain confidentiality.

The results of the study will be made known to the National Malaria Control Program, Biomedical Research and Training Institute, the provincial and district medical officers and Roll Back Malaria Southern Africa and other Malaria Control Programs. The community, in particular the women, could benefit from the study if the results contribute to gender sensitive measures being implemented in malaria control.

Chapter 3: Results

3.1 Sociodemographic characteristics of the respondents

Out of the calculated sample size of 190, a total of 170 women participated within the time available for the study. The response rate was 100%. Table 3 gives a summary of the sociodemographic characteristics of the study participants. The median age of the study participants was 23 years and more than half were in the 20-29 year age group. Over 80% of the participants were in the third trimester of their pregnancy. The majority were attending antenatal clinic for the second time. About a third of the women were primigravidae. All the participants could speak Shona and a quarter could speak or read English.

Table 3: Socio demographic characteristics of the study participants (n=170)

Variable	Categories	Number (%)
Age (years)	≤19	48 (28%)
Median age = 23	20-29	93 (55%)
Range = 18-49	30-39	26 (15%)
	40-49	3 (2%)
Antenatal visit number	1	50 (29%)
Median = 2	2	68 (40%)
	3	48 (28%)
	4	4 (2%)
Estimated gestational age weeks	First trimester	1 (0.6%)
Median =32	Second trimester	32 (18 %)
Range = 12-40	Third trimester	137 (80%)
Number of pregnancies	Primigravidae	58 (34%)
Median = 2	Multigravidae	112 (66%)
Range = 1- 7		
Educational level (years at school)	No formal education	2 (1%)
	≤ 3	6 (4%)
	4-7	76 (45%)
	8-9	42 (25%)
	10-11	44 (26%)
Languages spoken	English	43 (25%)
	Shona	170 (100%)
	Tonga	5 (3%)
Languages read	English	44 (26%)
	Shona	148 (87%)

Table 4 shows the number of live children, stillbirths and miscarriages that were experienced by the multigravid women. Over 70% of the women had children below the age of five years. About 20% had experienced the death of a child under the age of five years. About 30% had experienced a miscarriage or stillbirth.

Table 4: The past obstetric history of the multigravid women (n=112)

Characteristic		Number (%)
Number of living children	0	18 (16%)
	1	35 (31%)
	2	33 (29%)
	3	14 (12%)
	4	7 (6%)
	5	5 (4%)
Number of children under five years of age	0	32 (29%)
	1	71 (63%)
	2	9 (8%)
Number of deaths of children under the five years of age	0	88 (79%)
	1	20 (18%)
	2	4 (4%)
Number of miscarriages and stillbirths	0	76 (68%)
	1	33 (29%)
	2	3 (3%)

Table 5 shows the work that is done for a living by the women, estimates of the household income and other household characteristics of the study participants. Over 80% of the women were not employed either formally or informally and the husband provided most of the money in over 90% of the households. On average each household had about Z$60 000.00 per month to use. This is a very low amount in light of the costs of basic commodities at the time of the interviews. The average cost of bread was Z$2 500.00. The cost of an untreated bed net was Z$36 000.00 in the trade stores. The household size was defined as the number of people who regularly shared a meal prepared in the household by the woman being interviewed. Of note is that 71% of the respondents did not own a radio and only one had read the newspaper in the previous two weeks.

Table 5: Household characteristics of the women (n=170)

Variable	Category	Number (%)
Work done for a living	Unemployed	140 (82%)
	Informal work	27 (16%)
	Formal	3 (2%)
Provider of most of the money in household	Husband	160 (94%)
	Self	7 (4%)
	Other	3 (2%)
Estimated monthly income in Z$	Median	60 000
	Range	10 000 – 300 000
	Interquartile range	40 000 – 90 000
Total number of people living in household	Median	4
	Range	2-13
	Inter quartile range	2-9
Read newspaper in the past two weeks	Yes	1 (1%)
	No	169 (99%)
Ownership of a radio at home	Yes	49 (29%)
	No	121(71%)

3.2. Knowledge about malaria spread and control

Without prompting, about two thirds of the women identified malaria as the most worrying health problem in their area. 71% knew that mosquitoes cause malaria. Those who gave wrong responses mentioned dirty food and water, the sun and stagnant water. Surprisingly, only 34% thought that it was a community responsibility to prevent malaria. Less than 15% were not aware of any ways to prevent malaria. On being questioned which groups of people were most susceptible to malaria, over 50% said that the susceptibility is the same in everyone. Of those who knew that pregnant women could suffer from malaria, less than a quarter knew of their increased susceptibility compared to non-pregnant women. Table 6 gives a summary of the knowledge about malaria spread and control

Table 6: Knowledge about malaria spread and control (n=170)

Characteristic		Number (%)
Most worrying health problem	Malaria	114 (67%)
	HIV/AIDS	49 (28%)
	Diarrhoeal diseases	7 (4%)
Cause of malaria	Mosquitoes	122 (72%)
	Other	48 (28%)
Time of day when mosquitoes bite the most	Evening	149 (88%)
	All day	19 (11%)
	Don't know	2 (1%)
Whose responsibility is it to prevent malaria?	Health care workers	77 (45%)
	The whole community	58 (34%)
	The government	35 (21%)
Awareness of ways to prevent malaria	Yes	147 (87%)
	No	23 (14%)
Which groups are affected by malaria most?	Children	54 (32%)
	Adults	4 (2%)
	Pregnant women	3 (2%)
	Pregnant women and children	9 (5.29%)
	Everyone	100 (59%)
Can pregnant women get malaria?	Yes	128 (75%)
	No	12 (7%)
	Don't know	30 (18%)
Are pregnant women more susceptible than non-pregnant women? (n=128)	Yes	31 (24%)
	No	25 (20%)
	Don't know	72 (56%)

Table 7 shows the ways of preventing malaria that were mentioned by the respondents. More than two thirds of the respondents mentioned the need to keep the surroundings of the house clean. They frequently mentioned cutting long grass and disposal of empty containers in which water could accumulate. About a third of the respondents mentioned the burning of dry cow dung in the evenings. The thick smoke from the burning cow dung and the smell were believed to drive the mosquitoes away. Other methods regarded as 'incorrect' that were mentioned by the women include:

boiling water before drinking, using borehole water and putting garlic on the windows at night.

Eighty percent of the women said they are the ones who were in charge of preventing malaria in their households but only 37% of the women made the decision about the purchase of malaria control tools. Moreover, in more than 95% of the households the husband provided most of the money that was used in the household.

Table 7: Ways of preventing malaria mentioned by the respondents (n=147)

Method	Number (%)
Keeping the surrounds of the house clean	101 (69%)
Using a mosquito net	63 (43%)
Burning cow dung	47 (32%)
Incorrect method	19 (13%)
Preventive medicine	10 (7%)
Insecticide spray	6 (4%)

Chi-squared tests were done to assess whether knowledge of prevention of malaria differed by age, parity, educational level and gestational age. The results are shown in the table 8 below. There were significant differences by age and educational level. Women greater than 30 years of age were more aware of ways of preventing malaria than other age groups but the differences by age were relatively small. Those with a higher level of education were also more aware of ways to prevent malaria than the less educated women.

Table 8: Differences in the awareness of ways to prevent malaria (n=147)

Item	Number	Awareness of ways to prevent malaria	P-value
Age (years)			
≤19	48	39 (81%)	0.014
20-29	93	82 (88%)	
30-39	26	25 (96%)	
40-49	3	1 (33%)	
Educational level (years at school)			
≤ 3	6	4 (67%)	0.005
4-7	76	61 (80%)	
8-9	42	38 (90%)	
10-11	44	44 (100%)	
Gestational age			
First trimester	1	1 (100%)	0.683
Second trimester	32	29 (91%)	
Third trimester	137	117 (85%)	
Gravidity			
Primigravidae	58	50 (86%)	0.942
Multigravidae	112	97 (87%)	

Logistic regression analysis showed that after controlling for the other variables, level of education remains a significant contributor to the awareness of ways of preventing malaria especially for those who had at least 8 years at school. Table 9 below shows the regression analysis results.

Table 9: Predictors of awareness of ways of preventing malaria

Variable	β	Odds Ratio (OR)	P - value	95% Confidence interval (for OR)
Constant	2.152			
Age	0.020	1.020	0.670	0.932-1.117
Antenatal visit number	-0.055	0.947	0.873	0.484-1.851
Gestational age	-0.080	0.923	0.110	0.836-1.018
Gravidity	-0.319	0.727	0.604	0.217-2.428
Level 2 education	1.486	4.419	0.080	0.839-23.281
Level 3 education	2.392	10.933	0.014	1.628-73.382

Women with educational level 3 or higher (which was defined as 8 or more years at school) had a 2.4 fold increased awareness of ways of preventing malaria compared to those with educational level 1. This was statistically significant (p=0.014). All the other predictors such as age, number of antenatal visits and parity are non-significant contributors to the awareness of prevention methods.

3.3 Awareness of the signs, symptoms and complications of malaria.

All the respondents were aware of some signs and symptoms of malaria. The ones that they mentioned are shown in table 10. There was no mention of convulsions, jaundice or altered level of consciousness. Fever and headache were mentioned by more than 50% of the respondents. No one symptom was mentioned by all respondents.

Table 10: Signs and symptoms of malaria as mentioned by the respondents (n = 170)

Symptom	Number (%)
Fever	115 (68%)
Headache	101 (59%)
Lethargy	88 (52%)
Vomiting	58 (34%)
Body and joint pain	34 (20%)
Loss of appetite	22 (13%)
Diarrhoea	8 (5%)
Chills and rigors	2 (1%)

On being asked whether they thought a person could die from malaria 95% said yes, 3% said no and 2% did not know. Of those who said yes, 76% knew of somebody who had died from malaria. When asked the question "Do you think malaria in pregnancy is dangerous?" 90 (59%) of the women said yes, 11 (6.47%) said no and 69 (40.59%) did not know. Those who said malaria is dangerous in pregnancy were asked further what they thought were the possible consequences of malaria in pregnancy. Their responses are shown in table 11.

Table 11: The mentioned possible consequences of malaria in pregnancy (n = 90)

Consequence	Number (%)
Spontaneous abortions	44 (49%)
Maternal mortality	31 (34%)
Still-births	18 (20%)
Preterm delivery	7 (8%)
Maternal morbidity	5 (6%)

An interesting observation was that 22% of the women said they had symptoms of malaria and had taken malaria medication during the current pregnancy. Chi-squared tests and regression analysis were done to assess whether there were any significant differences between the women who had malaria symptoms at some point during the current pregnancy compared to those who did not. The differences that were assessed were awareness of ways of preventing malaria, knowledge about prophylaxis in pregnancy and whether or not the women had taken prophylaxis. The results are shown in the table below.

Table 12: Comparison of the women who had symptoms and those who did not

	Symptomatic women (n=37) Number (%)	Asymptomatic women (n=133) Number (%)	Odds Ratio	95% CI	P-value
Awareness of prevention measures	32 (86%)	115 (86%)	1.00	0.35-2.91	0.997
Current use of prevention measures	16 (43%)	66 (50%)	0.77	0.37-1.61	0.493
Knowledge about malaria prophylaxis	24 (65%)	84 (63%)	1.08	0.50-2.31	0.849
Taken malaria prophylaxis	25 (66%)	78 (59%)	1.47	0.68 – 3.17	0.328

The results showed no significant differences in the various risk factors between the women who had malaria symptoms during the current pregnancy and those who did not.

3.4. Care of suspected malaria cases

The study participants were asked how they usually cared for a household member with fever and more specifically with malaria. Their responses are shown in table 13.

The most common form of treatment of a household member with fever was tepid sponging, reported by 46% of the women. Only 4% mentioned traditional medicine. After prompting further whether they had used home made remedies in the treatment of any fevers, 46% of the women said they had. The first action for somebody suspected to have malaria was to go to the clinic in 66% of the responses. 22% said they would self- medicate with anti malarial drugs.

Table 13: Care of suspected malaria cases (n=170)

		Number(%)
Treatment of a household member with fever	Tepid sponging	78 (46%)
	Paracetamol	29 (17%)
	Go to the clinic	26 (15%)
	Other	14 (8%)
	Nothing	11 (6%)
	Traditional medicine	7 (4%)
	Chloroquine	5 (3%)
Use of homemade remedies in treatment of fever	Yes	79 (46%)
	No	91 (54%)
First action when somebody has malaria	Go to the clinic	113 (67%)
	Self medication	38 (22%)
	Other	17 (10%)
	Traditional medicine	2 (1%)
Do you keep anti malarials at home?	Yes	48 (28%)
	No	122 (72%
Anti malarial drugs kept at home (n=48)	Chloroquine	43(90%)
	Chloroquine & Fansidar[5]	3 (6%)
	Fansidar	2 (4)
Knowledge of the right dose (n=48)	Yes	16 (33%)
	No	32 (67%)
Had heard of "chloroquine (CQ) holders"[6]	Yes	130 (76%)
	No	40 (24%)
Ever consulted CQ holders (n=130)	Yes	51 (39%)
	No	79 (61%)

[5] The commonly used name for the pyrimethamine and sulphadoxine combination
[6] See page 14 for explanation of "chloroquine holders".

Home treatment of fever with homemade remedies was quite common (46%). Some of these homemade remedies that were elicited in the focus group discussion were; water drained from crushed papaya leaves, ash dissolved in water, the rubbing of leaves from strong smelling plants onto the body. It was difficult to elicit from the women in the focus group discussion what the difference was between the fever associated with malaria and fever due to other illnesses. The consensus among the women was that fever due to other illnesses is usually quick to resolve and is not usually associated with vomiting, but the distinction was not clearcut.

Twenty eight percent of the respondents kept anti-malarials at home. The commonly kept drug was chloroquine (90%). Of note is that of those who kept anti-malarials at home, only a third (33%) knew of the correct adult dose. 76% of the respondents had heard about chloroquine holders (either community health workers or school health masters) and 39% of the respondents had actually consulted them.

3.5. Use of malaria prevention measures

A total of 82 out of 170 (48%) of the respondents said they were currently using a method to protect themselves from mosquitoes. The most common method was cleaning the area around the house (52%). 39% said they were using a mosquito net. This option included both those who used insecticide treated nets and those whose nets were not treated. 20% mentioned burning dry cow dung and traditional plants. Table 14 shows the methods currently used by the respondents.

Table 14: Methods currently used to protect the household from mosquitoes (n=82)

Method	Number (%)
Cleaning area around the house	43 (52%)
Mosquito net	31 (38%)
Cow dung and traditional plants	16 (20%)
Mosquito coils	8 (10%)
Insecticide spray	2 (2%)
Applying mosquito repellent to skin	1 (1%)
Closing doors and windows	1 (1%)

Chi-squared tests were done to find out whether the use of malaria prevention measures was associated with educational status and other factors. The results are shown in table 15. The current use of prevention methods was significantly associated with educational level (p=0.003), with more educated women tending to use protection methods. There was no significant association with age nor parity

Table 15: Current use of malaria prevention measures (n = 82)

Item	Number (%)	Current use of malaria prevention measures	P-value
Age (years)			
≤19	48	20 (42%)	0.555
20-29	93	46 (50%)	
30-39	26	15 (58%)	
40-49	3	1 (33%)	
Educational level (years at school)			
≤ 3	6	1 (17%)	0.003
4-7	76	29(38%)	
8-9	42	21 (50%)	
10-11	44	31 (70%)	
Gravidity			
Primigravidae	58	30 (52%)	0.512
Multigravidae	112	52 (46%)	

Logistic regression analysis showed that after controlling for the presence of the other variables, level of education was a significant contributor to the current household use of malaria prevention measures by the pregnant women. Table 16 below shows the regression analysis results.

Table 16: Predictors of current use of malaria prevention measures (n=170)

Variable	β	Odds Ratio (OR)	P - value	95% Confidence interval (for OR)
Constant	-2.92			
Age	0.06	1.06	0.138	0.982-1.141
Antenatal visit number	0.24	1.27	0.320	0.792-2.044
Gestational age	-0.05	0.95	0.104	0.894-1.010
Gravidity	0.43	1.53	0.332	0.648-3.618
Level 2 education	1.95	7.05	0.111	0.638-77.99
Level 3 education	2.56	12.97	0.042	1.096-153.46
Level 4 education	3.30	27.10	0.008	2.364-310.75

The women with education level 3 (8 to 9 years at school) were 13 times more likely to be currently using some method to protect themselves from malaria in the household compared to those with educational level 1 (≤ 3 years at school). This increased use was statistically significant (p=0.042), and the 95% confidence interval excluded the null. Moreover, women with educational level 4 (10 to 11 years at school) were 27 times more likely to be currently using malaria prevention measures in their households compared to those with educational level 1 (≤ 3 years at school). This increased use was statistically significant (p=0.008). All the other predictors such as age, number of antenatal visits and parity were non-significant contributors to the current use of prevention measures.

3.6. Barriers to successful malaria prevention

All those who were using some method for the prevention of malaria (n = 82) were asked whether they were satisfied with the method that they were using. 39% said they were not. Those who were not satisfied were asked which preventive method they preferred to use. All preferred to use a mosquito net. Those women who were not using any method and those who were not satisfied with the method that they were using were then asked what prevented them from fully protecting their households from mosquitoes. The reasons they gave are shown in table 17.

Table 17: Factors preventing women from fully protecting their household from mosquitoes (n= 120)

Factor	Number (%)
I don't have the money	57 (48%)
Protection materials are not available to me	24 (20%)
I don't know how to	20 (17%)
I can't be bothered	16 (13%)
I don't have time	3 (3%)

3.7. Malaria prophylaxis in pregnancy

Table 18 below shows the responses of the women regarding malaria in pregnancy. Some women did not know about malaria prophylaxis in pregnancy, but on checking in their notes, they had actually been prescribed doses of fansidar and chloroquine and they claimed to have swallowed the tablets without knowing what they were for. Another finding from the focus group discussion was that some women reportedly bought the medication but would wait until they got the symptoms of malaria before taking the medication. This was not reported by any of the women interviewed as they all claimed that they swallowed their tablets when they got them.

Table 18: Malaria in pregnancy (n=170)

Question	Response	Number (%)
Do you know of prophylaxis for pregnant women?	Yes	108 (64%)
	No	62 (37%)
Have you taken prophylaxis duriing this pregnancy?	Yes	103 (61%)
	No	67 (39%)
What did you take? (n = 103)	Chloroquine and fansidar	76 (74%)
	Chloroquine	26 (25%)
	Fansidar	1(1%)
Where did you get it? (n = 103)	Clinic	102 (99%
	Pharmacy	1 (1%)

The 67 women who had not taken malaria prophylaxis during pregnancy were asked why they had not done so and their responses are shown in table 19 below.

Table 19: Factors preventing women from taking malaria prophylaxis (n=67)

Factor	No. (%)
I don't know about it	44 (66%)
I don't want to harm my baby	13 (19%)
I don't have the money	5 (7%)
I want to seek permission from my husband	3 (4%)
I can't be bothered	2 (3%)

Chi-squared tests were done to check for any associations between knowledge of prophylaxis and age, educational level and parity. There was a significant association between gestational age and knowledge of prophylaxis (p=0.029) with those in the third trimester knowing more than those in the first two trimesters. The results are shown in table 20.

Table 20: Knowledge about prophylaxis for pregnant women (n=170)

Item	Number (%)	Knowledge about prophylaxis among pregnant women	P-value
Age (years)			
18-19	48	24 (50%)	0.074
20-29	93	62 (67%)	
30-39	26	19 (73%)	
40-49	3	3 (100%)	
Educational level (years at school)			
≤ 3	6	5 (83%)	0.074
4-7	76	48 (63%)	
8-9	42	22 (52%)	
10-11	44	31 (70%)	
Gestational age			
First trimester	1	1 (100%)	0.029
Second trimester	32	14 (44%)	
Third trimester	137	93 (68%)	
Gravidity			
Primigravidae	58	32 (56%)	0.103
Multigravidae	112	76 (68%)	

Logistic regression analysis showed that after controlling for the presence of the other variables, antenatal visit number was a significant contributor to the knowledge about prophylaxis for pregnant women. Table 21 below shows the regression analysis results.

Table 21: Predictors of knowledge of malaria prophylaxis in pregnancy (n=170)

Variable	β	Odds Ratio (OR)	P - value	95% Confidence interval (for OR)
Constant	-1.87			
Age	0.05	1.05	0.329	0.954-1.151
Antenatal visit number	1.64	5.159	<0.001	2.738-9.721
Gestational age	-0.04	0.965	0.304	0.903-1.032
Gravidity	-0.26	0.770	0.602	0.289-2.055
Level 2 education	-0.59	0.555	0.610	0.058-5.327
Level 3 education	-1.19	0.305	0.311	0.031-3.031
Level 4 education	-0.40	0.671	0.735	0.668-6.750

The results indicated that for every additional antenatal visit that the woman made, there was a five-fold increase in the knowledge about malaria prophylaxis. This increased knowledge was statistically significant ($p<0.001$). All the other predictors were not significant. One would expect significantly more multigravid women to be knowledgeable about malaria prophylaxis compared to primigravid women. Surprisingly, the results show non- significant differences between these two groups.

3.8. Sources of information

The respondents were asked whether they had heard or seen malaria education messages from any source. 65 (38.24%) had not seen or heard of these messages before. 105 (61.76%) said they had. These were then asked where they heard or saw the messages and also what messages they saw or heard. Their responses are shown in the table 22 below.

Table 22: Sources of Information (n =105)

Question	Responses	Number (%)
Where have you heard malaria education messages?	Health workers	71 (68%)
	Posters	19 (18%)
	School	18 (17%)
	Radio	8 (8%)
What messages did you see or hear?	Prevention	88 (84%)
	Transmission	28 (23%)
	Can't remember	12 (11%)
	Treatment	7 (7%)

All the respondents were then asked what kind of information they would like to know about malaria and where they preferred to hear this kind of information from. Their responses are shown in the table 19 below.

Table 23: Preferred messages and sources of information (n = 170)

Question		Number (%)
What information would you like to know?	Treatment	135 (79%)
	Prevention	82 (48%)
	Transmission	43 (25%)
	Malaria in pregnancy	35 (21%)
Where would you like to get this information?	Health workers	145 (86%)
	School	18 (11%)
	Posters	14 (8%)
	Radio	5 (3%)

Chapter 4: Discussion

4.1. Study limitations

This study was hospital-based and hence may be subject to various kinds of bias. Firstly there might be selection bias because women who attend antenatal clinic at the district hospital might be different to other women in the community who do not attend antenatal clinic in terms of education, health consciousness age and reproductive status. This limitation affects the external validity (generalisability) of the results. Despite this, the results provide some valuable information for malaria control programmes.

Reporting bias could have been introduced by the fact that the interview was done in the hospital environment and the researcher was a health care worker. Women's responses might have been biased towards what they consider to be medically appropriate responses. This could have resulted in under reporting of use of traditional methods or over reporting of use of malaria control measures. However, this is not likely to have played an important role because despite this limitation, the results obtained still indicated important knowledge gaps.

4.2. Key Findings

The majority of the women consider malaria as a worrying health problem in their area. However, it is surprising that most do not consider it their responsibility to prevent malaria, with only a third (34%) acknowledging that the whole community should be responsible for preventing malaria. The results also indicate that despite high levels of knowledge of the causes, signs and symptoms of malaria, the majority of the women did not know about the increased susceptibility of pregnant women and

children. Worse still, a quarter (25%) either did not know or did not think that a pregnant woman could get malaria. This finding is important as it highlights the need for education of women about malaria in pregnancy for the success of Intermittent Preventive Therapy Programmes. In addition, although more than 80% of the women knew of ways of preventing malaria, only 48% were currently using prevention methods in their households. This is an unacceptably low proportion considering that Mudzi District has the second highest incidence of malaria in Zimbabwe of 572 per 1000 (ZNHP 1998, 2000). Use of homemade and traditional medicine was quite common for the treatment of fever in general but very low for malaria, which poses the question of how fever due to malaria is differentiated from other fevers. Keeping anti-malarials at home was uncommon, with only a third of those who did, knowing the right dose. Finally, health workers remain a critical and preferred source of health education.

4.3. Findings in the light of previous studies

4.3.1. Knowledge about malaria spread and household utilisation of malaria prevention methods

In this study a high proportion (72%) of the women knew of the cause of malaria. Several studies have been done to assess the community's knowledge about the cause of malaria. These showed that most respondents are aware that mosquitoes cause malaria (Onwujekwe et al. 2000; Lukwa et al. 1999; van Geldermalsen & Munochivei, 1995; Commercial Market Strategies, 2001). The respondents in these studies included males and females and the proportion of knowledgeable respondents was greater than 80%. There have been other studies that were done among female

respondents only, such as a study done in rural Gambia (Clarke et al. 2003), which showed that only 50% of their respondents named mosquitoes as the cause of malaria. A similar study done in the Mpumalanga province of South Africa, Gowere et al. (2000a) interviewed 299 female household heads and of these only 65.9% knew that malaria is caused by mosquito bites. Generally the findings of studies done among female respondents indicate a lower proportion with knowledge about the cause of malaria. This could be due to the lower level of education among the women compared to men in general.

Most respondents knew that mosquitoes bite the most in the evenings. Similar findings were obtained in the CMS study in Uganda (2001). Understanding vector behaviour is crucial to intervention, as people need to understand the rationale for various control methods.

On being asked which groups of people are affected most by malaria, very few women (2%) mentioned pregnant women and 6 % mentioned pregnant women and children. The majority of the women thought that everyone is affected equally. This is consistent with other studies that have shown low perceptions of risk and low knowledge about increased risk of malaria in pregnant women. The Commercial Market Strategies (2001) study showed that there was a strong perception that children were the most vulnerable to malaria (75.1% of the respondents compared to 9.9% who perceived pregnant women to be the most vulnerable). In the study by Onwujekwe et al (2000), the respondents were asked about their perspectives on their risk or members of their households contracting malaria. About a quarter of the respondents in 4 communities and 3.34% in one community felt that neither their

9.9% who perceived pregnant women to be the most vulnerable). In the study by Onwujekwe et al (2000), the respondents were asked about their perspectives on their risk or members of their households contracting malaria. About a quarter of the respondents in 4 communities and 3.34% in one community felt that neither their households nor themselves stood any risk of contracting malaria. In the current study, although 75% knew that pregnant women could get malaria, only a quarter of them knew about the increased susceptibility of pregnant women compared to non-pregnant women.

A very high proportion (86.7%) of the respondents in this study were aware of ways to prevent malaria. The most commonly mentioned method was keeping the surroundings of the house clean (69%) and 42% mentioned mosquito nets. To note is that the option of 'keeping the surroundings of the house clean' included both correct responses such as emptying containers that collect rainwater that could be potential breeding sites, but also included general environmental hygiene measures that are of no relevance to malaria control. This indicates the lack of clarity in the respondents regarding what environmental control measures are relevant to malaria control. Almost a third of the women mentioned dry cow dung (32%) as a way of preventing malaria. This method was also mentioned by 3% of the respondents in the study by Gowere et al (2000a). The efficacy and effectiveness of this method have not been demonstrated in scientific literature. The use of plants as mosquito repellents has however been reported in other studies. For example, a study done in the Honde Valley area of Zimbabwe showed that 92.6% of the respondents had used plants as mosquito repellents (Lukwa et al, 1999). The most common plant species was *Lippia javanica*. The reasons why it was used were that it was perceived to be "cheap" by

86% of the respondents, "effective" by 10% and "locally available" by 4% of the respondents. The repellent activity of *L. javanica* was confirmed in studies done by Lukwa et al (1994) and Gowere et al (2000b).

4.3.2 Awareness of signs, symptoms and complications of malaria

The clinical presentation of malaria varies but the common manifestations are fever, chills and headache. Severe and complicated malaria presents with altered consciousness, jaundice and convulsions. All respondents in the study were aware of some signs and symptoms of malaria. The symptom known by most respondents was fever (67.65%), then headache (59.4%) and lethargy (51.76%). None of the respondents mentioned the signs and symptoms of complicated malaria such as jaundice, convulsions and loss of consciousness. This is a knowledge gap that needs to be closed during information and education campaigns. Previous studies done in malaria endemic areas indicate that fever is the most commonly known symptom of malaria. (Gowere et al. 2000a; Clarke et al. 2003; Van Geldermalsen and Munochivei, 1995; Commercial Market Strategies, 2001). Njama et al (2003) also got similar responses on how malaria is recognized, but the caregivers in that study were further questioned how severe malaria is recognized. The same responses as for the first question were obtained with only 20% recognising convulsions as a sign of severe disease. Although fever is the most commonly recognised symptom, more education is needed about the other complications of malaria that are uncommon but may be fatal presentations. It is imperative that the signs and symptoms of both complicated and uncomplicated malaria be known so as to avoid treatment delays.

4.3.3 Care of suspected malaria cases

In this study the most common home treatment of fever was tepid sponging. This is similar to the results from a study done in the Solomon Islands, which showed that 46% of the 123 caregivers reported that the first treatment step for a child suspected to have malaria is bathing them in water (Dulhunty et al. 2000). 66% of my respondents said they would seek help from the clinic or hospital as the first line treatment for malaria. This result is similar to results from a study done by Njama et al. (2003) in an urban slum in Uganda, in which 63% of the respondents said they would seek treatment from the clinic or hospital as the first line treatment for any fever. Similar responses were obtained when asked how they would care for a child with malaria. Muller et al. (2003) did a study to describe the pattern of fever-associated morbidity, treatment seeking behaviour for fever episodes, and cause specific mortality in young children residing in a malaria holoendemic area in rural Burkina Faso. 55% of the fever episodes were attributed to malaria (fever + ≥5000 parasites/μl). 69% of the fevers were treated at home using either modern or traditional medicine, 16% were treated at the local health centre, 13% sought assistance from village health workers, traditional leaders or at the village shops and 1% in hospital. Clarke et al. also showed that home treatment of malaria in children was not a common practice with less than 10% of the cases being treated with chloroquine at home. It seems there is very little use of traditional medicines in the treatment of malaria in the different communities. Kaona et al. (2000) reported in their study that only 6.9% of their respondents mentioned the use of traditional medicine to cure fevers.

4.3.4 Malaria prophylaxis in pregnancy

65% of the respondents in the study knew about prophylaxis for pregnant women. 61% had taken some form of malaria prophylaxis. Most took chloroquine and fansidar. Almost all (99%) obtained it from the clinic. In a study concerning utilisation of malaria prophylaxis that was done in Dar es Salaam by Mnyika et al. (1995), 301 pregnant women attending antenatal clinic were the study participants. 71.1% said they used chloroquine prophylaxis. Of those who did not use prophylaxis, 43 (49.4%) attributed this to fear of side effects, mainly itching, and fear of abortion. Contrary to these results, fear of abortion was not one of the reasons mentioned by women in the study in Mudzi District as one of the factors preventing the women from taking malaria prophylaxis. The majority (66%) cited lack of knowledge as the main reason why they were not taking malaria prophylaxis.

Guyatt et al. (2004) also did a study to assess the use of intermittent presumptive therapy and insecticide treated nets by pregnant women in four Kenyan Districts. Household surveys were conducted and the participants were 1814 women who were pregnant in the previous twelve months. 81% of the women had attended antenatal clinic, 75% more than once. Only 13% of these women used a bed net during the pregnancy and only 23% had taken at least one dose of pyrimethamine-sulphadoxine (fansidar). Of those who took it, 60% had a single dose, and in all cases, this was administered at the antenatal clinic. 5% of the women received at least two doses of intermittent presumptive therapy at the antenatal clinic. In another study done in Kisumu, Kenya, during antenatal clinic exit interviews, 70.5% of the women knew the correct purpose of the prophylactic tablets that they had received (van Eijk et al. 2004). 1.6% thought that they were painkillers or treatment for flu, headache or abdominal pain.27.9% of the women did not know of the purpose of the tablets.

The antenatal clinic thus remains an important place for the delivery of vital information about prophylaxis to pregnant women. Compliance with dosage can be improved by strict following of the WHO guidelines regarding directly observed swallowing of the tablets.

4.3.5 Sources of information

Consistent with previous studies, health care workers remain one of the important sources of information on malaria. In the Commercial Market Strategies (2001) study in Uganda, about 70.6% respondents had seen or heard of messages about malaria (83% in urban areas and 67.5% in rural areas), mainly through the radio and 37.7% from the health workers. In a household survey that was done in five districts in Zimbabwe (n=2531), health workers were the most commonly known source of information (72.9%) (Tsuyuoka et al. 2001). Other sources that were mentioned in the study were village health workers, teachers, radio and television (ibid). The message that most respondents (76.8%) in the current study had heard was on malaria prevention but the majority (86%) wanted to know more about the treatment of malaria.

4.4. Implications of the results for the Roll Back Malaria initiative

The results emphasize the importance of educating females, because the more educated women were more likely to use malaria protection measures and were also more likely to know about malaria prophylaxis in pregnancy. Therefore the control of malaria should be an integrated and multisectoral approach involving the health sector and the education sector among others. Although a high proportion of the women

knew the cause of malaria, few considered it their responsibility to prevent malaria with the majority saying that they thought it was the responsibility of the health care workers to prevent malaria. This assumption is likely to have a negative impact on the success of malaria control programmes as the Roll Back Malaria initiative emphasises the need for community participation. To achieve this, community members should believe both that malaria is a problem in their area and that they too have a responsibility to prevent malaria.

All the women knew at least one of the symptoms of malaria. While this is positive, women should be informed about the other possible complications of malaria such as convulsions and jaundice. More information should be given to the community about the less severe as well as the more atypical presentations of malaria. When using the symptom 'fever' as equivalent to malaria, the sensitivity is very high although there are likely to be many false positives (low specificity). One would not be worried about the treatment of non-malaria cases as malaria because the treatment has few side effects, is not expensive and is non-invasive. Sensitivity is thus more important than specificity.

One of the most important points that came out of the interviews is the need for educating women about the varying susceptibility of different groups in the community and emphasising the increased susceptibility of women and children. According to the behaviour change model of health promotion, an increase in perceived susceptibility of a condition or health state is more likely to result in behaviour change (Coulson, et al. 1998). The behaviour change that malaria control

programmes such as the Roll Back Malaria initiative aim for is the increased use of prevention measures.

More focused education concerning the role of malaria prophylaxis is needed among the women. Some women admitted to having taken tablets they were told to take at the clinic but said they did not know anything about malaria prophylaxis. Communication at the consulting visit should be enhanced. In addition, the value of malaria prophylaxis, the frequency and the number of the recommended doses should be emphasised.

Insecticide-treated nets were the preferred choice of preventive tool among the women. However, most women did not own any because of financial constraints. 80% of the women said they are the ones who were in charge of preventing malaria in their households but only 37% of the women made the decision about the purchase of malaria control tools. Moreover, in more than 95% of the households the husband provided most of the money that was used in the household. The lack of decision-making power coupled with the general low standard of living makes it almost impossible for any of the women to consider purchasing insecticide treated nets.

Although self-administration of anti-malarial drugs results in prompt treatment of malaria, it is not effective if the women do not know the dosage of the drugs to be used. This is where the role of the 'chloroquine holders' should be highlighted. Although few women had consulted the 'chloroquine holders' in the community, most knew about their existence. This has implications for malaria control especially in cases where the women stay far away from the hospital or health centres. These

chloroquine holders have an important potential role of providing prompt treatment thereby shortening the length of time between the onset of symptoms and the commencement of therapy.

Most women said they preferred to be educated more about malaria by health care workers. The reason for this was that they could ask questions about the things that they did not understand, as it is usually an interactive session. Studies have shown that providing information results in change in awareness, attitudes and behaviour to the use of insecticide-treated nets. This was shown in a study done in Kenya by Alaii et al. (2003). There is very little use of media communication in the district and therefore more emphasis should be on verbal interactive sessions with the community members, and to a lesser extent posters and pamphlets as only a quarter of the women could read English although 85% could read Shona. This recommendation would differ in different contexts. The school system is also an essential and effective means of communication, and should be utilised.

4.5 Conclusion

This study sought to examine pregnant women's knowledge about the causes, signs and symptoms of malaria, their treatment seeking behaviour, their sources of information and the factors that hinder effective control of malaria by the women. The findings of the study are a source of information in the fight against malaria. This is because the success and sustainability of the various malaria control measures are dependent on human behaviour. Women potentially play a very important role in the prevention of malaria. The study indicated that despite high levels of knowledge about malaria, use of malaria prevention measures was quite low. Three main reasons

were elicited. First, there is a low perceived susceptibility to malaria. Second, most of the women think that it is not their responsibility to prevent malaria. The responsibility is placed on an external source, in this case, the government and health care workers. Last, for those who would like to take up the responsibility, financial constrains are the limiting factor.

In conclusion, according to the Ottawa Charter for Health Promotion, promoting health is the process of enabling people to increase control over, and improve their health. For this to occur some of the essential elements are the creation of supportive environments and strengthening community action in setting priorities, making decisions, planning strategies and implementing them to achieve better health. The creation of supportive environments can be achieved by removing financial and other barriers to the malaria control tools. Community action in malaria endemic areas can be strengthened by community empowerment through information, education and communication campaigns.

Policy makers need to bear in mind that the supply of malaria control interventions does not necessarily lead to utilisation by women. Interventions to improve health, must therefore be developed with a critical understanding of the women's own perceptions of their health problems and how these concerns are linked to the other facets of the women's lives.

4.6. Recommendations

1. In view of this study and in keeping with previous studies, it is clear that there is need to pay great attention to health education, especially concerning the

prevention, signs, symptoms and the impact of malaria on the household and the community. This education is most useful during interactive sessions, because during the sessions, the misconceptions that people have can be addressed. Health care workers should make optimum use of the time available to them when consulting clients to deliver these health education messages, as they are a preferred source of information.

2. Community awareness of malaria and participation in control strategies should be encouraged and emphasised. The community needs greater participation and commitment in the prevention of malaria. In addition, the community should be educated to perceive their role not to be that of passive recipients of services, and should be encouraged to make the decisions to protect themselves and their families. This can only occur if there is adequate understanding of the impact of malaria on the individual, household and the community as a whole.

3. As well as highlighting the usefulness of environmental control measures, more emphasis should also be placed on the value of personal prevention measures. However, the great challenge is to achieve adequate coverage with the insecticide-treated nets especially in poor areas where even the subsidised nets are too expensive for the residents. It is difficult for governments to remove the affordability barriers, but there is need for research that examine the cost-effectiveness, feasibility and sustainability of providing free insecticide-treated nets to pregnant women and children under five years of age in such poor areas. In one such study done in Kenya by Guyatt & Ochola

(2003) they concluded that providing bednets free of charge to pregnant women through the antenatal clinics is a feasible and effective option in Kenya.

4. Women are the caregivers in the households and are at great risk during pregnancy. Strengthening the information, education and communication campaigns and strategies among pregnant women is important to effective malaria control programmes. Educating pregnant women about malaria, especially their increased vulnerability, should be incorporated as one of the procedures during antenatal visits in malaria endemic areas.

5. In line with the WHO recommendations, there should be directly observed treatment by the women during antenatal clinic as this ensures compliance. This also reduces the occurrence of erratic use and inadequate dosages of the drugs.

6. In order to reach out to all the pregnant women in the community, not only those who might attend antenatal clinic, the village health workers should be tasked with providing information and encouraging pregnant women in their localities to attend antenatal clinic. In addition there is need to work with informal health providers such as traditional birth attendants and traditional healers so that they too are aware of the signs and symptoms of malaria, particularly traditional birth attendants, so that they encourage women to go to the clinic for malaria prophylaxis during pregnancy. RBM has recommended that the delivery of cost-effective malaria prevention to pregnant women

requires the strengthening of antenatal care systems and the involvement of traditional birth attendants in places where they are part of the health delivery system (RBM, 2004). The role of traditional healers and traditional birth attendants in preventing malaria has not been fully explored and more research is need in this area. More research is also needed to explore how gender roles specifically determine women's health related behaviour.

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Appendix 1

Focus group discussion guide

Questions

1. What causes malaria? Can malaria spread?
2. What are the signs and symptoms of malaria?
3. How do you treat malaria in this community?
4. How can malaria be prevented?
5. Are you currently using any method to protect your household from mosquitoes? If Yes, which methods? If No, why not?
6. Who is usually in charge of protecting your household from mosquitoes and why?
7. Do pregnant women get malaria? Ask about the effects of malaria on pregnancy?
8. Ask about any who have taken prophylaxis, which drug they took, when they took it and where they got it.
9. Sources of information on malaria.
10. What do the women perceive to be the barriers to successfully prevent themselves and other family members from getting malaria?

Appendix 2

Interview guide for key informants: district medical officer and environmental health officer

1. What are the common health problems in the locality? And the weighting given to malaria compared to other competing health needs?
2. What are the available facilities in the district for the diagnosis of malaria (laboratory etc)?
3. Is malaria prophylaxis in pregnancy implemented? If yes, which drugs are given and at what intervals and what is the compliance? If no, why not?
4. Are there any malaria control programmes that are coordinated by the environmental health department or at the district level? Who is responsible for the implementation of these and how responsive is the community? Explore the role of women in the implementation
5. What are the Health Education/Promotion messages given to the population from the district level and whom do they target?

Appendix 3

Information given to participants before verbal consent

Purpose

In this study, the researcher would like to know about your knowledge on what causes malaria, how it is prevented and also how you care for a household member with malaria. This information will lead to a better understanding of your role and that of other women in the control and management of malaria in your households.

Procedure

If you agree to take part in the study, you will be interviewed or will be involved in focus group discussions. The interview/focus group discussions will be less than one hour long.

Confidentiality

The questionnaire will be anonymous and there will be no personal identifiers. The responses that you give will be confidential.

Voluntary participation

Your participation is completely voluntary. If you refuse to participate or withdraw from the interview or the focus group discussion, it will not influence the medical care that you obtain from the clinic.

Appendix 4

Section A
General information

Demographic characteristics

1. Age of the respondent in years ..... ☐☐

2. Antenatal visit number..... ☐☐

3. When was your last menstrual period? _____
   Estimated Gestational Age (in weeks to be calculated after interview)..... ☐☐

4. What is the total number of pregnancies that you have had including the current one?..... ☐☐
   If first pregnancy go to 6

5. Can you please tell me the following:

a. Number of living children	
b. Number of children under five	
c. Number of deaths of children under five	
d. Number of miscarriages and stillbirths	

Education

6. Have you ever attended school?

Yes	1
No	0

If No go to 8

7. What is the highest level of education you have attained?

Grade 3 and less	1
Grade 4-7	2
Form 1-2	3
Form 3-4	4
Form 5-6	5
College/university	6
Never attended school	7
Refused to disclose	8

8. What languages do you speak? (For each of the languages spoken, ask the respondent whether they can read it)

Languages spoken		Languages read	
English	1	English	1
Shona	2	Shona	2
Ndebele	3	Ndebele	3
Other specify	4	Other specify	4

Socio-economic status

9. Regarding earning money for a living:

I do informal work	1
I do formal work in public or private sector	2
I am unemployed	3
Other (specify)	4

10. Who provides most of the money in your house?

Self	1
Husband	2
Other Specify	3

11. Can you please tell me an estimate of the total amount of money available per month in your household ☐☐☐☐
(Z$).....

12. How many people are living in your household including a children?.....☐☐

13. Have you read a newspaper in the past two weeks?

Yes	1
No	0

14. Does your home have a radio?

Yes	1
No	0

Section B
Knowledge about malaria spread and control

1. What is the most worrying health problem in your area?

_____

If **malaria** is mentioned go to 3

2. Have you ever heard of a disease called malaria?

Yes	1
No	0

If No go to section E

3. What is the cause of malaria that you know of?

Being bitten by mosquitoes	1
Other (specify)	2
Don't know	3

4. At what of the day do mosquitoes bite the most? Do not prompt. One answer only.

Morning	1
Afternoon	2
Evening	3
All day	4
Don't know	6

5. Whose responsibility do you think it is to prevent malaria? Circle all answers. Do not prompt.

Self	1
The whole community	2
The government	3
Health care workers	4
Other Specify_____	5

6. Are you aware of any ways of preventing malaria?

Yes	1
No	0

If No go to 9

7. What ways of preventing malaria are you aware of? Circle all answers. Do not prompt.

Sleeping under a mosquito net	1
Taking preventive medicine	2
Using mosquito coils	3
Keeping the surrounds of the house clean	4
Using insecticide spray	5
Other traditional specify_____	6
Other incorrect specify_____	7

8. Who in your family is usually in-charge of trying to prevent malaria?

Self	1
Husband	2
Other (specify)	3

9. Which groups of people are most affected by malaria in this area? Circle all the responses.

Adults	1
Children	2
Pregnant women	3
Pregnant women and children	4
Everyone affected equally	5

10. Can pregnant women get malaria?

Yes	1
No	2
Don't know	3

11. Are pregnant women more susceptible to malaria than non-pregnant women?

Yes	1
No	2
Don't know	3

Section C
Awareness malaria symptoms and complications

1. Do you know any signs or symptoms of malaria?

Yes	1
No	0

If No go to section D

2. What symptoms of malaria are you aware of both in children and adults?

Fever	1
Headache	2
Vomiting	3
Diarrhoea	4
Lethargy	5
Loss of appetite	6
Body/joint pain	7
Chills and rigors	8
Yellow urine? /Yellow eyes	10
Convulsions	11
Losing consciousness	12
Other (specify)	13

3. Do you think malaria in pregnancy is dangerous?

Yes	1
No	2
Don't know	3

If No and Don't know, go to 5

4. If a pregnant woman gets malaria, what are the possible consequences? Circle all responses and do not prompt.

Spontaneous miscarriages	1
Preterm delivery	2
Low birth weight	3
Still births	4
Maternal morbidity	5
Martenal mortality	6
Don't know	7
Other (specify)	8

5. Do you think a person can die from malaria?

Yes	1
No	2
Don't know	3

6. Do you know of somebody who has died from malaria?

Yes	1
No	0

Section D
Care of suspected malaria cases

1. Have you had an attack of malaria during this pregnancy?

Yes	1
No	0

2. Have you ever had an attack of malaria in your life?

Yes	1
No	0

3. What do you usually do when you or a member of the house has a fever?

Give paracetamol	1
Chroroquine	2
Go to the clinic	3
Traditional medicine	4
Tepid sponging	5
Nothing	6
Other specify	7

4. Have you ever used any home made remedies in the treatment of any fever?

Yes	1
No	0

5. What is the usual first action when you suspect that somebody has malaria?

Self-medication with anti malarial tablets	1
Go to the clinic	2
Give traditional medicine	3
Other specify	4

6. Do you keep anti malarial drugs at home?

Yes	1
No	0

If No go to 9

7. Which antimalarial drugs do you keep at home?

Chloroquine	1
Fansidar	2
Fansidar and Chloroquine	3

8. What is the dose that you would give to a person with malaria?

Knowledge of right dose:

Yes	1
No	0

9. Have you ever heard of chloroquine holders in the community?

Yes	1
No	0

If No go to section E

10. Have you ever obtained malaria medication for yourself or a household member from the chloroquine holders?

Yes	1
No	0

Section E

Perceived barriers to successful malaria control

1. Are you currently using any method, even if traditional, to protect your household from mosquitoes?

Yes	1
No	0

If No go to 5

2. What method are you currently your household from mosquitoes?

Circle all responses

Using a mosquito net	1
Insecticide spray	2
Clean the area around the house	3
Use mosquito coils	4
Apply mosquito repellent to skin	5
Close doors and windows	6
Use traditional plants	7
Other specify	8

3. Are you satisfied with this method?

Yes	1
No	0

If Yes go to 6

4. If No, which method would you prefer to use?

Mosquito net	1
Insecticide sprays	2
Mosquito coils	3
Other specify	4

5. What, if anything, prevents you from fully protecting your household against?
Circle all responses.

I don't know how to	1
I don't have money	2
I don't have time	3
Protection material are not available to me	4
I cant be bothered	5
Other specify	6

6. Do you know of malaria prophylaxis for pregnant women?

Yes	1
No	0

7. Have you taken any form of malaria prophylaxis during this pregnancy?

Yes	1
No	2

If No go to 11

8. What did you take?

Chloroquine	1
Fansidar	2
Fansidar and Chloroquine	3

10. Where did you get it?

From the clinic	1
From the shops/ pharmacy	2
Other specify	3

11. Why have you not taken any malaria prophylaxis during this pregnancy? Circle all responses.

I don't know about it	1
I don't have money	2
I don't want to harm my baby	3
I have to seek permission from my husband	4
I cant be bothered	5
Other specify_____	6

12. Who makes the decision concerning the purchase of malaria control tools in your household?

Self	1
Husband	2
Other Specify_____	3

Section F
Source of information

1. Have you ever seen or heard of malaria education messages from any source?

Yes	1
No	0

If No go to 4

2. Where did you see or hear these messages? Circle all responses.

Radio	1
Television	2
Newspaper	3
Posters	4
School	5
Health workers	6
Church	7
Friends	8
Other specify	9

3. What message or messages did you see or hear?

Messages about prevention	1
Messages about transmission	2
Messages about treatment	3
Cant remember	4
Other specify	5

4. What information would you like to know about malaria? Circle all answers

Information on prevention	1
Information on treatment	2
Information on Transmission	3
Other specify	4

5. Where would you like to get this information? Circle all the responses

Radio	1
Television	2
Newspaper	3
Posters	4
School	5
Health workers	6

Appendix 5

Sample of an educational pamphlet