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MPH POPULATION AND REPRODUCTIVE HEALTH

The Economic Burden of Malaria in Pregnancy in the Sunyani Municipality

Mabel Adarkwa
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THE ECONOMIC BURDEN OF MALARIA IN PREGNANCY IN THE SUNYANI MUNICIPALITY

A thesis submitted to the School of Graduate Studies, Kwame Nkrumah University of Science and Technology, (K.N.U.S.T.) in partial fulfilment of the requirements for the award of Degree in Population and Reproductive Health.

BY
MABEL ADARKWA,
FEBRUARY, 2009

DECLARATION

I, Mabel Adarkwa, author of this thesis, “Economic Burden of Malaria in Pregnancy,” do hereby declare that, apart from references to past and current literature duly cited in this thesis, the entire research work presented in this thesis was done by me as a student of the Department of Community Health, School of Medical Sciences, K.N.U.S.T.

It has neither in whole nor in part been submitted for a degree elsewhere.

SIGNATURE ……

MABEL ADARKWA

CANDIDATE

SIGNATURE……
DR EASMON OTUPIRI
ACADEMIC SUPERVISOR

SIGNATURE……..
DR ANTHONY ADUSEI
HEAD, DEPARTMENT OF COMMUNITY HEALTH

DEDICATION

This work is dedicated to my Godfather, Mr Kwabena Tieku, for his support, encouragement and love.

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Notwithstanding all this, I am entirely responsible for any error of fact, interpretation, omission or commission in the thesis.

DEFINITION OF TERMS

Complete Disability Period: The number of days in which the client had to avoid the engagement in her main and subsidiary occupation due to physical and /or mental disability.

Financial Cost: The amount of money spent to treat malaria both at home and at the health facility. These include cost of drugs, consultation, laboratory and transportation involved in the treatment of malaria.

Educational Level: The highest educational standard achieved.

Full Recovery: The ability to resume the engagement in her main and subsidiary occupation after an illness.

Opportunity Cost: This refers to the time lost by the pregnant woman as a result of the disease. These include travel time to the health facility, time spent at the health facility and the cost of productive time as a result of malaria.

LIST OF ABBREVIATIONS/ACRONYMS

ANC	Antenatal Care
CDC	Centre for Disease Control
DALYs	Disability Adjusted Life Years
GDP	Gross Domestic Product
GHS	Ghana Health Service
HIV	Human Immunodeficiency Virus
IPT	Intermittent Preventive Treatment
ITN	Insecticide Treated Net
LBW	Low Birth Weight
LHYH	Low to High Income Households
MHD	Municipal Health Directorate
MOH	Ministry of Health
OPD	Out-Patient Department
PHC	Primary Health Care
VLYH	Very Low Income Households
URTI	Upper Respiratory Tract Infection
WHO	World Health Organization
WIFA	Women in Fertility Age

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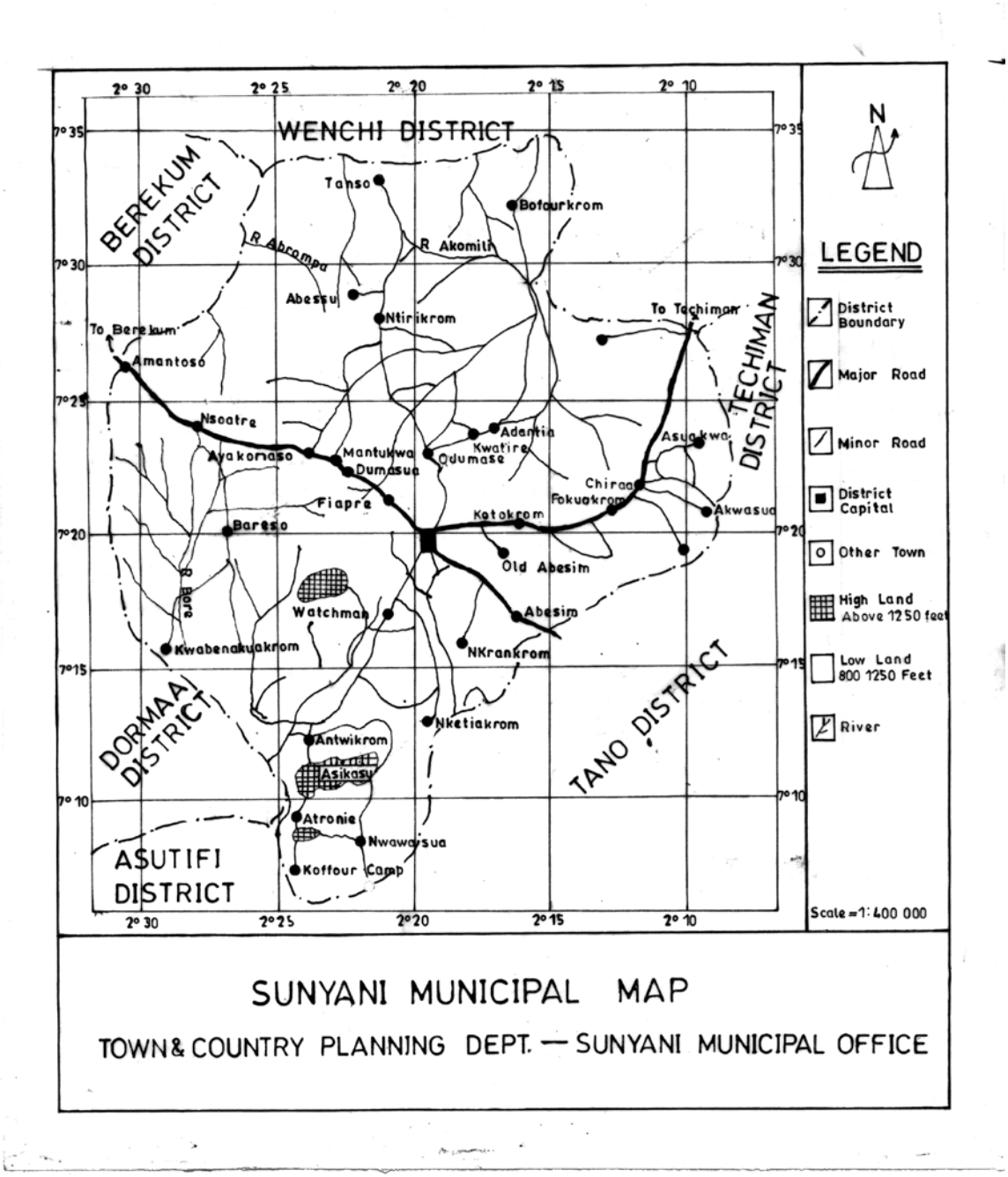
MAP OF SUNYANI MUNICIPALITY



ABSTRACT

Globally, over 40% of people live in areas where malaria transmission occurs. It is estimated that, three hundred to five hundred million cases of malaria occur each year resulting in seven hundred and fifty-thousand to two million deaths. Pregnant women infected with malaria have an increased risk of maternal anaemia, abortion, stillbirth, prematurity, intrauterine growth retardation and low birth weight.

This research was carried out to assess the economic burden of malaria in pregnancy in the Sunyani Municipality. The data were collected from three health facilities that were randomly selected and one purposively selected in the Municipality. A pre-tested questionnaire was used to collect information from the clients. Information was collected on the amount of money spent to treat malaria during pregnancy as well as the time lost due to malaria illness. Opportunity cost was measured and economic value assigned to it. For uniformity, the specific wage rate in the municipality was used. The average person's days lost during an episode of malaria illness in the study area was seven fully disabled days. Output and wages lost constituted the highest proportion of the opportunity cost of the clients.

From the study, an average cost of US $19 (GH¢16.67) was incurred by a pregnant woman accessing health care in a facility on each episode of malaria. Out of this, 24.3% was financial cost whilst 75.7% was opportunity cost. A large proportion of financial cost was on drugs (53.1%) for malaria treatment.

The economic burden of malaria among pregnant women in this study was largely due to opportunity cost incurred and this calls for concerted effort to intensify malaria control and prevention programmes especially for pregnant women.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND INFORMATION

Globally, malaria is the most important parasitic infection and ranks among the major health and developmental challenges facing large parts of the world, including some of the poorest countries. The health and wealth of nations and individuals alike are affected. In sub-Saharan Africa, malaria is understood to be both a disease of poverty and a cause of poverty. It serves as a barrier for millions of poor and vulnerable people, especially women, from engaging in economic activities to enable them escape from poverty. It accounts for the highest cause of mortality in Africa with 90% of the global malaria deaths occurring on this continent. It constitutes 9% of the disease burden to the people of Africa, and is responsible for 25% deaths below the ages of five years (WHO, 1998).

Malaria in pregnancy is an obstetric, social and medical problem requiring multidisciplinary and multidimensional solution. Pregnant women constitute the main adult risk group for malaria and 80% of deaths due to malaria in Africa occur in pregnant women and children below five years. In Africa, perinatal mortality due to malaria is about 1500/day. In areas where malaria is endemic, 20-40% of all babies born have a low birth weight (Kakkikeya, 2002). Malaria and pregnancy are mutually aggravating conditions.

The physiological changes of pregnancy and pathological changes due to malaria have a synergistic effect on the course of each other, thus making life difficult for the mother, and the unborn baby. *Plasmodium falciparum* malaria can run a turbulent and dramatic course in pregnant women. The non-immune, prime- gravidae are usually the most affected. The morbidity due to

malaria in pregnancy includes anaemia, fever illness, hypoglycaemia, cerebral malaria, pulmonary oedema, puerperal sepsis and mortality may occur from severe malaria and haemorrhage. The problems in the new born include low birth weight, prematurity, intra-uterine growth retardation, malaria illness and mortality.

Malaria is the number one public health problem in Ghana, and accounts for the major cause of hospitalization, morbidity and mortality among the vulnerable. Some 9% of deaths in this country are attributed to the disease which accounts for 30% of outpatient visits and 9% of hospital admissions (Asenso-Okyere, 1997). Malaria is endemic throughout Ghana and continues to be a major public health concern. It is one of the leading causes of morbidity and mortality, especially among pregnant women. The Ministry of Health (MOH) estimates over the past ten years showed that, there have been 2-3 million cases of malaria each year, representing 40% of outpatient cases, while severe malaria accounts for 33-36% of in-patients (GSS, 2004). During the launching of the Antimalarial Drug Policy in Accra, 2005, the then Minister of Health, Major Courage Quashigah confirmed that, two thousand women and fifteen thousand children under age five died of malaria in 2004 and attributed a quarter of all child mortality cases in Ghana to malaria.

WHO strategic framework approach for malaria controls during pregnancy is a multi-pronged one which has been adopted by Ghana. The approach includes intermittent preventive treatment (IPT), insecticide-treated nets (ITN) and case management of malaria illness. With IPT, Sulfadoxine Pyrimethamine is administered three times in pregnancy under supervision. The first dose is given after quickening and the subsequent ones at a four week interval. This strategy replaces the previous weekly unsupervised Chloroquine prophylaxis of which only 11.6% of pregnant women complied. ITNs serve as mechanical barriers; repel mosquitoes from biting the individual and kill

mosquitoes on contact. The Government of Ghana in an attempt to make ITNs more accessible and affordable to the populace especially the vulnerable has reduced tariffs on its importation. Some private companies such as Mobil Oil (Ghana) Limited have further subsidized the prices of the nets for the under-five and pregnant women, all in an attempt to reduce the disease burden among the vulnerable.

Generally with all disease conditions, prognosis is good if the condition is detected early with prompt and proper management. That is the reason why the MOH has strategized early diagnosis followed by prompt and adequate treatment. Chemoprophylaxis therefore remains the main thrust for malaria control in Ghana. Although self-medication is not encouraged during pregnancy due to its effects on the pregnant woman and the developing foetus, most pregnant women do self-medicate, especially for febrile conditions. This behaviour is partly due to the cost involved in accessing health care in a facility.

The cost involved in accessing health care usually serves as a barrier to most people. This can be attributed to the fact that malaria occurs in poor countries, and its presence has a strong negative correlation with economic growth in families, communities, and nations as a whole. Apart from the facility-based cost the individual incurs, there is an opportunity cost of travel time as well as time spent at the facility. These usually influence health seeking behaviour of pregnant women.

The disappearance of malaria in parts of Europe was associated with economic development related to agricultural expansion rather than vector control or chemoprophylaxis. It has been argued that because the burden of malaria is concentrated in poor countries there is inequity in allocation of global research funds especially by the pharmaceutical industry, since domestic purchasing

power for new products is very limited especially for antimalarial drugs (Najera, 1994). There is the need for cost effective health care resource allocation and programming of disease control based on a system that will reduce the greatest illness burden among the populace especially women and children.

1.2 PROBLEM STATEMENT

Malaria infection during pregnancy can have adverse effects on both mother and foetus, including maternal anaemia, foetal loss, premature delivery, intra-uterine growth retardation and delivery of low birth weight infants. It is a particular problem for women in their first and second pregnancies and for women who are Human Immunodeficiency Virus (HIV) positive. The burden of malaria is much greater in sub-Saharan Africa, with 15% of all disability adjusted life years (DALYs) lost to the disease with an estimated 90% of the total malaria incidence and deaths occurring particularly among pregnant women and children under five (WHO,1999).

Statistics available at the National Malaria Control Programme of Ghana indicate that about seven thousand pregnant women die of malaria annually in Ghana. Those pregnant women who survive may have various degrees of effect such as maternal anaemia, intra-uterine growth retardation, stillbirth among others (National Malaria Control Programme, 2005). An estimated US $2 billion is spent annually on both direct and indirect costs of prevention and care worldwide (WHO, 2000). In Ghana, malaria is recognized as one of the top five major causes of morbidity and mortality especially among infants, young children less than five years of age and pregnant women.

In the Sunyani Municipality, there has been an upward trend in malaria cases over the past five years (Annual Reports of Municipal Health Directorate [MHD] 2004 and 2005). Though, the

populace in the Municipality is at risk, the burden falls more on the vulnerable; women and children. Even within the vulnerable group, pregnant women tend to have a greater burden since the malaria parasite has a strong affinity for the placenta. Though the Municipal Health Directorate is aware of the impact of the economic burden of malaria in pregnancy, there is no documented information and no research has been undertaken to provide evidence based information for action. Moreover, women in fertility age (WIFA) constitute 26.2% of the population in the Municipality (MHD, 2005), this therefore call for the need to intensify malaria control efforts to reduce the burden of malaria in the Municipality, thereby preventing the various repercussions associated with it.

1.3 RATIONALE OF THE STUDY

Malaria remains a priority problem in Ghana and continues to be the most common disease and also the number one cause of morbidity seen in the health facilities in the country including the Sunyani Municipality. Over the past five years, there has been a gradual increase in malarial cases in the Municipality. In 2003 for instance, the Police Clinic in Sunyani recorded seven thousand, seven hundred and thirty-nine (7739) malaria cases constituting 15% of the total malaria cases recorded in the Municipality, followed by Nsoatre Health Centre with six thousand, two hundred and ninety-three (6293) malaria cases constituting 11% of the total malarial cases (MHD, 2004).

Research works have been undertaken in the Municipality to ascertain the reasons for low coverage of Expanded Programme of Immunization (EPI), increased diarrhoea cases in some sub-municipalities among others but no research has been done on malaria, especially, its economic burden in pregnancy (MHD, 2002, 2003 and 2004). This study was therefore carried out to have an in-depth look at the economic burden of malaria in pregnancy. The results of the study would assist

pregnant women make an informed choice about alternative providers of malaria therapy and also for decision makers to use cost structures as inputs in formulating effective health care policy.

1.4 RESEARCH QUESTIONS

The study sought to address the following questions;

1. What is the morbidity pattern of malaria in the Municipality?
2. What is the level of knowledge and health seeking behaviour of pregnant women with regards to the economic burden of malaria?
3. What is the estimated cost (financial and opportunity) of treating pregnant women with uncomplicated malaria?

1.5 RESEARCH OBJECTIVES

The main objective of the present study was to assess the economic burden of malaria during pregnancy in the Sunyani Municipality in the Brong Ahafo Region.

1.5.1 Specific objectives

The study specifically sought to:

1. Assess the knowledge of malaria and health seeking behaviour of pregnant women with regards to the economic burden
2. Estimate the cost of treating pregnant women with uncomplicated malaria
3. Offer recommendations to the Sunyani Municipal Health Directorate and significant others on how best this problem can be addressed

1.5 CONCEPTUAL FRAMEWORK: FACTORS INFLUENCING THE ECONOMIC BURDEN OF MALARIA

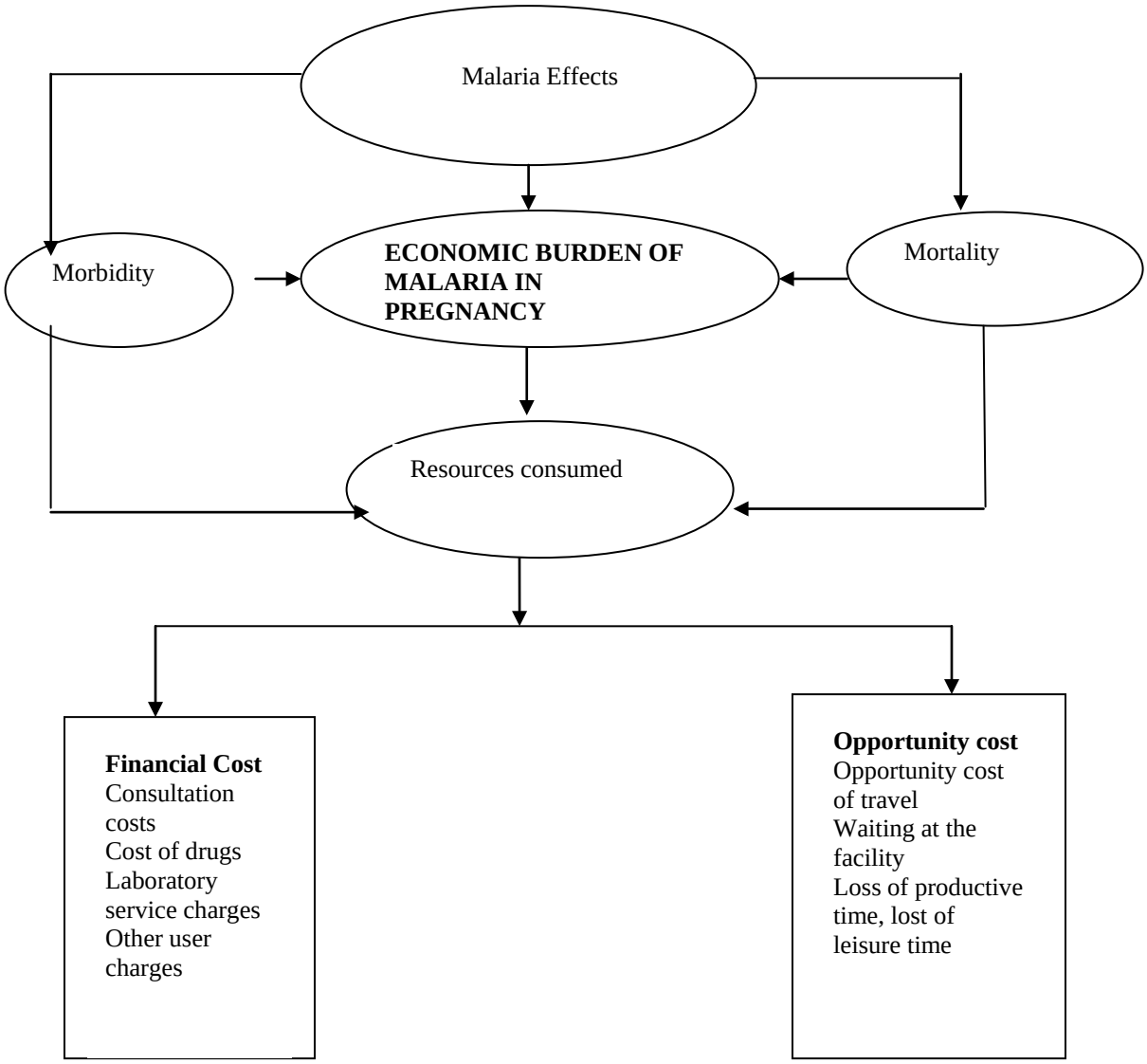


Figure 1: Conceptual Framework:

Source: Author's construction

There are five main sections in the Conceptual Framework as shown in **Figure 1** above with the economic burden of malaria in pregnancy as the central theme. Two sections which represent the economic effects of the disease while the last two sections represent the health effects all contribute to the economic burden of malaria in pregnancy. Morbidity and mortality are associated with the disease may lead to resource consumption. The cost involved can be direct or indirect. The direct cost refers to the direct out- of- pocket money spent on treatment, indirect cost on the other hand is the opportunity cost of travel, waiting at the health facility and lost of productive time.

1.6 PROFILE OF STUDY AREA

1.6.1 GEOGRAPHICAL LOCATION

Sunyani Municipality is the regional capital of the Brong Ahafo Region. It shares boundaries to the north with Berekum, south with Tano, west with Asutifi and east with Wenchi District. It has seven sub-municipals namely; Sunyani, Chiraa, Nsoatre, Odumase, Antwikrom, Abesim and Fiapre.

It is located in the tropical climatic belt with a characteristic vegetation of semi-deciduous forest with well drained fertilized soil derived from accumulation and decomposition of organic matter from leaf litter. There are two main rainfall seasons. The major season starts from April to July and the minor from September to mid November (Municipal Health Directorate, 2004, 2005).

1.6.2 INFRASTRUCTURE

1.6.2.1 Housing

Majority of the houses in the Municipality are built with cement blocks with few mud ones roofed with aluminium or zinc sheets. Most of the houses in the Municipality are in good shape with the

exception of a few, especially, in the ‘Zongos ‘associated with poor ventilation (Municipal Health Directorate, 2004).

1.6.2.2 Transport and Road Network

Sunyani Municipality is connected to the Berekum and Tano Districts through first class roads while Techiman Municipality is connected through a second class road. The Sub-municipalities are connected to each other by second class roads. Some of the villages are linked to each other by untarred roads and footpath. There are all kinds and makes of vehicles both private and commercial, which make up the road transport system (Municipal Health Directorate, 2004).

1.6.2.3 Electricity and Telecommunication

Most of the people in the Municipality enjoy some form of electrical power as the Municipality is connected to the national grid. Telecommunication facilities between the Municipal Health Directorate and the sub-municipal health facilities are good, as most of them have functional telecommunication service. This promotes free flow of information for the prompt reporting of epidemic-potential diseases among other things (Municipal Health Directorate, 2004).

1.6.3 ECONOMIC ACTIVITIES

The Municipality is predominantly an agricultural one engaged in food and cash crop production. Agriculture is mainly rain fed since there are no irrigation facilities. This makes income levels in these areas quite low, affecting the purchasing power of the people. However, trading has gained momentum in recent times due to double role as the Regional Capital. Trading is mainly all day but Wednesday is earmarked for marketing, where traders from the other areas converge to sell their goods. The market queens still wield a lot of power and do not allow people from other areas to sell

their foodstuffs directly in the market. This makes the cost of foodstuff quite expensive in the Municipal Capital. This affects food availability in the households, which in turn negatively impact on the nutritional status of the people in the municipality especially women and children. Again, the low income in these areas does not promote savings and wealth creation (Municipal Health Directorate, 2003).

1.6.4 HEALTH SERVICES

The Municipal Health Directorate has seven sub–municipalities and twenty-nine (29) health institutions. Of the total number of health institutions, the government owns only 30.8%. The Municipality has a population of one hundred and eighty-eight thousand, two hundred and thirty-five (188,235). This forms 1% of the total population of the Brong Ahafo Region which has two hundred and forty-six (246) communities. The Municipal Health Directorate has one hundred and thirteen (113) staff, 25% are Ward Assistants and 8.1% are Community Health Nurses.

Table 1.1: Distribution of Health Facilities in the Municipality

Category	Number	(%)
Hospitals	3	10
Health Centres	3	10
Clinics	5	17
Maternity Homes	6	20
School Clinics/Others	10	33
Quasi Government	3	10
TOTAL	**30**	**100**

Source: Municipal Health Directorate, 2003.

Table 1.2: Top Ten Morbidity (January-December) 2004

Condition	Number of Cases	(%)
Malaria	66797	55
URTI	7111	6
Disease of Skin and Ulcers	6420	5
Accidents	4400	4
Intestinal worms	3638	3
Gastroenteritis	3317	3
Diarrhoea	3305	3
Rheumatism	2585	2
Hypertension	1781	1
Gynaecological Disorders	1562	1
Ten Top Total	**100916**	**83**
All Other Diseases	21018	17
GRAND TOTAL	**121944**	**100**

Source: Municipal Health Directorate, 2005

1.8 SCOPE OF THE STUDY

The study was limited to pregnant women in the Municipality receiving Antenatal Care from three randomly selected facilities and one purposively selected facility. Questionnaires were administered to elicit information from pregnant women on the knowledge of malaria and health seeking behaviour and the cost involved in treating an episode of malaria in pregnancy. The main study variables were derived from the objectives of the study, conceptual framework and literature review.

1.9 ORGANISATION OF WORK

This thesis is divided into six main chapters organized as follows:

Chapter 1: Consists of background information on the economic burden of malaria in pregnancy, the problem of malaria in pregnancy**,** the research objectives and an overview of the profile of the study area.

Chapter 2: Reviews relevant literature related to economic burden of malaria in pregnancy. It is sub-divided into the following sections; morbidity pattern of malaria, knowledge and health seeking behaviour of pregnant women with malaria as well as the direct and indirect cost involved in treating malaria.

Chapter 3: Outlines the study methods and design, data collection techniques and tools, ethical consideration, limitations of the study and assumptions.

Chapter 4: This is devoted to the main results and findings of the data collected in relation to the morbidity pattern of malaria, knowledge and health seeking behaviour of pregnant women with malaria and the cost involved in malaria treatment during pregnancy.

Chapter 5: this chapter discusses the main results enumerated in chapter four.

Chapter 6: Summarises the main conclusions drawn from the study and makes appropriate recommendations to the Municipal Health Directorate, Regional Hospital, Regional Health Directorate and significant others based on the findings in chapter four.

CHAPTER TWO

LITERATURE REVIEW

2.1 MORBIDITY PATTERN OF MALARIA

Malaria is a disease of major Public Health concern in the African Region, with five hundred and fifty (550) million people at risk. It accounts for 30-40% of associated economic loss of over US$ 3 billion annually. Brinkman and Brinkman (1991), reviewing the malaria situation in Africa estimated that malaria mortality is about 5/1000 per year with a case fatality rate between 2% and 24% and that malaria accounts for between 20% and 50% of all admission in Africa hospitals although only a maximum of 25% of all persons with malaria do visit hospitals. Mortality from malaria results from severe infection almost always caused by the mosquito Anopheles gambiae.Africa alone accounts for 90% of malaria mortality (Sachs and Malaney, 2002).

Malaria is one of the leading causes of illness and death especially among children less than five years, 40% of fewer than five visits and 20% of antenatal consultations in maternal and child health service is due to malaria in the Gambia (O'Alessandro et al., 1995). A mortality survey conducted by the Department of State for Health in Gambia indicated that, malaria is the most frequent cause of death in the rural areas accounting for 105 deaths/1000 live births. Malaria is one of the causes of severe anaemia (Hb < 5.0g/d) in pregnant women in the Gambia. However; the actual proportion of anaemic cases that can be attributed to malaria is unknown. Severe anaemia increases the risk of death in mothers and infants. Between 1992 and 1995 severe anaemia accounted for between 8-10.5% of all maternal deaths and was also estimated to be contributory factor in 41.3% of all deaths in the maternity unit in the Royal Victoria Hospital in Gambia (Malaria Situational Analysis Report, 2002).

Mortality as a result of cerebral malaria, the most severe form of *Plasmodium falciparum* infection was estimated to be as high as 20% in Ghana (Commey *et al*; 1980). It is worth mentioning that, malaria and anaemia accounted for 59% of hospital deaths in 1996 and a survey conducted at the end of November 1996 diagnosed 22% of children 6-24months of age are severely anaemic (Koram *et al*;2000).

Low birth weight (LBW) deliveries are also associated with malaria in pregnancy. Over the last ten years, the prevalence of LBW deliveries in primigravid women at health facilities in rural Gambia varied between 18 and 30%. The prevalence of placental malaria infection, an indication of maternal infection was estimated at 26.4% between 1991 and 1992 in Basse Health Centre and 51.1% during the rainy season in 1997 in Bansang Hospital (Browne, 1997).

Data from outpatient and mortality records indicate that, malaria accounts for a large proportion of morbidity and mortality in Ghana (MOH, 1991). For instance clinical malaria accounted for 43% of all outpatient visits in 1987 and 44.1% of new clinic attendance in 1989. It has been estimated that malaria caused 6% of all deaths in the country in 1975 (MOH, 1992). The disease accounts for an average of 13% of all mortality cases in Ghana and 22% of all mortalities in children under five years. With regards to pregnant women, out of the total number reporting at health institutions, 13.8% suffer from malaria and 9.4% of all deaths in pregnant women (Antwi and Marfo, 1998; Marfo, 2002). It is estimated that malaria prevalence (notified cases) is 15,344/100000 with a malaria death rate for all ages being 70/100000. In the case of the 0-4 years, it is 448/100000 reported for the year 2000 (United Nations, 2003).

About 90% of all malaria deaths in the world today occur in sub-Saharan Africa. It accounts for 9% of the disease burden to the people of Africa (Africa Malaria Report, 2003). Malaria is the number one public health problem in Ghana and accounts for the major cause of hospitalization, morbidity and mortality particularly in infants and children under five years. It is estimated that, about 9.0 % of all deaths in the country are attributed to the disease, with 30% OPD visits and 9.0% of hospital admissions (Asenso- Okyere & Dzator, 1997).

In Ghana, malaria accounts for 13.8% of all OPD attendances by pregnant women, 10.6% of admissions and 9.4% deaths, seven deaths from malaria daily (Browne, 2003). Physiological changes that occur during pregnancy reduce the body's immunity against malaria. This can also be attributed to the fact that, the malaria parasite has affinity for the placenta. Consequently, malaria is more severe in pregnant women than in non-pregnant adults living in endemic areas. Severe anaemia in pregnancy is a major cause of maternal mortality in Africa. Although the causes of anaemia include a multiplicity of factors including iron and folate deficiencies, hookworm infestation and HIV infections, malaria is the predominant cause of anaemia in pregnant women in endemic communities.

Malaria is also a leading cause of workdays lost due to illness in Ghana thereby contributing more to potential income lost than any disease. On the average three workdays is lost per malaria episode by the patient(Asenso Okyere & Dzator,1997).The disease is again responsible for 12.2% of all healthy life lost making it the chief cause of lost days of healthy life in Ghana(Ghana Health Assessment Team,1997). Inability to diagnose malaria quickly is a contributing factor to increased

mortality, prolonged morbidity, the spread of drug resistance and delayed response to emerging epidemics.

Dipstick tests and other rapid, user-friendly field diagnostics are essential for addressing these challenges. Enhanced effort should be given to producing these tests at lower cost and increasing their availability in developing countries. Private sector interest in developing new diagnostics should be encouraged.

It is estimated that in Africa, about four hundred thousand (400,000) pregnant women develop severe anaemia due to malaria resulting in ten thousand (10,000) maternal deaths. *Plasmodium falciparum* infection in pregnant women is also a leading contributor to babies born with low birth weight. In the latter part of 1990, it was discovered that, pregnant women in malaria endemic countries develop antibodies against conserved epitomes of malaria parasites causing placental infection (Fried et al., 1998, Ricke *et al*., 2000). This may lead to inflammatory response and deposition of fibrinoid material. This in turn may reduce placental blood flow causing impaired foetal growth with subsequent low birth weight and prematurity (Menendez *et al*., 2000). Adult women in areas of stable transmission have a high level of immunity but this is impaired especially in the first pregnancy with the result that risk of infection increases.

The immunosupression occurring in pregnancy makes pregnant women in endemic areas susceptible to malaria which in most cases is severe. This usually leads to spontaneous abortion, premature labour, and placental parasitisation leading to still births, neonatal deaths, and maternal deaths among others. In early pregnancy, malaria may cause spontaneous abortion whilst in late

pregnancy, intrauterine deaths and low birth weight may result. It may also cause brain damage, speech disorders, blindness, hearing impairment and cerebral palsy (Mills & Shillcutt, 2004).

A lot of studies in other African countries revealed that, the problems enumerated above usually result due to low patronage of preventive services and late reporting at health facilities among others. An in-depth knowledge into these issues usually reveals that, individuals are unable to afford the cost involved with such services. This cost involves both direct and indirect. Moreover, there is a potential for bias arising from using clinic or hospital based data since only around 20-40% of malaria cases and deaths are estimated to receive treatment in formal health facilities (McCombie, 1996). Most malaria cases is diagnosed and treated in the home. As a result, data from health facilities reflects an inequity in access to those facilities, though the extent of the inequity cannot be determined without comparison to population based data.

Expenditure on malaria prevention was positively correlated with income according to a study in Malawi. Ten percent of all households reported expenditure on malaria prevention in the preceding month. Guiguemde examining expenditure on prevention and treatment combined in three zones in Burkina Faso found that more than US$80 per family was spent during the six month malaria season by 60% of families in the town centre, 45% of those in the intermediate zone and 39% of outlaying zone families. Thus those in urban areas spent more resources on prevention and treatment. Urban women (67%) are more likely to take antimalarial drugs during pregnancy than rural women (53%).The use of antimalarial drugs increases with increasing levels of wealth and education(GDHS, 2004).

The impact of malaria epidemic is greatest when they follow periods of drought and famine when populations are most vulnerable. There is likely to be an increase in the incidence of low birth weight babies and other complications arising from malaria in pregnancy following epidemics. During malaria epidemic in Sri Lanka in 1934-1935 for instance, a case fatality rate of 13% was recorded among pregnant women and the rate of foetal loss or neonatal death was almost 70%.In an unstable transmission area on the northwestern border area of Thailand, *Plasmodium falciparum* was the main cause of maternal deaths before the institution of ANC programmes and pregnant women were found to be two times more likely to develop severe malaria than non-pregnant women (White, N, J.1990).

An epidemic in Rwanda in 1998 led to a four- fold increase in malaria admissions among pregnant women and a five –fold increase in malaria maternal deaths due to malaria (Ettling & Shepard, 1991). Placental parasitaemia was associated with an increased risk of prematurity and a seven-fold increased risks of stillbirths in areas of unstable transmission in Ethiopia. Malaria continues to be one of the most important and devastating infectious diseases in developing areas of the world. Globally, over 40% of the people live in areas where malaria transmission occurs. It is estimated that 300-500 million cases of malaria occur each year resulting in 750,000 to 2 million deaths (CDC, 2004). Pregnant women infected with malaria have an increased risk of maternal anaemia, abortion, stillbirth, prematurity, intrauterine growth retardation and infants of low birth weight (Howard, 1999). Apart from being disabling and sometimes total disease itself, malaria in non-immune pregnant women accounts for abortion in up to 60% of cases and a maternal mortality of up to 10% (WHO, 1998).

In the United States for example, the number of deaths due to malaria is relatively much lower and involves the so-called imported cause in which U.S. travellers acquire the infection upon travel to endemic areas and subsequently return to the U.S. or in situations where infected foreign citizens travel to the U.S. Between 1979 and 1998, one hundred and eighteen deaths were reported with an average of six deaths per year (CDC, 1998).

2.2 KNOWLEDGE OF MALARIA AND HEALTH SEEKIN BEHAVIOUR OF PREGNANT WOMEN

Human malaria is caused by four parasite species. All of them belong to the Plasmodium genus and include *Plasmodium falciparum, Plasmodium vivax, Plasmodium ovale* and *Plasmodium malariae.* The first two cause majority of infections whereas the prevalence for the last two is low. *Plasmodium falciparum* is spread worldwide but especially common in Africa. It is the most aggressive species and accounts for 80-90% of infections and is responsible for the most severe or complicated malaria characterized by multiple vital organ dysfunction. This manifests as coma acidosis, hypoglycaemia, renal failure, pulmonary oedema or severe anaemia. In pregnancy severe malaria usually kills the foetus and the mother as well (Murphy & Bremen, 2001). Almost all malaria deaths result from *Plasmodium falciparum* infections. *Anopheles gambiae* and *Anopheles fenestus* are the principal vectors responsible for the transmission of malaria. The *Plasmodium falciparum* has a life cycle in the mosquito vector and also in the human host. The *Anopheles gambiae* mosquito is the vector responsible for the transmission of malaria. The prevalence of malaria is dependent on the abundance of the female *Anopheles* species, the propensity of the mosquito to bite, the rate at which it bites, its longevity and the rate of the plasmodium parasite inside the mosquito.

Generally, health seeking behaviour is influenced by availability, accessibility, affordability and acceptability of the facility. Availability refers to the geographic distribution of health facilities and pharmaceutical products among others. Accessibility includes transport, roads, etc. The cost of treatment as well as distance travelled to reach a health centre is mentioned frequently as barriers to access.

Affordability includes treatment costs for the individual, household and the family as a whole. Acceptability relates to cultural and social distance. This mainly refers to the characteristics of health providers-health workers behaviour, gender aspects and excessive bureaucracy. Medical geographers, anthropologists and epidemiologists have mainly emphasized distance and economic aspects as key factors for access to treatment (Good, 1987). Again in Zambia, a survey showed a substantially higher prevalence of malaria infection among the poorest population groups. Poor families live in dwellings that offer little protection against mosquitoes and are less able to afford insecticide treated nets.

In Mali, Kelley found that those in the poorest economic quintile were significantly more likely to seek care from traditional providers than other quintiles and to use hospitals less frequently than other quintiles. Individuals in the richest income quintile were almost twice as likely to seek treatment for fever as those in the poorest quintile. In that particular study, majority (60%) of respondents sought no care at all with 33% citing ‘lack of money’ as a reason for not doing so. Of those who sought no care at all, 89% self–medicated (Kelley *et al.*, 2001).

Though, few antenatal clinics in Africa provide IPT, there is considerable range with regards to utilization of antenatal clinics by the poor. This issue merits further discussion given the interest in

using antenatal clinics to deliver malaria services and commodities. Some of the pregnant women due to poverty may not attend any antenatal clinic throughout the pregnancy or at a later stage where nothing much can be done for the unborn baby. A survey in Zambia found a substantially higher prevalence of malaria infection among the poorest population groups. This can be attributed to the fact that poor families live in dwellings that offer little protection against mosquitoes and are also less able to afford IPT.

They are also less likely to pay either for effective malaria treatment or for transportation to a health facility capable of treating the disease. Again, evidence from Malawi revealed that, rural children as well as women with lower levels of education are more likely to suffer from fever compared to urban children and better educated women (Ndawala *et al*., 2000). In rural Kenya, a similar measure of assets to approximate socio-economic status in pregnant women with literacy as a proxy for socio-economic status was used. The study found an increased presence of placental malaria among women of lower socio-economic status (Shulman *et al*, 1999). Net ownership was more common among households where women had a source of cash income in Tanzania (Mwageni *et al.*, 2002). Multicountry studies show differences in types of care sought by the worthy and the poor, with the poor more frequently opting for care outside the modern sector and the worthy opting for care in the modern sector.

People in urban areas and those with high incomes were more likely to seek care for any illness from health facilities compared with those in the rural areas with low income in Burkina Faso. Those in the rural areas with low income either self–medicated or patronized the services of traditional healers as a result of geographical and monetary access. Malaria treatment at health facilities was found to incur the greatest out of pocket expenditure followed by self- treatment with

the services of traditional healers been the minimum (Mugisha *et al*, 2002). Data gathered on management practices for unconfirmed malaria illness from two communities in Ghana, one of low and one of relatively higher socio-economic status revealed very few people did nothing, but left–over drugs were used to treat more (82%) episodes in the poor compared to the less poor community (53%) and the purchase of drugs without prescription was more common (29%) in the poor than in the less poor (19%). The poor were also less likely to go to a clinic than the less poor, 19% and 31% respectively (Biritwum *et al*., 2000).

Fawole and Onadeko examined the treatment seeking behaviour of urban poor mothers and carers of children with fever in Nigeria. The level of education was statistically significant predicator of the kind of health care intervention sought (Fawole & Onadeko, 2001). In assessing the choice of antenatal care options in a rural subsistence farming community in Uganda, the level of education, religion and marital status of women did not influence antenatal clinic attendance. However; health seeking behaviour was influenced by the perceived high cost of ANC services, delivery and treatment and the inadequacy of formal health system. In the study, 66.4% of women reported suffering from malaria during current pregnancy and only 49% of these had obtained treatment from the formal delivery system. The rest had used self-treatment with drugs purchased from shops or been treated by neighbours using herbs or no treatment at all. The main reason for not using formal health systems was economic and lack of drugs in formal clinics, distance and cost of travel to clinics and waiting time (Ndjomugyenyi *et al*., 1998).

Ghana can broadly be divided into three agro-ecological zones namely the coastal, the forest and the savannah. Each of these zones exhibits different characteristics in relation to the vector and the parasite. Differences in temperature, rainfall and humidity patterns as well as the ecology account

for these variations (GDHS, 2004). Malaria is endemic in Ghana and its distribution follows distinct climatic and ecological zones with two rainy seasons, that is, the coastal and forest ecological zones as compared to one in northern savannah, the seasonal pattern of malaria differs throughout the year in various parts of the country. It has been observed that, there is an increase in the reported cases of malaria just before and after the rains Ahmed, 1989.

WHO strategy for prevention of malaria in pregnancy has a three-pronged approach. These include IPT, ITN and Effective Case Management. IPT involves the use of anti-malarial drugs given in treatment doses at predefined intervals after quickening to clear a presumed burden of parasites based on the assumption that, every pregnant woman living in areas of high malaria transmission has malaria parasites in her blood or placenta, whether or not she has symptoms of malaria. Sleeping under an ITN is probably the most effective method for preventing mosquito bites because mosquitoes bite at night when the pregnant woman is asleep. ITNs prevent mosquito bites by repelling them or killing them on landing on the net as well as serving as a mechanical barrier (Ghana Health Digest, 2004).

In spite of these preventive measures, some pregnant women would still become infected with malaria. When this happens, there is the need for effective case management to prevent it from becoming complicated (Ghana Health Digest, 2004).

2.3 FINANCIAL AND OPPORTUNITY COST OF TREATING MALARIA IN PREGNANCY

Malaria is said to cause poverty and prevent or reduce people's ability to escape poverty. The evidence, however, about the relationship between poverty and malaria incidence and the causal pathway between the two is scant. The economic cost due to malaria was clearly perceived by rural Columbia households, that a 1/3 of the cost of illness was represented by the cost of treatment and 2/3 by time lost by the patient and the caretaker, and that the psychosocial costs were more difficult to compensate when the disease affected women (Bonilla & Rodriguez, 1992). The disease burden puts people in the poverty trap. This can be attributed to the fact that, the growth of income depends on investment, investment in turn depends on savings and savings depends on income. Thus, the low level of incomes coupled with various preventable disease conditions in poor developing countries prevent the investment required to raise it, hence the low level of economic growth (Bauer,2000).

Both financial and opportunity costs associated with malaria episode represent a substantial burden on the poorer households. A study in northern Ghana found that, while the cost of malaria care was just 1% of the income of the rich, it was 34% of the income of poor households (Akazili, 2002).

The financial cost entails out of pocket payment. The opportunity cost is estimated using the number of days lost from work output foregone, which is oddly narrow, calculations being based on the loss of wages during sickness, some including travel time and time spent at the health facility to seek health care. Again, the cost of accessing treatment options was the main reason why some options were not utilized in Kenya .Transport cost was found to be an important deterrent to treatment, providing support to the argument for mobile clinics in such areas. Malaria accounts for 40% of all out –patient visits and is responsible for an average loss of 3.7 days of male and 4.7

days of female output (Nyamongo, 2002). Out of the total number of pregnant women reporting ill at health institutions, 13.8 % suffer from malaria, 10.6% are on admission because of malaria whilst 9.4% of all deaths in pregnant women are attributed to the disease (Ghana Health Digest, 2004).

A lot of research findings have shown that, malaria is a leading cause of workdays lost due to illness in Ghana contributing more to potential income lost than any other disease. On the average three workdays is lost per malaria episode by the patient and two workdays by the caretaker (Asenso Okyere & Dzator, 1997). The value of these days lost to the management and treatment of malaria episode is US$6.87 and this formed about 79% of the cost seeking treatment in 1994. Malaria accounted for 3.6 ill days in a month, 1.3 work days absent and 6.4% of potential income lost in Ghana for 1988/1989. Annual economic growth in countries with high malaria transmission has historically been lower than in countries without malaria (WHO, 1999). Economists believe that malaria is responsible for a 'growth penalty' of up to 1.3% per year in some African countries. When compounded over the years, this penalty leads to substantial differences in GDP between countries with and without malaria and severely restrains the economic growth of the entire region. It has been estimated that in sub-Saharan Africa, the cost of a case of malaria was US$9.84 in 1987, comprising $1.83 in financial costs and $8.01 in opportunity costs (Shepard *et al*., 1991) equivalent to twelve days output on average. Again, opportunity costs to society as a result of malaria include poor educational performance of children, exacerbation of malnutrition and anaemia which negatively impact both children and adults. Effective interventions for the prevention, improved diagnosis and treatment of malaria are likely to produce significant benefits for afflicted populations by alleviating suffering and decreasing mortality.

On the basis of the 1987 values it was projected that in 1995 the total cost of a case of malaria will be $16.40 because of increased severity of the disease and increased resistance to Chloroquine and that the lost days would be equivalent to twenty-one days output. Most economic estimates of the malaria burden neglect many other short term cost and long-term consequences. Short–time costs are likely to result in economic losses of several days lost at work thereby affecting productivity in the long run (Gallup and Sachs, 2000). Expenditure on malaria prevention was positively correlated with income, 10% of all households and only 4% of very low income households (average annual income=$68.11) reported expenditure on malaria prevention in the previous month. Estimated annual expenditure on prevention in all households was $2.55, ranging from $0.59 or 0.9% of annual income in very low income households (VLYH) to $4.70, or 0.5% of annual income in low to high income households (LHYH) in Malawi (Ettling,1994). In contrast, it was estimated prevention expenditure accounted for 1.6% of rural (poorer) and 2.1% of urban (less poor) annual household income in Benin (Rashed *et al*., 2000).

CHAPTER THREE

METHODOLOGY

3.1 RESEARCH METHODS AND DESIGN

The study is a descriptive cross-sectional study conducted in three public health facilities and one private health facility in four out of seven sub-municipalities within the Sunyani Municipality from June to August, 2005. Selected health facilities had to satisfy the following criteria; offer antenatal services and have a minimum of twenty clients at each antenatal clinic. Based on these criteria, four facilities in the public and three in the private sector qualified for inclusion. From the seven facilities that qualified for inclusion, three were randomly selected for the study. The Regional Hospital located in the Sunyani sub- municipality was purposively selected because it is the only facility that sees patients from all the seven sub- municipalities.

3.2 STUDY POPULATION

The study population were pregnant women receiving antenatal care at health care facilities in Sunyani Municipality. Four health facilities selected were Nsoatre Health Centre, Chiraa Health Centre, Greenhill and Regional Hospital and pregnant women receiving ANC services at these health facilities were randomly selected for the study.

Table 3.1 Facilities and ANC Attendance

Facility	Sub-District	ANC Attendance
Regional Hospital	Sunyani Sub-Municipal	4271
Greenhill	Abesim Sub-Municipal	2957
Nsoatre Health Centre	Nsoatre Sub-Municipal	3285
Chiraa Health Centre	Chiraa Sub-Municipal	2628
Total		**13141**

Source: Records from Health Facilities, 2005

The above **Table 3.1** shows the health facilities randomly selected in the various sub-municipalities with ANC Attendance for 2004.

3.3 DATA COLLECTION TECHNIQUES AND TOOLS

This study used both primary and secondary data. The main focus was on the economic burden of malaria in pregnancy.

The study used three (3) main techniques to collect the data, namely

1. Self and interviewer-administered questionnaires
2. Observation
3. Review of both Antenatal Clinic and Out-Patient records.

This tool was used to collect primary data: structured questionnaire with closed and open-ended questions.

To obtain the primary data, trained interviewers administered the questionnaire to the respondents.

To obtain information on the cost of treating malaria, respondents were asked whether they have suffered from an episode of malaria in the cause of pregnancy for the past five years or during present pregnancy. Knowledge of malaria was ascertained by asking the respondents about the cause of the disease as well as the signs and symptoms they observed before seeking treatment. Thus, perception of the disease, clinical observations and confirmed laboratory results were used.

A series of questions were asked about their attitude and perception of malaria, what they did when they realized they have the disease, distance to the facility, number of visits to the facility as a result of malaria, number of times the client had treated malaria at home in the cause of pregnancy among others.

Regarding both financial and opportunity costs, the structured questionnaire was used to guide the respondents to recall the expenses they incurred as a result of malaria in pregnancy. The financial cost included transportation, cost of registration and consultation, laboratory cost (blood film), cost of routine antenatal drugs as well as cost of drugs for treating uncomplicated malaria. Aside asking the respondents about the various direct costs, the prices of the drugs were obtained from local chemical sellers and dispensaries of the health care facilities. Transportation costs, distances covered and travel time for seeking malaria treatment at health care facilities were obtained by interviewing the drivers and mates of vehicles plying the routes linking the communities and the facilities. Respondents were asked a series of questions to ascertain the opportunity cost incurred as a result of malaria. These included travel time to the facility; time spent at the facility to seek for

malaria treatment, number of days of admission as well as the number of days spent at home before resuming any economic activity.

Secondary data were collected from the Municipal Health Directorate and the facilities chosen for the study - Nsoatre Health Centre, Chiraa Health Centre, Greenhill Clinic and the Regional Hospital through review of their Antenatal Clinic and Out Patient records.

3.4 SAMPLE SIZE AND SAMPLING TECHNIQUE

A total of two hundred (200) pregnant women were included in the study. The sample size was estimated based on malaria prevalence of 40% at 95% confidence level. The sample size for each facility was computed using probability proportional size based on ANC attendance for 2004. A total of sixty-five (65) clients were selected from the Regional Hospital, ninety (90) from the other public facilities and forty-five (45) from the only private facility chosen for the study. Each of the selected facilities was visited on a particular day and ANC attendants for that day were asked for the cardinal symptoms of malaria (fever, chills, headaches, general bodily weakness, bitter taste and joint pains) during the current pregnancy. The pregnant women were selected for the study using convenience sampling techniques. All those who have had the cardinal malaria symptoms were interviewed after seeking informed consent. If the number interviewed was less than the computed sample size for that facility, the facility was visited on different days till the total number for that facility was obtained. Where the number of clients with the cardinal symptoms exceeded the number N, for that facility, the first N clients with the cardinal symptoms were interviewed.

3.5 STUDY VARIABLES

Table 3.2 Study variables

No	Variable	Definition	Scale of measurement
1	Financial Cost	The expenditure incurred by pregnant women on malaria in pregnancy expressed in Ghana cedis	Continuous
i	Cost of drugs	Amount of money in cedis used to procure drugs for malaria treatment	Continuous
ii	Registration and consultation cost	Amount of money in Ghana cedis spent at the health facility to seek malaria treatment	Continuous
iii	Laboratory cost	Laboratory service charges in Ghana cedis	Continuous
iv	Transport cost	Amount of money in Ghana cedis the individual pays to get to the facility	Continuous
2	Opportunity Cost	Opportunity cost of travel and waiting at the health facility and loss of productive time	Nominal, Ordinal or Continuous

Source: Author's Construction, 2005.

3.6 PRE-TEST

The data collection techniques and tools for the study were pretested with a group of pregnant women at Holy Family Hospital in Techiman Municipality which was not part of the selected area for the study but shares common characteristics with the study area. This was done to ensure that respondents understood the questions and the necessary modifications were made before the survey.

3.7 DATA HANDLING AND STORAGE

With the structured questionnaire, the researcher made sure that the data collected were complete and accurate by checking through the questionnaire after each day's field work. Data collected from each facility was kept in an envelope, labelled and kept safely under lock and key for analysis.

3.8 DATA ANALYSES

The survey data were coded and entered directly into Microsoft access and Statistical Package for Social Sciences (SPSS) used for data analysis. The results were presented in descriptive statistics showing the means and ranges in the financial and opportunity costs of malaria morbidity.

3.9 ETHICAL CONSIDERATIONS

Permission was sought from the Department of Community Health, Kwame Nkrumah University of Science and Technology (KNUST) to carry out this study. Permission was also sought from the Brong Ahafo Regional Health Directorate, the Municipal Health Directorate as well as the Management of the various health institutions surveyed. Informed consent was obtained from all the respondents of the survey before the interview. The purpose of the study, the methods and eventual use of the study findings were also explained to the pregnant women and health care providers. The respondents were also assured of the confidentiality of their responses.

3.9.1 Limitations

The study was affected by the following. The facility based nature of the study excluded those pregnant women who do not patronise antenatal clinic. There was a possibility of the existence of general difficulties in recalling the total amount of money spent on each episode as well as the number of productive days lost due to malaria by the respondents.

3.9.2 Assumptions

Respondents unequivocally understood the questions and were honest as far as the information given was concerned. The respondents have similar economic status. The research assistants were not bias and a client was not interviewed twice.

CHAPTER FOUR

RESULTS

4.1 ANTENETAL ATTENDANCE OF THE STUDY SITES

Out of the fourteen health facilities rendering antenatal services in the Sunyani Municipality, three public health facilities and one private health facility were selected and these are the ANC attendance for 2004 as shown in **Table 4.1 below**.

Table 4.1 Health Facilities and ANC Attendance for 2004

Facility	Sub-District	ANC Attendance for 2004
Regional Hospital	Sunyani Sub-Municipal	62724
Greenhill	Abesim Sub-Municipal	24775
Nsoatre Health Centre	Nsoatre Sub-Municipal	27537
Chiraa Health Centre	Chiraa Sub-Municipal	16390
Total		**116,666**

Source: Mid-year Report Sunyani Municipal Health Directorate, 2005.

4.2 DEMOGRAPHIC CHARACTERISTICS OF STUDY POPULATION

Table 4.2: Socio-demographic Characteristics of Respondents

Study Variable	Frequency	%
Age Group		
(-)	2	1
< 20	9	4.5
20-34	156	78.0
35-49	33	16.5
Total	**200**	**100**
Educational level		
None	24	12.0
Non-formal	2	1.0
Primary	30	15.0
JSS/Middle	98	49.0
Secondary	46	23.0
Total	**200**	**100.0**
Marital status		
Single	27	13.50
Married	173	86.50
Total	**200**	**100.00**
Occupation		
Formal	23	11.50
Non-Formal	155	77.5
Unemployed	22	11.0
Total	**200**	**100.0**

Source: Author's Construction, 2005.

The socio-demographic characteristics of the respondents in the present study are shown in **Table 4.2** above. The age distribution of respondents interviewed ranged between <20-49 years. About 5% were less than 20 years, 78% between the ages of 20 and 34 years whilst 16.5% were between 35 and 49 years. However, 1% of the respondents did not know their ages. Out of the two hundred people interviewed, 12% had no formal education, 1% had non-formal education (night school), and 15% had up to primary education whilst 49% of them attained up to either junior secondary or middle school. Twenty-three percent (23%) of the respondents had education up to secondary school or above. Majority of the respondents (86.5%) were married whereas 13.5% of them were single. Most of the respondents (77.5%) were working in the non-formal sector with 11.5% of them in the formal sector. Meanwhile, 11% of the respondents were unemployed.

Table 4.3: Residential status of respondents

Place of residents	Number of respondents	%
Urban	142	71
Rural	58	29
Total	200	100

Source: Author's construction, 2005

The place of residence of the study participants were grouped into urban and rural. From **Table 4.3**, 71% of the respondents lived in urban and peri-urban areas whiles 29% lived in the rural areas.

4.3 MORBIDITY PATTERNS OF MALARIA IN SUNYANI MUNICIPALITY

Table 4.4: Top Ten Morbidity in Sunyani Municipality, 2004

Condition	Number of Cases	%
Malaria	66797	55
URTI	7111	6
Disease of Skin and Ulcers	6420	5
Accidents	4400	4
Intestinal worms	3638	3
Gastroenteritis	3317	3
Diarrhoea	3305	3
Rheumatism	2585	2
Hypertension	1781	1
Gynaecological Disorders	1562	1
Top Ten Total	**100916**	**83**
All Other Diseases	21018	17
GRAND TOTAL	**121944**	**100**

Source: MHD, 2005

The morbidity patterns of various illnesses in the Municipality for 2004 are shown in **Table 4.4.** Malaria was the topmost (55%) cause of morbidity in the Municipality, followed by URTI and skin diseases whilst hypertension and gynaecological disorders were the least recorded morbidity. Other diseases not listed in **Table 4.4** constituted a proportion of 17% of all morbidity in the study area.

The topmost cause of morbidity at the OPD during the 2004 in the Sunyani Hospital was malaria (23%), followed by acute eye infections (8%), accidents and burns and oral infection (6%) whilst skin diseases was the least reported morbidity as shown in **Table 4.5** below.

Table 4.5: Top Ten Causes of OPD Morbidity in Sunyani Hospital for 2004

Diagnosis	Number of cases	%
Malaria	18139	23
Acute Eye Infection	6484	8
Diseases of Oral Cavity	4533	6
Accidents & Burns	4322	6
Hypertension	4031	5
Gynaecological Diseases	3607	5
URTI	3502	4
Ear Infection	3440	4
Gastroenteritis	3295	4
Skin Diseases	1813	2
Total	53166	67
All Others	25353	33
GRAND TOTAL	78519	100

Source: Sunyani Regional Hospital

In 2004, malaria recorded the highest number with 23%, 7% out of this represented pregnant women with malaria. Acute eye infection, diseases of the oral cavity, accidents and burns and hypertension were 8%, 6%, 6% and 5% respectively. The rest are gynaecological diseases, upper respiratory tract infection, infection of the ear, gastroenteritis and skin diseases with 5%, 4%, 4%, 4% and 2% respectively. All other diseases accounted for 33%.

4.4 KNOWLEDGE OF MALARIA AND HEALTH SEEKING BEHAVIOUR

Majority of respondents (78%) were able to identify mosquitoes as the cause of malaria. Fifteen percent were of the view that, stagnant water and filthy environment in general serve as a conducive environment for mosquitoes to breed whilst 7% attributed it to poor diet. Out of the two hundred respondents, 55% were able to mention five cardinal signs of malaria; fever, chills, loss of appetite, joint pains and general bodily weakness whilst 32.5% were able to mention four, 15.5% mentioned three, 3% made mentioned of two with 2% and 1% mentioning one and none respectively.

When the respondents were asked whether malaria was a problem in the municipality, about 79.5% indicated that malaria was a problem whilst, 6% said it is not a problem whereas 14.5% did not know whether it was a problem or not. Of the 79.5% respondents who said malaria was a problem, 50.3% said it was very common, 15% said it can kill easily, 21.3% were of the view that malaria affects work output whilst 13.4% said it is costly to cure.

4.4.1 HEALTH SEEKING BEHAVIOUR OF MALARIA IN PREGNANCY

The cost incurred in seeking care and treatment of malaria was estimated using various factors that contributed to the financial cost of treating malaria in pregnancy.

4.4.2 Distance Covered to Seek Care for Malaria

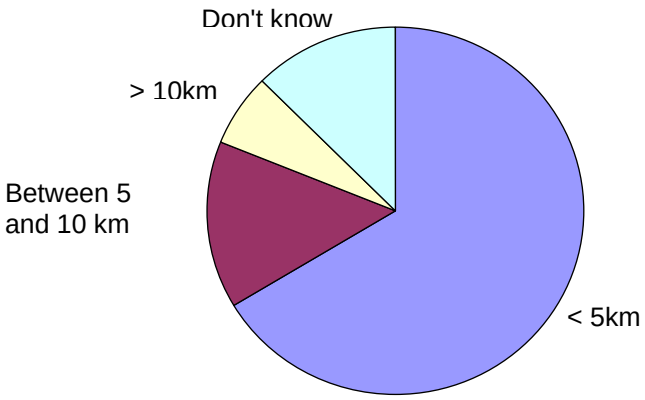


Figure 2: Distance covered by respondents to the four health facilities

Majority of the respondents covered a distance of less than 5km to seek care for malaria treatment, followed by a distance between 5- 10 km covered whilst fewer of respondents covered a distance greater than 10km as shown in **Figure 2.**

4.4.3 Frequency of Visits to Health Facility with Malaria during pregnancy

The number of times respondents have visited a health facility with malaria during pregnancy for the past five years is shown in **Figure 3.** Most of the correspondents have visited the health facility once with malaria during pregnancy and within the five years period, some respondents have visited the health facility more than four times with malaria.

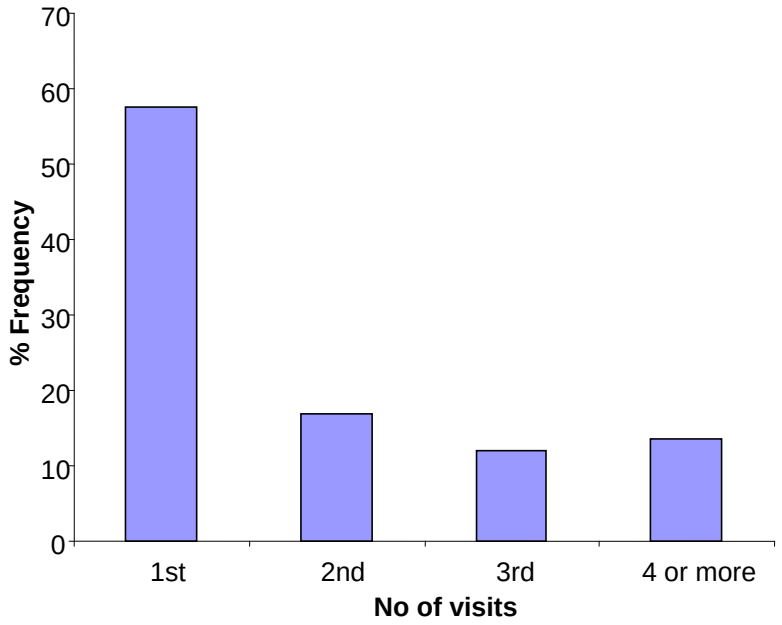


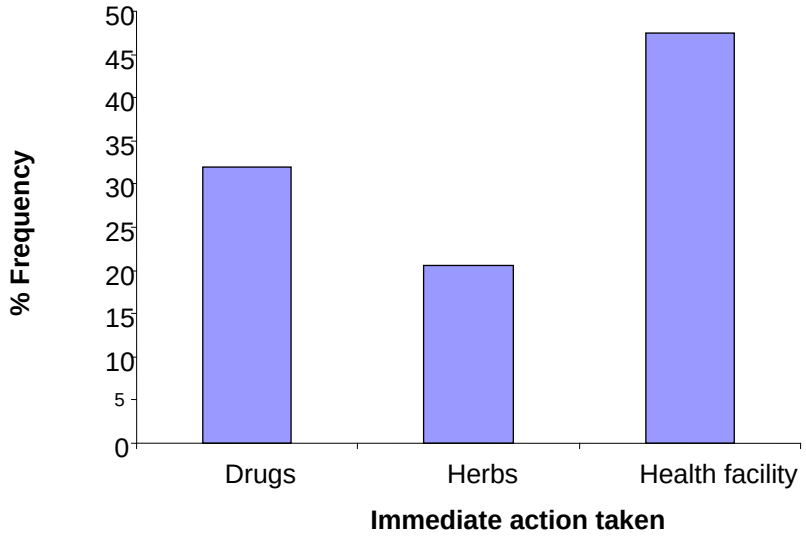
Figure 3: Visits to a health facility with malaria during pregnancy for the past five years

Source: Authors construction

4.4.4 Health seeking with Malaria during pregnancy

Respondents' health seeking behaviours were assessed to determine where and what they do in the event that they have malaria and these were the outcomes of their responses. The action respondents would take were taking orthodox medicine at home, herbal medicine at home or going to a health facility for care. Majority of the mothers (47%) sought treatment from a health facility, whilst 53% bought over the counter drugs herbal medicine as shown in **Figure 4** below.

Figure 4: Distribution of immediate action taken by respondents



Source: Authors construction

4.5 ESTIMATED COST OF TREATING MALARIA IN PREGNANCY

The cost of malaria involved morbidity, disability and in some cases mortality and these conditions constitute the cost of illness. The various cost components are financial costs, opportunity costs and intangible costs (Shepard *et al*. 1991; Malaney, 2003).

Cost-of-illness (COI) = **Private Medical Cost + Non Private Medical Cost + Labour Loss + Risk Related Behaviour Modification + Investment Lost + Non Economic Personal burden**

The costs incurred are financial, opportunity and intangible. The cost of illness can be expressed as; C **= X + Y + Z,** where: **C** = cost of illness of malaria, **X** = Financial costs associated with malaria, **Y** = Opportunity costs, Z = Intangible costs.

4.5.1 FINANCIAL ESTIMATED COST OF TREATING MALARIA IN PREGNANCY

The financial cost of illness (**X**) is the combination of personal, household, institutional and government expenditures on both prevention and treatment of malaria.

The financial cost is expressed as **X = H + I+ G,** where; **H** = the household cost of malaria treatment and control, **I** = the institutional cost of malaria not borne by patients, **G** = the cost incurred by the government not captured in the institutional cost. However, in this present study, institutional cost of malaria not borne by patients (**I)** and the cost incurred by the government (**G**) were not captured in the institutional cost not captured as one of the variables of the study.

Household Cost of Malaria Treatment = **X** = Transport Cost + Registration and Consultation + Laboratory Cost + ANC Medicines + Anti-malarial Drugs

4.5.2 Transportation Cost

Table 4.6: Transportation cost to facility

Cost to facility	Number of respondents	%	Total cost
Less than 50 pesewas	93	46.5	46.50
Between 50 and <100pesewas	59	29.5	44.25
GH1 and above	10	5	15.00
Walking distance	38	19	0.00
Total	200	100	**Average: 0.53**

Source: Author's construction using data from the survey

Of the 200 respondents interviewed, 46.5% spent less 50 pesewas on transport, 5% spent at least GH¢1.0 whilst 19% walked to the facilities. However, the average cost for transport was GH¢ 0.53.

4.5.3 Registration and Consultation

All the two hundred people interviewed who accessed health care paid between 50 pesewas and 100 pesewas at the various facilities. An average of 75 pesewas was paid to receive treatment.

4.5.4 Laboratory Cost

Table 4.7: Cost of blood film

Cost of blood film	Number of Respondents	%	Total cost
GH1.00	163	81.50	163.0
Between GH1.00 and GH2.00	18	9.0	27.0
GH2.00 or more	19	9.50	47.5
Total	200	100	Average: **1.19**

Source: Author's construction using data from the survey

The average cost for laboratory services (blood film) was GH¢1.19. However, 81.5% spent GH¢1.0 on laboratory services whereas 9.5% spent at least GH¢2.0 on laboratory services as shown in **Table 4.8** above.

4.5.5 Cost of Drugs

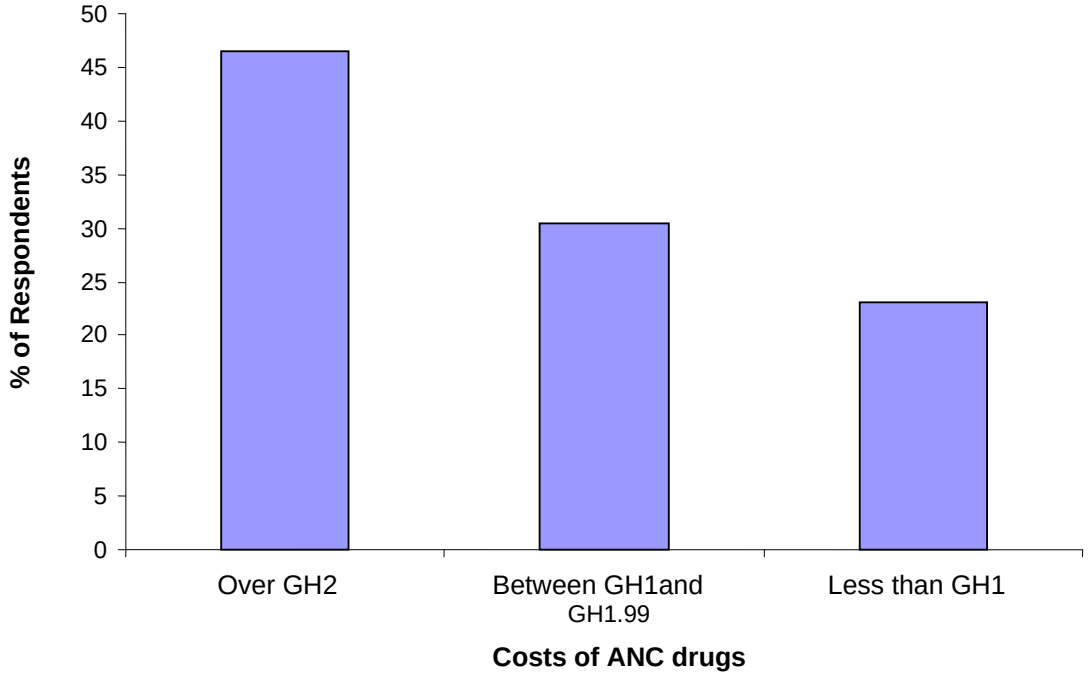


Figure 5: Amount spent on routine ANC drugs

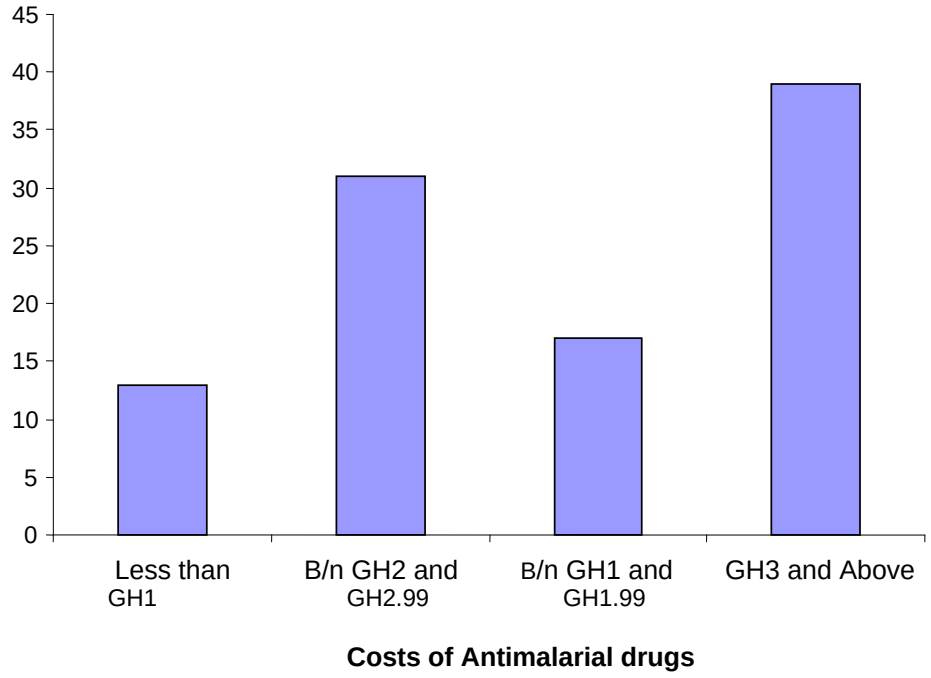


Figure 6: Amount spent on drugs for malaria treatment

The average cost of routine drugs for ANC and anti-malarial drugs was GH¢ 2.2. More than 47% of the respondents spent more than GH¢ 2.0 on routine ANC drugs (**Figure 5**) whilst about 23% spent less than GH¢ 1.0. About 38% of the respondents spent more than GH¢3.0 whereas about 13% spent less than GH¢ 1.0.

Table 4.8: Summary of the average financial cost for treating a case of malaria at health care facility

Item	Average Cost(GH¢)	% Cost
Registration and consultation	0.75	18.2
Transportation	0.53	12.8
Laboratory cost	1.19	15.7
Drugs supplied at facility	2.20	58.3
Total Treatment cost	**4.67**	**100**

Source: Author's construction using data from the survey

The average financial cost of treating malaria in pregnancy was estimated to be GH¢4.67. Out of this, 58.3% constituted cost of drugs supplied at the health care facilities, 18.2% being registration and consultation cost, and 15.7% for laboratory with 12.8% constituting transportation cost.

4.5.6 OPPORTUNITY COST OF TREATING MALARIA IN PREGNANCY

The opportunity cost of illness (**Y**) due to malaria is the value of the output that is lost because people could not work either permanently or partially due to malaria related morbidity and premature mortality. The opportunity cost due to malaria morbidity is expressed as:

$Y = \mu (y1 + y2 + y3 + \ldots + yn)$,
where;
y1 = time spent travelling to obtain health care,
y2 = waiting time for treatment at the facility,
y3 = time spent caring for the sick,
y4 = time lost due to incapacitation (i.e. duration of illness and convalescence).
y5 to yn = other opportunity cost due to malaria.
μ = daily agricultural wage rate.

Table 4.9 Number of days spent at the workplace weekly

No of days	Number of Respondent	%
2- 4	40	20
5- 7	160	80
Total	200	100

Source: Author's construction using data from the survey

The number of days spent by respondents at their workplaces ranged from 2 day to 7 days in a week. Majority of them (80%) spent between five to seven days in a week while 20% spent between two to four days as shown in **Table 4.10** above.

Table 4.10: Travel time to the facility

Travel to facility	Frequency	%
‹ 30minutes	139	69.5
Up to 1hour	56	28.0
Up to 2 hours	4	2.0
Up to 3 hours	1	0.5
Total	200	100

Source: Author's construction using data from the survey

The average travel time for respondents to a health facility was 41 minutes. However, majority of them (69.5%) spent 30 minutes, 28% spent up to an hour, 2% used two hours whilst 0.5% spent up to three hours to get to a health facility as indicated in **Table 4.11** above.

Waiting time for pregnant women at a health facility ranged from 30 minutes to 4 hours. Majority of the pregnant women, one hundred and twenty spent up to two hours to receive treatment at the health care facilities, fifty–six spent up to three hours, fourteen spent up to one hour, six spent less than thirty minutes with four spending more than four hours (**see Figure 7 below**). Thus a total of four hundred and thirty nine hours, thirty minutes was spent by the respondents to receive malaria treatment given an average of 2.2 hours per each respondent.

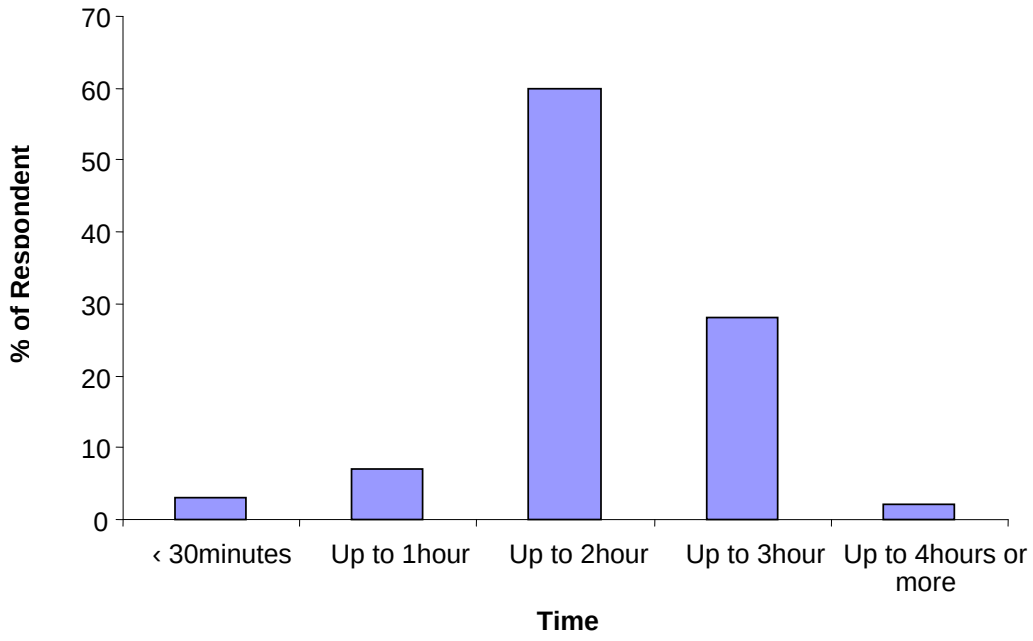


Figure 7: Time spent on the management of uncomplicated malaria at a health facility

Table 4.11 Times of Admission

Admission for malaria	Frequency	Percentage
Once	172	86.0
Twice	28	14.0
Total	200	100.0

Source: Author's construction using data from the survey

The number of times respondents have been admitted at a health facility with malaria was either once or twice. Majority of the pregnant women (86%) have been admitted once whilst 14% have had admission twice.

Table 4.12 Number of completely disabled days lost due to malaria

Days not worked	Frequency	%
1 – 3	73	36.5
4 – 7	51	25.5
>7	72	36.0
0	4	2.0
Total	200	100.00

Source: Author's construction using data from the survey

An average of 5.4 completely disabled days lost due to malaria was determined amongst pregnant women seeking care at the various health facilities at the Sunyani Municipality. More than 36% of the respondent spent between 1 – 3 days before resuming their economic activities, 36% spent more than 7 days whilst 25.5% spent between 4 – 7 days before resuming their economic activities. Meanwhile, 2% of the pregnant women did not take a day' off due to malaria.

In Ghana, there are various daily agriculture wages as of 2005 ranging from a minimum of GH¢1.5 to a maximum of GH¢5 depending on the geographical location. However, in the Sunyani Municipality, the daily agriculture wage rate was GH¢2.0. Thus, calculating for the opportunity cost was done using the formula: $\mathbf{Y = \mu (y1 + y2 + y3 + \ldots + yn),}$ where

y1 = time spent travelling to obtain health care,
y2 = waiting time for treatment at the facility,
y3 = time spent caring for the sick,
y4 = time lost due to incapacitation (i.e. duration of illness and convalescence).
y5 to yn = other opportunity cost due to malaria.
μ = daily agricultural wage rate.

In this present study however, the time spent caring for the sick (y3) due to malaria was not captured amongst the study variables.

Thus, y1= travel time = 41 minutes, y2 = time spent at facility = 135 minutes, y4 =time lost due to incapacitation = 5.4 days. Sum of y1+y2 =176 minutes =3hrs, Hence Y= μ (0.5 day+5.4 days),

Y = 2.0(6days) = GH₵**12.0**

4.5 .7 COST OF ILLNESS OF MALARIA IN PREGNANCY

The cost of illness in treating malaria in pregnancy is the total of the financial cost (X), opportunity cost (Y) and the intangible cost (Z).

C **= X + Y + Z,** where: **C** = cost of illness of malaria, **X** = Financial costs associated with malaria, **Y** = Opportunity costs, Z = Intangible costs.

Table 4.13: Summary of average cost for each case of malaria in the randomly selected facilities

Cost of Illness per episode	**Amount** (GH₵**)**	**%**
Financial Cost	**4.67**	**24.26**
Opportunity Cost	**12.0**	**73.74**
Intangible Cost	**0**	**0**
Total	**16.67**	**100**

Source: Author's construct using data from the survey

The cost of treating malaria illness per episode in pregnancy was GH¢16.67 as shown in the **Table 4.14**. The financial cost and opportunity cost borne by pregnant women with malaria was 24.3% and 75.7% respectively as shown in table above.

CHAPTER FIVE

DISCUSSION

5.1 MORBIDITY PATTERN OF MALARIA

Malaria is a burden socially, medically and economically among the people in the Sunyani Municipality in general but the burden is heavier among pregnant women and children under five. The immunosupression occurring in pregnancy puts a heavy toll on them when they experience this febrile attack. The data obtained from the Records and Statistical Department of the Municipal Health Directorate and the Regional Hospital revealed the following morbidity pattern for the year 2004 to June, 2005.

In the year 2004, the grand total for top ten morbidity was 121944 out of which malaria accounted for 66797 (55%) of the grand total for the year. The figure exceeds that of most African countries which is between 20 and 50% as reported by Brinkman & Brinkman (Brinkman & Brinkman, 1991). The morbidity due to malaria for the year 2004 indicated that for the total outpatient attendance of 66797, children under five accounted for 16993 whilst women in reproductive age constituted 14225, 25.4% and 21.3% respectively. During the first half of year 2005, the grand total morbidity for top ten was 61934. Out of this, malaria accounted for 29720 (48%). Children under five years and women in reproductive age constituted 6231 and 7832 respectively.

According to the officials at the selected facilities, almost all malaria cases coming to the facilities are treated on out-patient basis and those beyond them are referred to the Regional Hospital as early as possible. Greenhill Clinic recorded one death, a twenty-six year old pregnant woman as a result of malaria whiles the Regional Hospital recorded eight death among pregnant women during

the year under review. Though, these figures might appear to be low, they are significant, since only about 20-40% malaria deaths are reported in formal health institutions (McCombie, 1996 & Commey *et al.*, 1980).

5.2 KNOWLEDGE OF MALARIA AND HEALTH SEEKING BEHAVIOUR

Majority of the respondents were able to identify mosquitoes as the cause of malaria. Others were of the view that poor environmental hygiene creates enabling environs for the disease to spread with just a few associating the disease with poor diet. The level of education attained by the respondents did not influence their responses so much. The findings further showed that, most of the respondents (55%) knew as much as five of the cardinal signs of malaria,23.5% were able to mention four,15.5% three,3.0% two,2.0% one with 1% who did not know any symptom. This knowledge can partly be attributed to the health talks given at the facilities as well as the audiovisual medium.

Again a greater number of people acknowledged malaria as a problem in the municipality with its associated repercussion such as low work output, drain on disposable income, anaemia, still- birth, and low birth weight among others. The study revealed that, geographical access to a health facility was not a problem to the people in the surveyed area. This is partly contrary to that of Good (1987) which emphasised distance and economic constraint as key factors for access to treatment. As much as 66.5% of the respondents covered a distance of less than five kilometres, 14.5% covered a distance of between five with 6.5% covering a distance of ten kilometres. About 12.5% of the respondents said they did not know the distance from their place of residence to the health facility.

About 77% of the respondents were petty traders and subsistence farmers whose income were relatively low .Their disposable income is limited restricting them from seeking prompt service in a health care facility. This is in line with a study carried out by Ndjomugyenyi (1998) in a rural subsistence farming community in Uganda. The study revealed the major factor that influenced pregnant women from seeking health care in a facility is perceived high cost associated with such facilities Ndjomugyenyi (1998). It is worth mentioning that, majority of the respondents who visited the health facilities first self-medicated with orthodox and/or traditional medicine and most of such respondents were petty traders and subsistence farmers. Again, most of such people were in the low economic quintile. This supports the research carried out in Mali where those in the low economic quintile seek malaria care from traditional providers and use hospitals less frequently (Kelley *et al*., 2001). Considering the number of times the individual had visited a health care facility in the course of pregnancy within the past five years, 57.5% had visited the facility once,17% twice,12% three times with 13.5% more than three times. This can be attributed to the fact that, majority of the respondents is unable to afford preventive care such as insecticide treated nets and other chemoprophylaxis even before pregnancy due to their low income levels. This goes to confirm the finding of Mwageni and colleagues (2002) in Tanzania where net ownership was more common among households where women have relatively high income.

Moreover, respondents were asked the immediate action they took when they realized they had malaria. Forty-seven percent (47%) of the respondents went to a health care facility; 20.5% treated it at home with herbal preparation before going to a health facility with thirty-two percent patronizing antimalarial drugs from peddlers and chemical sellers before going to the hospital. This was common among the respondents. Those who did not go to the health facility as a first point of call were asked why they did that. They were of the view that once they recognize the signs and symptoms of the disease they resorted to the readily available options. This supports the research

carried out by Asenso Okyere and Dzator (1997) that the use of clinical symptoms to ascertain malaria made respondents sought for the readily available treatment options (Asenso Okyere &Dzator, 1997). About 65% of those who took herbal preparation said it was readily available and without any adverse event. Sixty percent of those who bought drugs from peddlers and chemical shops said it is relatively cheaper and less time consuming compared to visiting a health care facility. This finding also confirms that of Biritwum et al., (2001) where majority (82%) of the respondents used 'left over drugs' as well as over the counter drugs to treat unconfirmed malaria.

5.3 ESTIMATED FINANCIAL COST INCURRED

The survey revealed the estimated financial cost of treating malaria in pregnancy as GH¢4.67. The estimated cost indicated that financial cost accounted for 24.26% of the total cost. Out of this, cost of drugs formed as much as 53.1% which is quite significant. The results also showed that 39% of the respondents paid more than GH¢3.0, 15.5% paid between GH¢2.0 and GH¢2.99, 17% paid between GH¢1.0 and GH¢1.99 .Thus an average of GH¢2.2. This is similar to the findings of Asenso-Okyere and Dzator (1997) and Ettling *et al.* (1991) that the average treatment cost of drugs from health care facilities represented a significant proportion (64.8%) of the total treatment cost for each episode of malaria.

The survey also revealed that, an average of GH¢0.75 was paid as registration and consultation in the four facilities surveyed. The findings further showed that as part of the routine care, all the two hundred respondents had their blood smears taken and the average amount paid was GH¢1.19.

The cost of transportation incurred by the respondents who boarded a vehicle to a facility amounted to GH¢91.4, with an average cost of GH¢0.53. It constituted 13.5% of the total financial cost incurred by the pregnant women. The 13.5% was expected since the pregnant women might

not travel far to seek care; this has been indicated in the results where majority of the respondents (66.5%) had to travel a distance of less than 5km to seek treatment in a facility.

5.4 ESTIMATED OPPORTUNITY COST INCURRED

Opportunity cost of seeking malaria care comprises the economic cost of time spent in travelling, waiting at health facility and loss of productive time. Generally, in all the four facilities surveyed, more time was spent at the health facility to receive treatment .Regarding the duration of stay at the facility to receive treatment on OPD basis, 60% of the respondents spent up to two hours, 28% spent up to three hours, 7% spent up to one hour, 3% spent less than thirty minutes with 2% spending four hours and above. It is worth mentioning that those who went to Chiraa and Nsoatre Health Centres spent lesser hours compared to those who went to Greenhill Clinic and Regional Hospital. This can be attributed partly to the fact that, a relatively greater number of people prefer using a referral centre as a first point of call thereby creating congestion in such facilities.

The results of the study again indicated that, a total of 542 hours were spent by patients to receive treatment, out of which 439 hours were spent by pregnant women to receive malaria treatment at the health facility accounting for 81.1% of the total time spent in seeking treatment in the four facilities. On the average, approximately two and half hours were spent by pregnant women seeking malaria treatment in the facilities. This is very similar to the figure reported by Asenso-Okyere and Dzator (1997) who also found the average time spent at health care facility to be approximately three hours in their study area.

In general travel time to health facility forms a small portion (18.9%) of the total time spent on the management of malaria. The little time spent in travelling to seek health care is an indication that

people do not travel far from their communities to the health facilities to seek treatment as majority of the respondents (66.5) travelled a distance of less than 5km. Measurement of opportunity cost was restricted to economically active pregnant women, which excluded time lost by those engaged in house work, schooling and job seeking. This has been a common characteristic of other studies as well (Asenso-Okyere & Dzator, 1997) and on the premise that economic loss is limited to impact on production.

The findings showed that, man-days were lost by one hundred and eighty-four respondents who were working. Thus some time and income were lost due to malaria. A total of 1137 productive days were lost by economically active pregnant women. Brinkman and Brinkman (1991) found in a study in Chad that a semi immune person with uncomplicated malaria on the average would be unable to work for 3.5days. This study in the Sunyani Municipality however exceeded this and thus differed significantly from Brinkman and Brinkman (1991). The figure in the Municipality also exceeds that of a study in Matala, a malaria endemic district in Sri Lanka where an average of four days were lost as complete disabled days (Attanayeke *et al*., 2000).

Two broad choices can be used to apply values to the time loss: applying some kind of average price to the whole (or part) of the sample or pricing each person's time loss according to their own cost of lost production. The most common approach has been to adopt a single price and apply it to the whole sample as in the case of Sawyer (1993), Jayewardene (1993) and Asenso-Okyere and Dzator (1997) who applied the average wage rate of the study area. Mills (1994) took a different approach, and chose to value any change in hired wage labour and wage losses.

This study used the approach adopted by Sawyer (1993), Jayewardene (1993) and Asenso-Okyere and Dzator (1997) who applied the average wage rate of the study area to measure the time lost to production due to malaria. Multiplying the specific wage rates by their respective number of days lost to malaria, the value of days lost to the management of the disease was estimated at GH¢227.40. (US$249.89).This gave the opportunity cost per case of malaria in pregnancy to be GH12.0 (US$14.36) which forms 75.7% of the total cost of managing malaria in pregnancy in the study area.

To sum up the cost of recovery from an episode of malaria in pregnancy, the total financial cost of treating a case of malaria was estimated to be GH¢837.22 (US$920.00) with an average of GH¢4.67 (US$4.6) which forms 24.3% of the total treatment cost. The opportunity cost on the other hand was estimated to be GH¢227.40 (US$249.89) for the one hundred and seventy-four respondents with an average cost per case as GH¢12.0 (US$14.36) constituting 75.7%. This was done using the equivalent daily wage in the surveyed area because of its uniformity, the daily wage in the surveyed area is GH¢2.0. The average number of days of debility was 5.4days.

Ettling et al., (1994) revealed that the opportunity cost of malaria based on days of work lost ranged from $2.13 in very low income households to $20 in high-income households. A similar study found that, the average cost of treating malaria per person amounted to $8.67 per adult output. The minimum wage and actual average daily income was used by Kaewsonthil to value the days lost from malaria illness in Thailand. It ranged from 5.3 to 5.5days (Kaewsonthil, 1998).This compares with the estimate from Shepard et al., (1991), which gave the total of a case of malaria in Africa to be $9.84.

Findings from this study revealed that, when the financial and the opportunity costs are combined the total estimated cost of treating an episode of malaria in pregnancy in the survey area was GH¢16.67 (US$18.96). This high level of costs is to the pregnant woman and her family as a whole. The high incidence of malaria in the municipality can be attributed to the fact that, little is been done by public authorities charged to control this menace. The individuals are not doing enough to control the disease as choked gutters, overgrown weeds and other conditions promoting the spread of the disease can be found in the municipality.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

This study can conclude that the majority of the respondents had very good knowledge on malaria. However, most of them sought treatment from home, chemical shops and or drugs peddlers when they detect one or more symptoms of malaria instead from a health facility. In general, the economic burden of treating malaria in pregnancy was high and the opportunity cost was much higher than the financial cost incurred in the Municipality. The malaria morbidity patterns among WIFA in the Municipality were high and this requires that stakeholders' in-charge with the control and prevention of malaria needs to be intensified. Hence malaria in pregnancy is a serious economic burden affecting both the pregnant women and their families.

6.2. RECOMMENDATIONS

Based on the findings and conclusions from the survey, the following recommendations have been made;

- The Municipal Health Directorate as a matter of urgency should intensify public education on the effects of self medication during pregnancy on the mother and the unborn child.

- The Municipal Health Directorate should collaborate with the Regional Research Unit to carry out researches in testing the efficacy of the various local herbal preparations used in treating malaria. Once this is done, their use can be promoted as a means in reducing the cost of

antimalarial drugs. Apart from the cost component, the people are more comfortable using the herbal preparations than the orthodox ones because it's perceived absence of adverse effects.

- The promotion and the use of insecticide treated net must be intensified to complement passive case detection and chemotherapy to further reduce malaria transmission. Though, the cost the nets has been subsidized for the vulnerable group -pregnant women and children under five, there is the need to widen this scope to include all women in reproductive age.

- Innovative policies and effective malaria prevention programmes must be designed and implemented by the municipality involving all stakeholders as far as health care is concerned to reduce the burden among the populace in general and pregnant women in particular of the disease in the municipality.

- Municipal Health Directorate should collaborate with the appropriate authorities such as the Municipal Environmental Team to enact some by-laws to ensure environmental hygiene. This will go a long way to reduce the prevalence of the disease in the municipality.

- Incentives should be provided for community health nurses and midwives to encourage them to work in the communities and provide antenatal services through outreach programmes to the pregnant women in the hinterlands.

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APPENDIX

QUESTIONNAIRE

Please tick or write the appropriate answer

RESPONDENTS ARE ASSURED OF CONFIDENTIALITY

SOCIO-DEMOGRAPHIC DATA

Name of health facility……

Date of interview ……

1. Age…

2. Marital Status
   [ ] single [ ] married [ ] divorced [ ] widowed.

3. Educational level
   [ ] none [ ] primary [ ] Middle/ JSS

   [ ] Secondary / Tech/Voc [ ] post secondary [ ] tertiary [ ] other (specify)

4. Occupation
   [ ] civil servant [ ] self - employed [ ] Trader [ ] farmer [ ] student

   [ ] unemployed [ ] other (specify)

5. Where do you normally live?
   [ ] urban [ ] rural

   Or state name of locality

6. Occupation of husband
   [ ] civil servant [ ] self - employed [ ] trader [ ] farmer [ ] student [ ] other (specify)

B. KNOWLEDGE OF MALARIA AND HEALTH SEEKING BEHAVIOUR

7. What is malaria?
……

8. What are the symptoms of malaria?

   a. Vomiting
   b. Fever
   c. Headache
   d. Chills
   c. General malaise
   d. Joint pains
   e. Bitterness in the mouth
   f. Yellowish urine
   g. Other

9. What did you do when you realized you had malaria?

   [ ] treated at home [ ] went to a health facility for treatment [ ] bought some drugs [ ] did not do anything

10. Do you consider malaria a problem in your area?

    [ ] yes [ ] no [ ] don't know

11. If yes, why do you say so?

    a. very common
    b. can kill easily
    c. affects work output
    d. costly to cure
    e. other

12. If no, why do you say so?
    …….
13. Can you estimate how far your house is from a health facility?

    [ ] yes [ ] no [ ] don't know

14. If yes, what is the distance in km?

    [ ] less than 5 km [ ] between 5 and 10 km [ ] More than 10 km

15. How many times have you been pregnant in the past five years?

    [ ] none [ ] one [ ] two [ ] three [ ] other

16. How old is this pregnancy in months

    [ ] less than three months [ ] less than six months [ ] six months and above

17. How many times have you visited a health facility in the course of this pregnancy?

[ ] once [ ] twice [ ] three [ ] four [ ] five or more

18. How many of these visits were normal antenatal care (ANC) visits?

[ ] one [ ] two [ ] three [ ] four [ ] five or more

19. How many of the visits were due to malaria?

[ ] one [ ] two [ ] three [ ] four or more [ ] none

20. Have you ever treated malaria at home in the course of this pregnancy?

[ ] yes [ ] no [ ] don't remember

21. In the course of this pregnancy, how many times have you treated malaria at home without visiting a health care facility?

[ ] once [ ] twice [ ] thrice [ ] four or more [ ] none

22. Name some of the drugs used in treating malaria?
    a. Chloroquine
    b. Fansidar
    c. Camoquin
    d. Artesunate
    e. Other

C FINANCIAL COST

23. How much does it cost you to travel to the nearest health facility per visit?
[ ] less than ¢5000 [ ] less than¢10,000 [ ] ¢10,000 and more [ ] Nothing

24. How much do you normally pay for registration and consultation at health facility per visit?
[ ] less than ¢5000 [ ] less than ¢10,000 [ ] ¢10,000 and more

25. How many times have you been to the laboratory in the course of this pregnancy for Blood film (BF for MPS) analysis?
[ ] Once [ ] Twice [ ] Three or Four [ ] Other

26. How much do you pay for each blood film examination?
[ ] less than ¢10,000 [ ] less than ¢ 20,000 [ ] ¢20,000 and more

27. How much money do you normally spend on your routine ANC charges (Haematinics etc) per visit?

[ ] less than ¢ 10,000 [ ] less than ¢20,000 [ ] ¢20,000 and more

28. About how much extra does it cost you to pay for drugs used in the treatment of uncomplicated malaria for each episode?

[ ] less than ¢10,000 [ ] less than ¢20,000 [ ] less than ¢30,000 [ ] ¢40,000 or more

29. Who normally pay for your bills when you attend a health facility?

[ ] self [ ] husband [ ] both of us (husband and wife)

[ ] other (specify) ……..

D PERSON'S TIME

30. How many days do you spend at work?

a. One day
b. Two days
c. Three days
d. Four days
e. Five days
f. Six days
g. Seven days
h. None of the above

31. What time do you normally go to work?

……

32. What time do you close from work?

……

33. How long does it take you to travel from your home to the nearest health facility?

a. less than 30minutes
b.30minutes to less than one hour
c. one to less than two hours
d. two hours to less than three hours
e. three hours to less than four hours
g. four hours to less than five hours
h. five hours or more

34. How long do you normally spend at the hospital for a normal ANC visit?

a. less than 30minutes
b. 30 minutes to less than one hour
c. one to less than two hours
d. two or more hours
e .three hours to less than four hours
g. four hours to less than five hours
h. five hours or more

35. How long do you spend at the hospital? (Excluding admission) when you have uncomplicated malaria?

a. less than 30 minutes
b.30 minutes to less than one
c.one to less than two hours
d.two or more hours
e.three hours to less than four hours
g.four hours to less than five hours
h.five hours or more

36. How many times have you been admitted on account of malaria in the course of the pregnancy?

[ ] None [ ] once [ ] twice [ ] Three times [ ] Four or more

37. In total, how many days have you been admitted for malaria in the course of this pregnancy?

a. one day
c. three days
b. two days
d. four days
e. five days
f. six days
g. seven days
h. other

38. Besides admissions, can you estimate how many days (or hours) you have not worked as a result of malaria?

a. one day
b. two days
c. three days
d. four days
e. five days
f . six days
g. seven days
h. other