LAY PEOPLE'S RESPONSES TO ILLNESS: AN ETHNOGRAPHIC STUDY OF
ANTI-MALARIA BEHAVIOR AMONG THE ABAGUSII OF SOUTHWESTERN
KENYA

By

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To my mother, the Late Rhoda Bosibori Nyamongo

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Malaria is re-emerging with a vengeance after near eradication a generation ago. In

Africa, it kills between 1 and 2 million people, mostly children, each year and many more

are incapacitated leading to enormous human and economic loss. I present data on

responses to malaria among the Abagusii, an agricultural, Bantu-speaking people who

inhabit the fertile rainy highlands of southwestern Kenya. Data on knowledge of common

illnesses in Bomorenda, the site for the study, and malaria symptoms, were collected using

systematic ethnographic methods. Malaria-focused narratives from 35 informants yielded

additional ethnographic information of lay people's responses.

The study reveals that Abagusii have multiple notions of malaria causation. A

majority (85.7%) consider the mosquito as the major cause of malaria. Other causes

are eating sugary foods (57.1%) and witchcraft (34.3%). They assign naturalistic

causation as well as associate malaria with environmental dangers. These findings support

the indigenous contagion theory. Abagusii recognize the same symptoms as those in the

clinical case definition of malaria. Using symptom salience as a measure of importance,

headache (salience = .447), shivering (.393), fever (.226), vomiting (.188) and paining

joints (.158) are the top five symptoms.

Transition state probability results show that the longer the illness lasts, the more

likely that the illness will be treated outside the home (transition probability =.772). Over

82% of lay people report self-treatment as a first choice (t). The percentage of people who

use self-treatment drops to 12.5% at the time of second choice (t+1) and zero at time

three (t+2) while those who seek treatment outside the home increases. Illnesses that last

long are regarded as serious and patients prefer taking those illnesses to private or public

health care facilities where they are likely to get specialized attention (Fisher's exact test p

< .0001, Cramer's V = .719).

Lay people in Gusii purchase a variety of drugs for malaria management from local

shops. A cognitive map of informants reveals that they arrange these drugs along a

dimension based on age of the patient and along a malaria–analgesic drugs dimension.

Although informants have good knowledge regarding drug dosage, sometimes they get

wrong information about the administration of different drugs. This has implications for

the immediate management of malaria and for the long-term effects of improper use

including the development of drug resistant parasites. Three quadratic assignment

procedure (QAP) analyses indicate no gender differences with regard to lay people's responses to malaria-focused ethnographic interviews and similarity among illnesses and malaria drugs. The r-square for the three QAP analyses range between 0.72 and 0.88.

A biocultural model is used to show that ecological and cultural factors play an important role in sustaining mosquito density in Bomorenda. Farming practices and type of houses constructed provide optimal conditions for Anopheline mosquitoes that transmit *Plasmodium* parasites. The utility of the biocultural model is assessed and policy implications drawn.

CHAPTER 1
INTRODUCTION

Malaria is a world-wide problem. It was almost eradicated a generation ago, but has come back from the brink with a vengeance. In Africa alone it kills between 1 and 2 million people every year, mostly children. Over 100 million people are exposed to the malaria causing parasite each year in Africa and over 500 million are classified as at risk. In addition to deaths, morbidity from malaria causes great economic harm. It is estimated that between 3 and 7 days of work are lost per case of malaria, causing a loss of about 0.8 billion dollars (Shephard et al. 1991). I discuss these problems in greater detail in Chapter two.

Despite early efforts to eradicate malaria, the disease is re-emerging in many areas where it was thought to have been controlled. Resurgence of malaria is due to many factors–environmental, genetic and cultural. The world over, human activities are causing changes in the global environment creating conditions conducive to the development of the mosquito, the vector responsible for the transmission of *Plasmodium spp.*, the malaria causing parasite. Computer simulations reveal that an increase of between $0.25\,^{\circ}C$ and $0.5\,^{\circ}C$ in the global temperature could lead to an increase in the incidence of malaria on the order of 50% to 100% in regions of low endemicity and a reduction of between 15% to 30% in areas of high endemicity, the latter effect being the result of increase in immunity (Janssen and Martens 1996: 26-27). Based on these

projections, a best case scenario would result in an overall increase of malaria in the

range of 20% while the worst case scenario would result in a 85% increase in malaria

cases annually. These predictions assume a steady state situation in demographic, social

and economic development.

Governmental and non-governmental bodies have instituted programs to improve

health care in rural communities where these services are weak. For their part,

governments are dealing with the problem of malaria through enhancement of

institutional capabilities and in the training of community based health care providers.

These people are responsible for providing health care to communities located in rural

areas, far from health care facilities. In certain remote areas they are the only people who

provide western health care. While the programs recognize the importance of

community-based approaches to the control of malaria, they have been less successful in

their implementation and sustainability. They fail to sufficiently consider the social and

cultural context of malaria (Tanner and Vlassoff 1998).

Governments face many problems in their endeavors to control malaria, including

lack of adequate funding. More important, however, is the emergence of parasites

resistant to drugs used for malaria treatment. Due to inadequate capacity to deal with

malaria in developing countries, lay people[1] devise strategies to combat the malaria

problem at home (home case management). Home case management practices include

treatments administered at home as well as the search for and selection of outside health

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[1] I use the term lay people throughout this dissertation to refer to non-health professionals involved in day to day health problems.

care providers. Treatments offered at home include use of herbal remedies, over-the-counter pharmaceuticals, and dietary changes (Ryan 1998). For them to start appropriate treatment, lay people rely on correct diagnosis of the specific health problem.

Actual treatment seeking behavior relies on several factors. This dissertation explores these factors using data from Bomorenda in Gusii. Specifically, the focus is on lay people's reaction when they suffer malaria.

In the next section I discuss the biocultural model and its relationship to the medical ecology model; components of the biocultural approach; critiques (predominantly from the critical medical anthropology group) leveled against both the biocultural and medical ecology models; and the reasons why I have adopted the biocultural approach in this study. I place the biocultural model within the cultural materialist paradigm (Harris 1979).

Biocultural Theoretical Approach

There is a vast literature on determinants of disease rates and factors that influence health care behavior of patients (Suchman 1965; Mechanic 1968, 1969; Colson 1971; McKinley 1973; Fosu 1981; Young 1980, 1981a; Mwabu 1986; Mathews and Hill 1990; Bentley 1992; Snow et al. 1994; Ryan 1995, 1998; Ryan and Martinez 1996). The factors that influence health care include knowledge regarding specific illnesses (Fabrega 1971, 1975; Lipowsky et al. 1992), presence and accessibility of health care facilities

(Snow et al. 1994), and the cost of services (Gould 1957;Yoder 1989). Ecological

factors such as weather patterns, temperature, terrain and infrastructural factors,

people's beliefs and practices also influence disease patterns. These factors fit into a

three tier framework: infrastructural, structural, and superstructural (cultural). I discuss

these broad categories using a biocultural theoretical approach. The biocultural

approach places emphasis on both the cultural and the biological aspects of people's

response to health and suffering (Armelagos et al. 1992). The biocultural model borrows

heavily from the medical ecology model; the primary difference between these two

models is in the orientation of the researchers.

According to Brown et al. (1996) studies in disease ecology include at least three

levels of causation: (1) a microbiological level, which focuses on agents of disease acting

within the human body; (2) a cultural ecological (or microsociological) level, which

focuses on how individual behaviors–encouraged or constrained by sociocultural

factors–put people at risk for contracting certain diseases; and (3) a political ecological

(or macrosociological) level, which focuses on historical factors involving interactions

between human groups and how these factors shape people's access to resources.

Brown et al. (1996: 189) point out that studies in disease ecology are a "biocultural

enterprise" which "allows and requires a bridging of the biological and cultural

paradigms in anthropology." The malaria situation in Bomorenda can be explained

following these three levels. Although the data did not focus directly on the

microbiological level, it has been long established that malaria is the product of

interaction between parasites, the human host and cultural factors. I have devoted a

section of Chapter two to the biology of malaria–the interaction between the disease causing agents, the parasites, and human beings.

There is no major difference between the ecological model and the biocultural model (Townsend and McElroy 1992). Townsend and McElroy argue that any differences which exist reflect technical or disciplinary affiliation. The ecological model is used primarily by biological anthropologists to analyze biocultural responses to disease (Armelagos et al. 1992). The "biocultural" term is used more often by cultural anthropologists while the "ecological" term is used by biological anthropologists. Wiley (1992) makes a finer distinction between the two however. According to Wiley the biocultural orientation adds an historical perspective in the analysis while medical ecological models do not necessarily consider such a diachronic perspective.

Ecological anthropologists place emphasis on the adaptive nature of human beings; they see the environment, which is composed of the biotic, abiotic, and cultural components as a stress causing agent to which we adapt. Ecological models allow the integration of biological, demographic, and socio-cultural systems in accounting for human patterns of adaptation (Townsend and McElroy 1992). This adaptive response may be biological or behavioral. In the case of malaria, Livingstone (1958) showed the development of the sickle-cell trait to be a biological response to the increased incidence of malaria in tropical Africa. This arose from changes in the environment caused by new agricultural practices. Behavioral and technological responses to malaria include: use of drugs to treat the illness, use of mosquito nets, insecticides, and repellents, along with construction of houses with protective screens, to prevent illness. Genetic responses, of

course, take many generations to stabilize in a population and hence are rare. The most common responses are behavioral and technological. The general adaptive responses are discussed further in Chapter two.

The medical ecology and the biocultural models have been heavily criticized by some medical anthropologists who offer a competing approach (see for example Singer 1989; Singer 1990; Singer et al. 1992; Baer 1997). Critical medical anthropology theory faults the medical ecology theory for placing emphasis on the individual rather than looking for causal variables at the political and economic level. They argue that health issues need to be understood within the context of political and economic forces that influence human relationships, shape social behaviors, condition collective experiences, re-order local ecologies, and situate cultural meaning (e.g. Singer et al. 1992). They place greater significance on the structural level (political and economic forces), while ecological theorists place greater emphasis on the infrastructural level–the interaction between human beings and the natural environment–and then on the structural level and cultural level. Scheper-Hughes (1990) calls for the radicalization of medical knowledge and practice so as to focus on the afflicted. This implies that critical medical anthropologists should see themselves as championing the cause of the patient. In Baer's (1997: 1568) words, critical medical anthropologists, whether "in academia or in a clinical setting, need to become proponents of 'patient power.'"

Critical medical anthropologists accuse medical ecologists of "stopping short of 'real analysis' in that their work does not focus on the political and economic origins of illness" (Wiley 1992: 219). Those critical medical anthropology theorists who fault

medical ecological theory (e.g. Singer 1989) criticize it for being too biomedical and too adaptationist. They use a narrow and limiting definition of adaptation and seem to equate adaptation with "the perfect fit" between an organism and its environment (Wiley 1992). Although their criticism holds true of some past formulations of the medical ecology model, "[the] limitations do not characterize the emergent biocultural perspective" (Armelagos et al. 1992 :38).

The emergent paradigm of medical ecology is holistic and encompasses political and economic forces. Political and economic forces have their base in the environment (the infrastructure). The infrastructure influences the structure and the ideology of a people (superstructure). Thus a model (theory) that places greater emphasis on the structure or superstructure would have lower explanatory power than one that is based on the infrastructure. Such a model would take into account factors such as terrain, altitude, and weather conditions that are part of the infrastructure.

I do not imply that critical medical theory is of no use. Since the medical ecology model places greatest emphasis on the infrastructure and then on the structure and superstructure, it must have a higher explanatory power following the principle of infrastructural determinism (Harris 1979). I find the materialist approach and the principle of infrastructural determinism particularly useful in explaining the malaria situation in Bomorenda.

Even critical scholars in the field admit that their approach gives "scant attention to ecological factors" (Baer 1996: 129). There is no arguing that ecological factors influence the incidence of disease around the world. The fact that many infectious

diseases are in the tropical regions has less to do with political and economic factors

initially. It is the prevailing ecological factors, such as warm climate and rainfall, that are

of first-order significance. Political will and economic muscle only come into play to

mobilize the resources that will bring success to the struggles of those who live in such

environments.

In what follows, I apply the biocultural model to analyze the malaria situation in

Bomorenda of Kisii District in Kenya, the major components of which are presented in

Figure 1.1. The model takes into account the cost of services, the distribution of health

care facilities, and the drug supply, as well as the cost of remuneration to health care

professionals, along with local beliefs regarding malaria, lay people's health care

practices, land inheritance rights and farming patterns, the type of local houses, and

parasite resistance to drugs. The same model allows me to analyze these factors which

are critical to long-term malaria control within a historical context that integrates both

ethnomedical and biomedical perspectives (Fabrega 1975; Kleinman and Mendelsohn

1978).

The utility of the biocultural model as a tool for understanding "coping behavior

within the context of ecological-political-cultural systems" (Armelagos et al. 1992) is

analyzed for the conclusion of Chapter eight. Based on this analysis I conclude that the

search for health care is indeed, tied to infrastructural, structural, and ideological factors.

There is no getting around the importance of culture here: the views of professionals

regarding malaria causation and treatment regimen sometimes differ from the views of

lay people. These differences influence the search for health care and the outcomes of

health care choices. By placing these cultural differences within a more comprehensive

cultural materialist and ecological explanation, we achieve greater understanding of the

dynamics of response to malaria in Gusii.

<u>Outline of the Dissertation</u>

The next Chapter provides a review of the literature about responses to malaria

around the world and, in particular, in Kenya. This review includes a critique of single

country studies that examine the cost of malaria, the effect of malaria on pregnancy, the

problem of compliance and the emergence of drug resistant parasites as well as how lay

people recognize and react to malaria. This literature shows that the family plays a key

role in health care. I discuss the family's role in the provision of health care to its

members in Chapter three.

Ill health affects the family's resources particularly its financial base. Those who

are sick withdraw from active participation in economic activities and resources are

redirected toward the sick individuals in order to restore their health. This in turn affects

other social aspects of the family. When patients/caretakers consider a case of malaria to

be serious, they may opt for choices that destabilize the family's economic and social

base in the short term. For less serious illnesses patients/caretakers may hold on longer

so as to assess disease progression before taking action. The social support patients

receive is found within the family or within the patient's social network. Health care

decisions are made, usually, within these circles. These same decisions are constrained

by a wide variety of macro-economic and institutional factors over which they have no

control (Figure 1.1).

This macro-economic and institutional context is described for Kenya in Chapter

four. In Chapter five, I provide background information on the Abagusii people–their

history, social systems, and, in particular, their actions and beliefs to keep misfortunes at

bay–whose decision making process provides the focus of the analysis presented in

Chapters six, seven, and eight. I discuss the special challenges of studying ones own

community in Chapter five. Chapter six deals with the methods used in data gathering,

processing, and analysis of the research which was conducted over a 10-month period

between February 1997 and November 1997 in Bomorenda, Kisii district. In Chapter

seven and Chapter eight I present the study findings and conclusions.
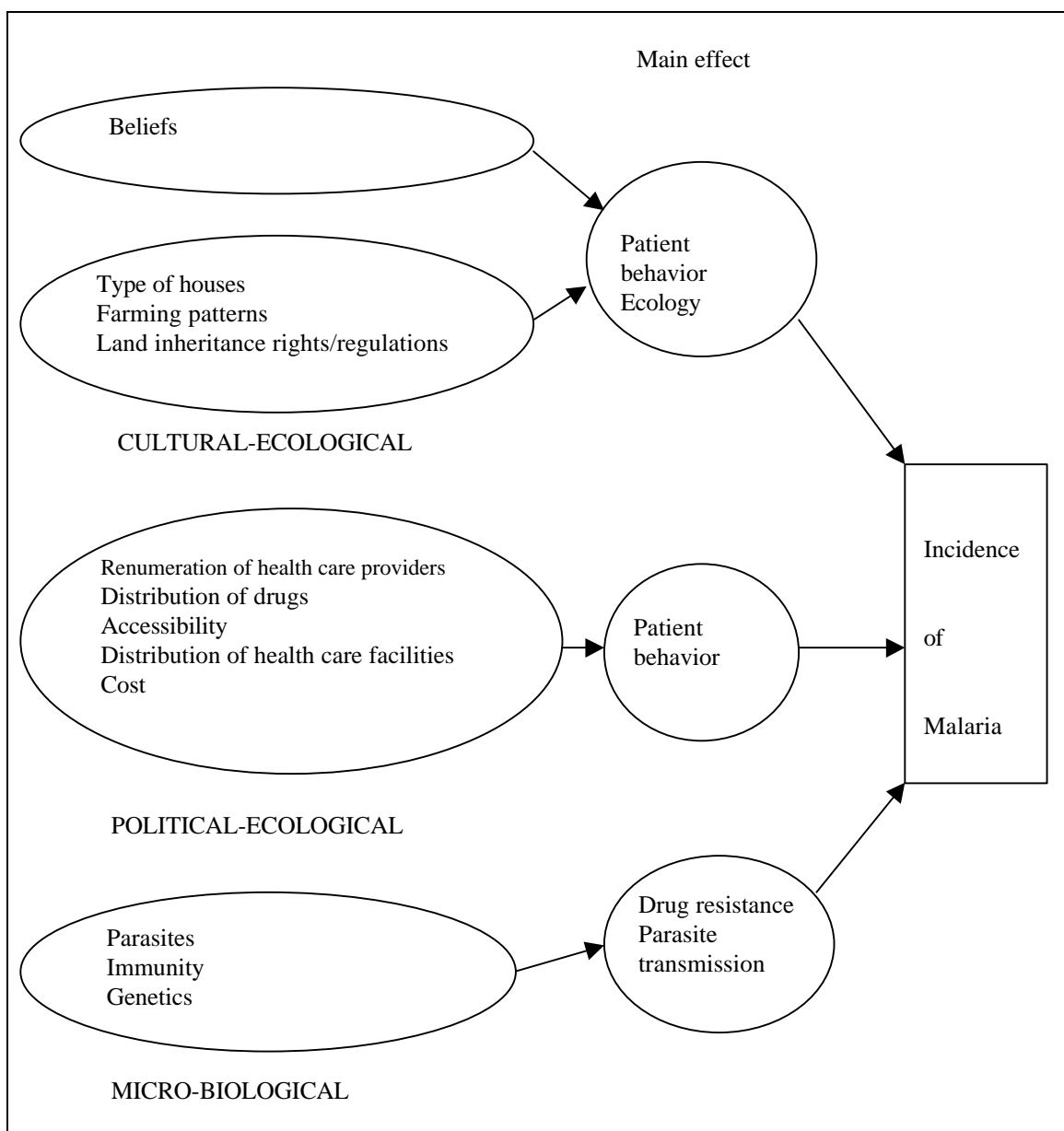
Figure 1.1: A Biocultural Model of Malaria in Bomorenda

CHAPTER 2
SOCIAL AND BEHAVIORAL RESPONSES TO MALARIA INFECTION IN KENYA

Introduction

Malaria was one of the first vector borne diseases to be subject to widespread

efforts of control. One reason is the disease's huge economic impact on families and on

nations. Unfortunately, however, reduction in the incidence of malaria during the late

'50s and early '60s have been wiped out and now humans in malaria-endemic areas are

under great stress (Oaks et al. 1991:1). Malaria has increased worldwide, especially in the

last two decades due to the emergence of parasites resistant to chloroquine (the most

widely used drug for the control of malaria) and of mosquitoes resistant to insecticides

(Table 2.1).

In many countries where the disease is widespread, control programs are in

operation. As in the 1950s and 1960s, WHO is the driving force behind many of these

programs, which include providing people with insecticide-impregnated bed nets and

prophylactic medicine, and spraying against mosquitoes. Although research shows that a

combination of these methods can offer real protection against the disease, people have

not readily accepted these programs and compliance is often dismal. Helitzer-Allen et al.

(1994) argue that anti-malaria campaigns can only be successful if there is client demand.

To date, however, there is little understanding of the combined effect of infrastructural,

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structural and cultural factors on client demand. Client demand can be manipulated better by understanding local knowledge about illness and health.

It seems obvious that the study of illness behavior <u>should</u> help us design more effective health delivery and control programs everywhere. While this is an often-invoked assertion, it is rarely demonstrated. Illness behavior refers to any behavior associated with conditions that cause individuals to concern themselves with disease and to seek help (Mechanic 1968). By disease I mean the aggregate symptoms (abnormalities of the body organs or organ systems) that lay people recognize to identify an ailment. I use the word "infection" instead of "disease" to mean the presence of parasites in the body without necessarily there being outward symptoms. Thus, a person can be infected with parasites (or germs) that cause a particular disease and yet, to lay people, such a person might be considered healthy because outward and recognizable symptoms are not manifest.

People recognize a particular disease at different stages depending on familiarity with symptoms and the progression of the illness (Feierman 1985). In some cases a disease may be put in a different category depending on who is doing the classification. The result is that people seek help at different times in their sickness and some never seek help at all.

Mechanic (1968: 116) long ago recognized and emphasized the need to study illness behavior more broadly taking the population in general, and not those who seek care at specialized agencies. There are those who prefer not to go for treatment or who use self-treatment at home. Therefore, studying illness behavior by selecting those who seek help from general practitioners excludes those in the general population who do not

consult the general practitioner. This is particularly true of illnesses that are prevalent

(Mechanic 1968: 116). This calls for health care research that focuses on the larger

community through the study of household and individual responses to disease.

In this Chapter I examine factors that influence people's response towards

malaria. The chapter is divided into five sections. First, I review the biological

background of the disease. This is followed by a review of the literature on the impact of

malaria on individual populations. In the third section, I discuss the manifestation of

malaria and the responses of people in the search for treatment. Next, I discuss how

various factors influence the health care seeking behavior of lay people. The factors I

consider include: diagnosis of disease, cost, household composition, and decision makers.

Finally, I put the discussion into a broader theoretical perspective and I apply the emic-

etic[1] distinction to account for differences in people's response to malaria.

<u>The Biology of Malaria</u>

<u>Cause, Transmission, and Epidemiology of Malaria</u>

Malaria is one of the oldest and most serious tropical diseases. The probability

and rate of its transmission is affected by variables associated with parasites, vectors,

hosts, and the environment. The hosts (humans) are particularly complex. Biological,

demographic, behavioral, cultural, and social variables all affect the transmission of

malaria parasites to humans.

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[1] In this dissertation I have used emic to imply the folk perceptions about illness, illness causation and their interpretation of the symptoms. I use the term etic to imply the biomedical interpretation of illness causation and symptoms.

There is a diversity of malaria parasites that infect human beings. Out of 120 known *Plasmodium* species Nevill (1990) identifies four types: *P. falciparum, P. vivax, P. malariae,* and *P. ovale* to be of major concern to human beings because of their association with malaria. *P. falciparum* is responsible for the majority of malaria cases. In some areas of tropical Africa it accounts for over 90% of the infection (Beausoleil 1986).

The vector for the malaria causing parasite is the mosquito. There are more than 2500 known species of mosquitoes. Only a subgroup of 50 to 60 species belonging to the genus *Anopheles* are capable of transmitting the *Plasmodium* parasites to humans. The key vectors, particularly in East Africa, are the blood sucking female mosquitoes of four species: *A. gambiae, A. funestus, A. melas,* and *A. arabiensis* (Meuris et al. 1986).

Nearly 40% of the world's population live in malaria-infested environments. Malaria is endemic[2] in many parts of Asia, Africa, Central and South America, Oceania and certain Caribbean Islands. Occasionally imported cases of malaria are reported in Europe. Imported cases have been reported in Britain (Pryce et al. 1993), and in Switzerland (Steffen et al. 1993). In Africa about 500 million people are at risk of malaria infection. Four-fifths of these people are in sub-Saharan Africa where about one million people, mainly children, die from malaria each year (Meuris et al. 1986; Nevill 1990). In Sub-Sahara Africa, poor utilization of services together with poor communication makes

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[2]Endemicity is defined in terms of parasite rates, spleen enlargement rates (determined by palpating the spleen to determine whether it is enlarged) and vector seasonality and abundance. Based on these criteria four types of endemicity are recognized. They are holoendemic (if the spleen rates in the 2-9 years age-group are > 75%), hyperendemic (for rates from 50 - 74%), mesoendemic (for rates from 10 - 49%), and hypoendemic (for rates < 10%). Holoendemic areas have a transmission more or less continuous throughout much of the year. Hyperendemic areas have high rates of stable malaria with seasonal increases in both morbidity and mortality. Mesoendemic areas have seasonal unstable malaria. Hypoendemic areas have transmission occurring only in limited periods of the year (Kenya, Republic of 1992 and Roberts 1974).

reporting of malaria cases problematic. The total number of people who die from malaria and malaria-related complications is probably much higher than currently estimated (see for example Najera et al. 1992).

One of the key determinants in the epidemiology of malaria is the emergence of parasites resistant to chloroquine and mosquitoes resistant to insecticides. In 1961 Young and Moore reported for the first time chloroquine resistant *P. falciparum* in a patient from Colombia (Young and Moore 1961). Since then strains of drug resistant *P. falciparum* have been reported in many areas (see Draper et al. 1988–East Africa; Alvar et al. 1987–Equatorial Guinea; Raccurt et al. 1986–Cameroon; Van-der-Kaay et al. 1984–Central Africa). Apart from Western Sahara, Morocco, Algeria, Tunisia, Libya, Egypt, South Africa and Lesotho, all the other Africa countries have reported drug resistant *P. falciparum*. The whole of the Indian sub-continent and southeast Asia, and South America (excluding Argentina, Chile, Paraguay, and Uruguay) have parasites resistant to chloroquine (Center for Disease Control 1990: 8). With 2.13 million cases reported, India accounted for at least 40% of the total number of cases reported to WHO excluding Africa in 1992 (WHO 1994, 1997; Table 2.1).

The leading cause of malaria in Kenya is *P. falciparum*. In some parts of the country (e.g. the Kano Plains in Nyanza Province), *P. falciparum* accounts for at least 80% of malaria infections. *P. malariae* is responsible for about 10%–15% of the infections, and *P. ovale* for 5% of the infections (Roberts 1974: 307; Spencer et al. 1987). *P. vivax* is occasionally reported from the coastal area (Kenya, Republic of, 1992).

Three clearly defined epidemiological situations are found in Kenya. These are: (1) endemic, (2) epidemic or seasonal malaria, and (3) no malaria transmission (Roberts 1974) (Table 2.2). This distribution corresponds to altitude and rainfall patterns.

The Life Cycle of the Malaria Parasite

Advances in knowledge regarding the life cycle of the malaria parasite were made in the latter part of the 19th century (Oaks et al. 1991). In 1898 Giovanni Battista Grassi, Amico Bignami, and Guiseppe Bastianelli, in Italy, documented the transmission of the human malaria parasites. Soon after, they described the developmental stages of the two most important malaria parasite species: *P. falciparum* and *P. vivax*. Before them, in 1880, Laveran, a French army surgeon in Algeria, for the first time saw and described malaria parasites in human red blood cells. And, in 1897 Ronald Ross in India found a developing form of the malaria parasite in the body of a mosquito that had previously fed on the blood of a malaria patient.

The *Plasmodium* parasite has three phases of development in the mosquito and two in the human host (Figure 2.1). It is transmitted into humans in the sporozoite forms in the saliva of infected female mosquitoes. The sporozoites then invade the liver cells. Within 5 to 15 days the sporozoites develop into schizonts. This period varies by species. It takes about 7 days for *P. falciparum*, 6 to 9 days for *P. vivax* or *P. ovale*, and 14 to 16 days for *P. malariae* (Jetten and Takken 1994: 3). Each of the schizonts contains 10,000 to 30,000 merozoites. The merozoites are released and they themselves invade the red blood cells. The pre-erythrocytic development in the human host is known as the intrinsic incubation period.

In the red blood cells each merozoite matures into a schizont with 8 to 32 new merozoites. The red blood cells eventually rupture to release the merozoites into the blood stream. The merozoites can then again invade new red blood cells. It is this rupturing that is associated with fever and it signals the clinical onset of malaria (Oaks et al. 1991). Disease symptoms are caused by the asexual parasite stages present in the human host.

Malaria parasites can remain in the human host for a long time. These can cause malaria after a lapse of many months and, sometimes years. In patients with *P. vivax* and *P. ovale* this phenomenon, which caused by dormant liver-stage forms of the malaria parasites, is known as relapse. They can remain dormant up to 4 years before resuming development and releasing merozoites into the bloodstream. In patients with *P. falciparum* and *P. malariae* recurrence of malaria is due to recrudescence. Recrudescence is caused by surviving blood-stage parasites from earlier infections (Oaks et al. 1991: 27).

Some merozoites in red blood cells differentiate into sexual forms, the gametocytes, which may be ingested by mosquitoes. Once in the mosquito, gametocytes leave the red blood cells to initiate the process of fertilization. Male and female gametes fuse to form a zygote. Within 12 to 48 hours the zygotes elongate to form ookinetes (the fertilized forms of the malaria parasite in the mosquito's body). The ookinete penetrates the wall of the mosquito's stomach and becomes a oocyst. Within a week or more depending on the plasmodium species and the ambient temperature, the oocyst forms more than 10,000 sporozoites. The period of development of malaria parasites outside the human host is known as the extrinsic period. When the oocyst ruptures, the sporozoites

migrate to the mosquito's salivary glands, ready to be injected into a human host, and the life-cycle is completed.

Impact of Malaria on the Population

Many studies of malaria focus on the economic impact on families. These studies concentrate on the direct costs (measured by amount of money spent) required for treatment and transportation (Vosti 1990; Sauerborn 1991; Ettling 1991; Sherphard et al. 1991; Jayawardene 1993), and on the indirect costs–measured by lost agricultural production time and the indebtedness that comes from medical expenses (Conly 1975; Sauerborn 1991; Jayawardene 1993). Studies on the direct costs of malaria are by far the more frequent, perhaps because direct costs are easier to measure than indirect ones.

Other studies have focused on malaria's effects on mothers during pregnancy (Cot et al. 1992; Steketee et al. 1988; Kaseje et al. 1987; McGregor 1984; Bray and Anderson 1979), on adaptive advantages conferred by the sickle cell trait and immune responses in malaria-infested environments (Madrigal 1990; Esposito et al. 1988; Marsh et al. 1988; Fleming et al. 1985; Bienzle et al. 1972; Livingstone 1958; Allison 1954a, 954b), and on the use and effectiveness of mosquito repellents–such as coils, body smears, and mosquito nets (Snow et al. 1988).

Effects on the Local Economy

Conly (1975) studied the effects of malaria on the family's economy in eastern Paraguay. She examined 28 new settler families over a 2-year period in a malaria endemic region. This area had limited malaria control activities. Conly's study revealed:

(1) a decline in the rate of land clearing; (2) diminished harvests of subsidiary crops; (3) a reduction in the amount and efficiency of farm work done; (4) a reduction in reciprocal labor exchange; and (5) a shift in agricultural priorities. According to Conly, malaria was also the probable stimulus for migration among many young men. Conly estimated a loss of between 5 and 15 days of work for each malaria episode.

In Africa, it is estimated that between 3 and 7 days of work are lost per case of malaria. On average about 2.1 days (approximately US $ 1.70 per capita per year, the average cost of goods and services produced per day was US $0.82 in 1987) of output per person are lost. In 1987, a case of malaria cost US $ 9.84 ($ 1.83 in direct costs and $ 8.01 in indirect costs). The average value of goods and services produced per day was $ 0.82 (Shephard et al. 1991). The economic burden of malaria to Africa was US $ 0.8 billion (Table 2.3). This was predicted to rise to US $ 1.7 billion in 1995 (Shephard et al. 1991). In Kenya, it is estimated about 174 million (P_p X D_o, Table 2.3) working days per year are lost among the 15-60 years age-group (46% of the population). The estimates assume a disability due to malaria of 15 days per year (Kenya, Republic of 1992: 19). Kenya's per capita GNP is US $ 270.00 per person per year (World Bank 1995). The country, therefore, looses about US $ 129 million (P_p X D_o X V_{gs}, Table 2.3) every year due to lost working days because of malaria. This is a great burden for a developing country whose economy relies primarily on agricultural production.

And this is surely an underestimate. Some work days are lost because relatives and friends come to visit those suffering from malaria. In Kenya, at least, lost school days and lost work days for mothers taking care of sick children and other family members are not counted (Kenya, Republic of 1992: 19). In a 1994 study in Uasin Gishu district the

rate of school absenteeism among primary school pupils ranged between 17.6% and

54.4% for some days. The rates were higher in Class 1 and 2 (between 6 and 8 years)

than in the rest of the Classes. Students missed school because: (1) they had malaria; (2)

they were taking care of household duties of a sick relative; (3) they left to take care of

the home while adults were away attending funerals of close relatives or friends.

Sometimes the entire school missed an afternoon in order to join the community in a

funeral which may have been malaria related (Some 1994).

Immediately following a malaria episode work output is low before people regain

their full strength. This produces further, unknown, losses. We need better-informed

measures for the economic losses due to malaria. Researchers should determine all the

people linked to a sick person. Once this has been done, it should be easier to follow

them up and record their activities in relation to the sick person. The sick should also be

followed throughout a single episode and their activities accurately recorded. Following

this strategy we should be able to better determine the direct and indirect economic losses

that families incur as a result of malaria or other illnesses. Unfortunately, I have not been

able to do that here because of logistical problems, which I have discussed in Chapter six.

Effects on Pregnancy

Women may suffer from various problems during pregnancy. For example,

increased parasitemia[3] occurs during pregnancy (Bray and Anderson 1979). Evidence

suggests a relationship between parity and parasitemia. McGregor (1984) reports that in a

sample of primigravidae women in Gambia, 64% were infected. For those in their second

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[3]Parasitemia is defined as the level of parasites present in the blood.

or third pregnancy, 39% were infected; among women who had already been through at least three pregnancies, 20.9% were infected. Elevated levels of *P. falciparum* are associated with: 1) high maternal morbidity; 2) high maternal mortality; 3) spontaneous miscarriage; 4) still births; 5) premature deliveries; and 6) low birth weight children (Steketee et al. 1988; McGregor 1984).

It is not clear why parasitemia increases during pregnancy. Pregnancy appears to depress pre-existing acquired immunity (Brabin 1983). Beer and Billingham (1978) argue that increased production of hormones occurs during pregnancy. Some of these hormones, particularly cortisone, can exert immunosuppressant effects in certain experimental conditions.

Women in their second trimester are considered to be at particular risk for complications due to malaria infection. Brabin (1983) observes that infection rate is at its highest during this time. *Plasmodium* parasites multiply in the body and attack the red blood cells. Hemoglobin in the red blood cells is broken down leading to anemia. In a state of increased red blood cell destruction the maternal system is under pressure to produce more red blood cells. This demand sometimes cannot be met in poor health (or nutritional) conditions that are characteristic of most tropical countries. Under these circumstances malaria related complications are high.

In 1986 WHO recommended early recognition and treatment of malaria and chemoprophylaxis using effective antimalarial drugs throughout pregnancy. Following this recommendation, malaria programs in endemic regions stepped up antimalarial drug distribution to pregnant women. However, few studies have measured the clinical value and cost-effectiveness of chemoprophylaxis. In Gambia malaria chemoprophylaxis

administered by traditional birth attendants resulted in reduced parasitemia, fewer cases

of anemia, and fewer low birth weight babies–but only in primigravidae women

(Greenwood et al. 1989). Parasitemia may have been reduced significantly in

primigravidae women because more of them are infected with the malaria parasites.

Reduced parasitemia then led to fewer anemia cases and fewer low birth weight babies.

The effect of prophylaxis on placental infection has been shown to be less

effective when administered for less than one month (Cot et al. 1992). In many parts of

the third world women do not go to prenatal clinics until late in their third trimester–if

they go at all. In some areas (e.g. the Mara region of Northern Tanzania) other factors

that hinder chemoprophylaxis programs may add to the complexity of the problem

(MacCormack and Lwihula 1983). These factors include: (1) inconsistent drug supply;

(2) problems in drug distribution; (3) poor communication, particularly in rural areas

(where the majority of women live); (4) inadequate staffing of health care facilities; (5)

poor (or lack of) community participation; and (6) drug side effects.

Similar factors have been identified in Saradidi, Kenya (see Kaseje et al. 1987).

One would question the effectiveness of prophylaxis at this late period in pregnancy.

During this stage parasitemia appears to decrease even without intervention (Brabin

1983). Thus, achieving maximum benefits at minimum cost requires proper timing.

However, proper timing alone is not enough. Pregnant women must be willing to

participate in prophylaxis programs. In areas where problems due to drug supply and

distribution have been overcome, most expectant mothers who are malaria asymptomatic

do not take antimalarial drugs for prophylaxis. Due to lack of recognizable symptoms

they may not readily associate antimalarial prophylaxis with long term health benefits.

This is a problem of illness-disease distinction. In endemic areas constant reinfection may cause a change of patients' behavior towards malaria and the use of medicine. Patients start to regard the medicines used as ineffective. The bitter taste of the pills and the negative side effects of the drugs (e.g. chloroquine-induced itching and miscarriages–Kaseje et al. 1987) also influences people's behavior. In their study, Kaseje and colleagues found that 4% of the women from the Kano Plains of western Kenya reported that they fear using chloroquine for prophylaxis because "they believed chloroquine caused stillbirths and abortions" (Kaseje et al. 1987 : 81). Compliance becomes erratic and patients stop taking drugs as soon as malaria symptoms disappear, preferring to keep the stock of remaining pills for later episodes.

In some cases pregnant women who are identified as having malaria decide against use of anti-malaria drugs. In Sri Lanka (Jayawardene 1993) and in Kenya (Kaseje et al. 1987) pregnant women do not take anti-malarial drugs because they fear that using these drugs would be harmful to the unborn child. The women in Sri Lanka refrained from seeing a therapist even to obtain advice for fear that they would be asked to take anti-malaria drugs. Their concern about the unborn child is genuine. In many developing countries where abortion is illegal, young girls have been known to use, often with disastrous results, a large dose of chloroquine tablets to induce abortion. Brabin (1991) provides a detailed review of malaria in pregnant women.

Compliance is the degree to which a patient's behavior corresponds with therapeutic recommendations. It encompasses a wide range of behavior which include missing medication doses, taking too much medication, ceasing medication, and failing to go for follow-ups at the recommended intervals (Elixhauser 1991).

Compliance is a problem everywhere. Many patients in the US fail to complete the 10-day regimen for most antibiotics. When symptoms disappear after 3–4 days, people stop taking pills. In coastal Kenya, Mwenesi (1993) found that 55% of the patients who were seen at health care centers did not follow instructions for taking malaria drugs. Mothers exiting clinics were asked about instructions given to them. Most did not describe correctly what they were told by those dispensing drugs, which included directions that the patients should complete the dose. The mothers did not ask for clarification for fear that health workers would reprimand them (Mwenesi et al. 1995a). Eighteen percent of households surveyed had anti-malaria drugs at home, but none had a complete course (Mwenesi 1993). It is quite likely that the patients in the surveyed households did not comply with the treatment regimen. Non-compliance reduces the potential benefits of treatment and it exacerbates disease (Elixhauser 1991).

Patient compliance raises important theoretical issues. The explanation by patients of their behavior varies between groups. In most developing countries non-compliance results from the perceived need to preserve medicine for future use. This behavior minimizes the cost that families incur to treat subsequent illness cases judged to be similar. In the developed world non-compliance is the result of other factors. In the case of non-compliance, I would expect to have similar justification between different groups since we are seeking an explanation to account for one specific behavior. But this is not the case.

Structural differences between developed and developing countries provide an explanation for non-compliant behavior. In the model shown in Figure 2.2 I identify infrastructural and structural factors that influence non-compliance behavior. These

factors present what I consider to be major determinants of patient non-compliance behavior. In the developed countries forgetting to take prescribed medicine and clearing of the symptoms is a post-hoc justification for behavior. In the developing countries the reasons for non-compliance include keeping of medicine for self future use or for use by other family members.

How do the infrastructure and the structure influence compliance? Developing countries are characterized by large families with a network of extended relatives. The cost of treatment is relatively high. Therefore, the strategy adopted by many families for minimizing treatment costs is to keep medicine for future use. Availability and accessibility are key issues also. Medical care facilities are few and far between. This may cause a further increase in the cost of treatment.

In the developed world, families are small and the cost of treatment is high. However, health care is available and accessible to most people. Furthermore having health insurance off-sets the high cost of treatment. Under these circumstances patients may stop taking medicine as soon as the symptoms disappear. They will go back to the health care provider should the condition reappear.

Despite problems of non-compliance, research has shown that programs can be evolved that lead to increased acceptance of prophylactic treatment (see Helitzer-Allen et al. 1994). Using knowledge gained from previous community based research Helitzer-Allen and her colleagues developed an intervention program in Malawi. Earlier research had focused on local concepts of malaria and issues regarding malaria prevention and treatment during pregnancy. They used this information to evolve an intervention that

included a change in the health education message given during antenatal clinics and the distribution of sugar-coated chloroquine pills.

Use of the new health education message led to a 45% increase in chloroquine utilization over the baseline rate while provision of sugar-coated chloroquine pills led to a 65% increase in chloroquine utilization. Utilization of chloroquine was measured by detecting in the urine the level of the parent chloroquine compound and the desethyl metabolite of the drug. If the compound and its metabolite were present the test was recorded as positive and negative if absent. A combination of the new health message and the sugar-coated pills suggests an additive effect (Helitzer-Allen et al. 1994). This result may, however, be skewed because only 44% of the 1,035 women enrolled for the study returned for follow-up. Some of the women were not included in the final analysis because their follow-up date fell beyond the study period and most of those who returned for the follow-up had negative urine chloroquine during the enrollment screening. The presence of chloroquine in the urine may have been due to nurses putting emphasis on using the chloroquine pills provided. It may also be that the women knew that their urine would be sampled and may have complied because of fear that the health workers would be angry with them if it was discovered that the chloroquine pills were not used (Helitzer-Allen et al. 1994). Other factors such as packaging, pill color, shape, and size influence compliance.

Effect on Genes: Adaptive Advantage of Sickle-cell Trait

Distribution of the sickle-cell trait. A map of the world showing the distribution of sickle cell trait superimposed on that showing the distribution of malaria suggests a

relationship between the two. Sickle cell anemia, a condition resulting from having a double dose of abnormal hemoglobin, was first described in the Western medical literature in 1910. A Chicago physician, James B. Herrick, observed the condition in the blood of a 20 year old black student from the West Indies (Durham 1991: 105). Herrick's suggestion that the sickle cell disease is caused by a change in the composition of the red blood cells later proved to be correct.

By 1950, the literature on the distribution of the sickle cell trait among human populations was accumulating. The literature enabled Frank B. Livingstone to discuss the general distribution of the sickle cell gene in the Old World and in immigrant populations (Livingstone 1958). Data from this period raised an important question: why was there a clear pattern of the sickle cell trait distribution? People who are homozygous ($Hb^S Hb^S$) for the sickle cell trait rarely reproduce. Most die before reaching reproductive maturity. Therefore there would be a constant loss of genes each generation. Livingstone (1958) concluded that for the sickle cell genes to attain a frequency of 0.1 to 0.2 in the population a mechanism compensating for the loss must exist.

It is now known that individuals who are homozygous dominant ($Hb^A Hb^A$) suffer higher rates of malaria infection compared to those who are heterozygous ($Hb^A Hb^S$) (Allison 1954a, 1954b; Garlick 1960; Gilles et al. 1967; Raper 1955). Those who are homozygous recessive ($Hb^S Hb^S$) die because of complications related to sickling of the red blood cells. The sickle cell in a heterozygous state reduces the severity of malaria and resistance to infection is enhanced (Ringelhann et al. 1976). Heterozygosity leads to a condition known as "heterozygous advantage." In malaria endemic regions such as West

Africa, high levels of the sickle cell trait are maintained because of a strong selection pressure from malaria against the normal hemoglobin (Haldane 1948).

The malaria hypothesis. The geneticist J.B.S. Haldane was among the first to propose a balancing selection pressure to explain hemoglobin polymorphism. Haldane (1948) pointed out that an unusually high rate would be required for mutation alone to account for the frequencies of another hemoglobin disorder, alpha thalassemia (Cooley's anemia), found in some Mediterranean populations. The homozygous condition for the thalassemia gene is lethal while the heterozygous one leads to mild anemia. In the malaria hypothesis, Haldane (1948: 270) argued that red blood cells with the thalassemia trait were more resistant to attacks by the sporozoa which cause malaria. Malaria was prevalent in the Mediterranean region (Italy, Sicily, and Greece).

The malaria hypothesis has been applied to explain the sickle cell trait distribution. Some researchers claim that the sickle cell trait confers certain adaptive advantages in malaria environments (e.g. Allison 1954a, 1954b; Madrigal 1990; Fleming et al. 1985). From Togo (Bienzle et al. 1972) and East Africa (Allison 1954b) local level correlation between malaria infection and the rate of the sickle cell trait in the population has been shown to be high. In Togo, two Ewe population groups, one from the mountains and the other from the plains, were selected for this study. The incidence of the sickle cell trait was lower (5%) in the mountain group than in the group from the malarious lowland (23%) (Bienzle et al. 1972). Allison (1954b) found a clear relationship between the sickle cell trait and malaria among 35 ethnic groups from East Africa. In areas where falciparum malaria is hyperendemic sickle cell trait levels varied from 14% to 40.5% compared to < 6% from other areas. Areas that had considerable differences in malaria

endemicity had levels of between 7–10%. Less than 5% of the Abagusii were found to have the trait.

Livingstone (1958) associated agricultural practices to the incidence of mosquitoes. He observes that *A. gambiae* require warm, sunlit ponds of fresh water for its reproduction. The cutting down of the forest in parts of West Africa created conditions conducive for *A. gambiae* breeding. Therefore the spread of agriculture became responsible for the spread of the selective advantage of the sickle cell gene. As a result of selective advantage the sickle cell trait spread. This is known as the Livingstone hypothesis (Durham 1991: 125). Livingstone hypothesized an association between cultural (agriculture) and genetic evolution and he showed that gradients of sickle cell gene frequency in West Africa correspond to geographical patterns in the spread of agriculture. Livingstone's 1958 paper is a landmark in the development of medical anthropology, providing a clear and detailed example of the association between culture, biology, and disease (Johnston and Low 1984: 224).

How the sickle cell trait protects individuals from the effects of falciparum malaria is not well understood. It appears that the malaria parasites do not thrive well in red blood cells with sickle cell trait. Also, infected red blood cells have a tendency to sickle when oxygen supply is low. Sickled cells are disposed of faster by the macrophages and other cells of the reticulo-endothelial system (Bruce-Chwatt 1980: 59).

Other genetic factors such as glucose-6-phosphate dehydrogenase (G6PD) deficiency might exert a protective effect against *P. falciparum* malaria. Greene (1993) reviews the literature on G6PD deficiency and *falciparum* malaria. Like the sickle cell

trait, epidemiological studies reveal that there is a general covariation in the distribution of G6PD deficiency and *falciparum* malaria around the world.

Allison and Clyde (1961) studied 532 children aged between 4 months and 4 years in Tanzania in areas with holoendemic *falciparum* malaria. Parasite rates and densities were found to be lower in G6PD deficient children than in the G6PD normal children. In another study, Gilles et al. (1967) reported protection by G6PD deficiency against *falciparum* malaria in 100 Nigerian children (4 months to 4 years). They compared children admitted to hospital suffering from severe malaria with a control group over a three year period. The frequency of G6PD deficiency was significantly lower among subjects with severe malaria compared to the frequency of the trait in the control group (Gilles et al. 1967). The strength of these two studies is in the group of subjects' used–they were young so that the development of natural immunity was not complete. Literature on the protective effect of G6PD deficiency against *falciparum* malaria is also available for African American soldiers in Vietnam (Butler 1973; Kar et al. 1992).

Hemoglobin polymorphism has implications for lay people's response to malaria. It affects infection frequency and severity. Later in this chapter I discuss how disease frequency and severity influence lay people's responses to malaria.

<u>Manifestation of Malaria and Lay People's Response</u>

<u>Manifestation of Malaria</u>

Clinically, malaria is characterized by the presence of all or a combination of some of the following symptoms: chills, severe headache, fever, general body weakness,

painful joints, excessive sweating, vomiting, nausea, dizziness, convulsions (in severe

cases), and anorexia. If the parasites continue unabated they destroy many red blood cells

leading to malaria-related anemia. Anemia has serious consequences, especially in

pregnant women (Steketee et al. 1988; McGregor 1984).

A more serious form of *falciparum* malaria, cerebral malaria, may present

additional neurological symptoms. It begins with headache and may progress to

convulsions, delirium, and altered consciousness ranging from mild confusion to coma.

Cerebral malaria can lead rapidly to unconsciousness and, in survivors, a remarkable

recovery into full awareness. Indeed this is cited as one of the distinguishing features of

cerebral malaria (Oaks et al. 1991). Cerebral malaria kills between 10 and 50 percent of

its victims depending on the level of endemicity, the definition of the disease, the level of

care available, and the age of the patient.

Clinical Categories of Malaria

Malaria attacks with varying degree of severity. The extent of severity depends on

several factors. They include the age of the individual, their general health and immunity

to malaria. Molyneux and Marsh (1993) identify three concepts associated with malaria

severity. First, the etiological concept involves distinct pathological entities such as

cerebral malaria. These must be separated from other non-cerebral forms of malaria.

Severity may also be defined in terms of the chances of a particular episode having a

greater than a predetermined chance of leading to death. This is known as the prognostic

concept (Molyneux and Marsh 1993). It is influenced by the need to identify, in a

hospital setting, groups that have bad prognoses, so that they can be closely monitored.

This approach excludes those subjects who do well in a hospital but who, nevertheless, have a poor prognosis outside the hospital. Finally, in some cases severity may be defined in terms of the load on the health care system. Under this category anyone who requires in-patient treatment is included. The assumption here is that only severe cases of malaria get hospital admission.

Defining severity is arbitrary. Individuals suffering from malaria may be classified as severe when they are not. To overcome this problem the following guidelines are used to identify clinical categories of malaria (Molyneux and Marsh 1993: 7 - 8):

Not malaria. This is characterized by the absence of parasites from a specified number of oil-immersion fields on a thick blood film. The common stipulation is 100 microscope fields.

Asymptomatic infection. This is characterized by the presence of parasites in the blood film, but the person is otherwise 'well'. The term 'well' is used here subjectively. It should be clarified before any studies are undertaken. It should include objective assessments such as the ability to attend school or work. The patient's temperature should be used whenever possible.

Uncomplicated malaria. In uncomplicated malaria the patient has suggestive symptoms or fever, with asexual forms of *P. falciparum* parasitemia at a density above a level already chosen before the study. The minimum density in tropical Africa is usually set at between 1,000 and 10,000 parasites per µl. Care should be exercised such as taking into account the study season and the distribution of the parasitemia in the study population.

Severe or complicated malaria. In complicated malaria the presence of some or all of the following characteristics may be chosen as the criteria for a particular study: cerebral malaria; severe anemia–a high level of parasitemia; prostration; convulsions; acute renal failure; pulmonary edema/respiratory stress syndrome; shock; and spontaneous or prolonged hemorrhage. If unexpected death occurs in a patient in whom malaria is the only significant finding at autopsy, the deceased should be included in the severe or complicated malaria category.

Recognition of Malaria by Lay People

The symptoms used by lay people to diagnose and classify malaria are many and not necessarily the same as those used in biomedicine. In a study of Liberian children and mothers, Jackson (1985) found that, for the study population, malaria symptoms consisted of a constellation of bioculturally defined signs. The expressions used by the respondents were: body cold all over, head hurting too bad, body hot all over, weak body, all bones hurting, sweating a lot, hurting belly, belly sore to touch, loss of appetite, throwing up, body jerks, being sick–nauseated, turning eyes–dizziness, and other symptoms. Eleven malaria signs and symptoms were reported for children and fourteen for mothers (Jackson 1985).

In another study in rural Ghana, Agyepong (1992) reports that the Adangbe recognize malaria as a symptom complex locally known as *asra*. *Asra* is characterized by headache, a rise in body temperature, chills, bitterness of the mouth, yellow eyes, deeply colored urine, loss of appetite, body aches and pains, weakness and easy fatigability, vomiting, pallor of the palms and soles, and cold sores around the mouth.

Jayawardene (1993) has given the following graphic description of malaria by one of his informants in Mahaweli Scheme in Sri Lanka: "The fever comes, the fever goes. Suddenly we sweat, feel very cold and the fever leaves. You take a Panadol, feel better for a day, the fever drops and then it rises. That's malaria" (Jayawardene 1993: 1171).

During a preliminary field trip to Gusii in June and July 1994, I found that they also rely on similar symptoms to recognize malaria. They identify malaria through the following symptoms: (1) feeling cold (usually accompanied by shivering and then a rise in body temperature); (2) vomiting yellowish-green liquid (*esosera*); (3) joints aching; (4) feeling tired and weak (usually accompanied by dizziness); (5) headache; (6) stomach ache (*amatema*); (7) lack of appetite; (8) unusual heart beat; and (9) drooping eyes. For children symptoms may also include dullness, crying a lot, and intermittent involuntary spasms during sleep.

Ugandan women report that infants, children, adults and pregnant women exhibit different malaria symptoms (Kengeya-Kayondo et al. 1994). For infants, the symptoms include raised body temperature, refusing to suck, crying all the time, vomiting, sores in and around the mouth, general weakness, jaundice, palpitations and loss of consciousness. For children the main symptoms are raised body temperature and lack of appetite. Headache, general weakness, and feeling thirsty were also mentioned for this group. In adults, body weakness, feeling cold, and pain in joints were reported as the main signs of malaria, while in pregnant women miscarriage, vomiting, general weakness, a lot of heat in the stomach, and feeling cold were reported as the main features.

Malaria has symptoms that can, sometimes, lead to misdiagnosis by lay people. Even experts need to perform blood smear tests in order to confirm the presence of malaria parasites. In developing countries blood smear tests are rarely done. Medical personnel rely on clinical diagnosis and they use presumptive treatment. Across the world, however, studies show that lay people generally identify malaria using similar symptoms.

Lay People's Responses to Malaria

Whatever the criteria for recognizing disease, lay people's therapeutic choices are determined, in part, through recognition of the disease symptoms (Foster and Anderson 1978; Scrimshaw and Hurtado 1988) and perception of disease seriousness based on the recognized symptoms. In many non-western societies illnesses thought to be the result of supernatural agents, or causes beyond the control of western medicine, are treated using traditional medicine. (See Helitzer-Allen [1989] and Fivawo [1993] for examples on cerebral malaria.) People generally rely on a variety of local therapeutic systems to resolve their health problems.

Several treatment alternatives are available. They include the application of a home remedy, self-medication with pharmaceuticals bought over-the-counter on the open market, herbal therapies provided by traditional healers, and therapies obtained from health centers or hospitals (Colson 1971; Young 1981b; Hunte and Sultana 1992). A patient can also choose not to seek any therapeutic intervention. Lay people choose from these treatment alternatives based on the perceived effectiveness of the particular choices.

However, infrastructural and structural forces also influence health care utilization. Snow et al. (1994) found that the Giriama of the Kenya coast consult a variety of health care sources for a single childhood illness. Up to five different therapies are used: shop-bought drugs, traditional healers, government dispensary, private medicine, and home remedies (herbs and prayers). About 72% (272) of the 376 respondents reported using over-the-counter drugs to self-treat fevers, 51% (194) mentioned using health care facility, 8% (31) mentioned self treatment using home remedies (tepid sponging, traditional medicine, and prayers). Only one respondent mentioned consulting a traditional healer to treat fevers (Snow et al. 1992). Snow and his colleagues also found that measures of household socio-economic resources such as radio and mosquito nets were higher in the children admitted to hospital while distance from the nearest bus stop appears to influence utilization of hospital care. Children whose homes were located further away from a bus stop were less likely to use hospital care (Snow et al. 1994).

Feierman (1981) identifies eleven sources of health care available to lay people in Northeastern Tanzania. These are: (1) full-time healers, whose primary responsibility is to provide care for the sick; (2) part-time practitioners some of whom perform a set of inherited treatments (they provide their services upon request); (3) specialists who live outside the village and provide care to serious cases of spirit-induced illnesses; (4) old women who serve as village midwives; (5) common herbal cures used at the household level; (6) private shops that sell (non-prescription) medicine over the counter; (7) outpatient clinics or mission hospitals; (8) free government dispensary; (9) government hospital; (10) stocks of unused pills kept in the household from previous hospital or

dispensary visits; and (11) health screening and treatment available from the researchers doing research in the area.

In theory, treatment options are available to all seekers. However, in practice, not all are utilized. The search for therapy may follow any one of a number of therapeutic alternatives available (Young 1981b; Hunte and Sultana 1992) although the treatment outcomes may be unknown to patients. Patients do not always get the anticipated outcome and they have no sure way to determine the type of treatment alternative that will yield the desired state or the best results.

Though unable to pre-determine treatment outcomes, patients still must prioritize their decisions. They must first order the alternatives available according to some rules of preference and they must decide on a strategy with a perceived good chance of leading to the desired results (Fjellman 1976). If a particular treatment choice fails, patients or the person(s) responsible for their health must make new choices. As time passes, and if the illness persists, the patient becomes desperate and receptive to therapy suggested by others (Feierman 1981; Agyepong 1992).

Deciding what treatment option to take does not always follow the same sequence in the same individual during different episodes nor need it be the same in different individuals. The decisions made can be considered as part of a chain reaction. Decisions made at time $t+1$ depend partly on decisions that were made at time t and their outcome. Further, they also depend on conditions prevailing at time $t+1$. (The researcher is faced with the task of mapping out the chain of decisions made and, by inference, the behavior of the patients at each of these levels–a difficult but not an impossible task.) The decision-maker is faced with a game of probabilities, a game informed by decisions and

outcomes of time *t* and the prevailing circumstances at time *t*+1. It appears that health

care decisions are a Markov process with transition-state probabilities at each step. For a

detailed discussion on the use of Markov models see Bailey (1964), Anderson et al.

(1976), and Isaacson and Madsen (1985).

Markov process modeling has been used to study health status switching of

infants in Kampala, Uganda (Biritwum and Odoom 1995). The main purpose of the study

was to obtain estimates of the transition probabilities between wellness and sickness,

from month to month of children aged from 0 to 18 months. Markov process modeling

can be used to measure disease prevalence (new illnesses arising or those continuing

from previous illnesses) and to assess the expected impact of a health improvement

program (Biritwum and Odoom 1995). It is possible to extend Markov models to health

care decisions.

<u>Factors Affecting Health Behavior</u>

Several factors operate on the family level to influence the choice of medical care.

They include the socio-economic status of the households; the educational status of the

decision-makers; the type of households; the number of children in each household; the

people whom patients (or decision-makers) know and can trust to give them good advice

(social networks); and personal experiences with earlier malaria episodes. Each of these

factors influence medical care decisions that affect disease progression.

Moving beyond the household, there are a wide variety of factors–distance of

health care facility from the patient's home, the presence of good access roads to these

facilities, and the availability of affordable transportation–that influence lay medical care

decisions. These factors in turn affect health care behavior of people at the household level. In this section I focus on how health care-seeking behavior of patients might be influenced by indigenous concepts of disease causation, the cost of treatment and the effect of household composition as well as by the role played by decision makers.

Indigenous Concepts of Disease Causation

Among the Abagusii, mosquito bites are widely believed to cause malaria. Some people believe that malaria can be caused by eating too much maize, or eating too much sugarcane, and drinking "bad water." In Uganda, Kengeya-Kayondo et al. (1994) found that women believe malaria can be caused by drinking water that has not been boiled, by environmental conditions, and by vectors such as mosquitoes and by other illnesses. Some people associate malaria with causes beyond human control. For example, it is reported that some communities in Malawi, Tanzania and Kenya (see Helitzer-Allen 1989; Fivawo 1993; Mwenesi et al. 1995b) attribute a type of fever accompanied by convulsions to spirits, witchcraft or to 'animals' and 'worms' which enter the patient. This fever usually turns out to be cerebral malaria.

Mwenesi et al. (1995b) carried out a study in Kilifi, Kenya to determine whether convulsions and anemia are: (a) recognized as symptoms of childhood illnesses, and (b) perceived as life-threatening and how these symptoms are managed. They interviewed 883 mothers (608 Mijikenda, 152 Luo, and 123 from other communities). About 56% (or 498) of mothers said convulsion was a childhood illness. Eighty percent of these mothers (about 400 of 498) believed convulsions to be non-preventable, 43% mentioned

avoidance of mosquitoes while 19% mentioned wearing charms and amulets as means of preventing convulsions.

The Mijikenda and Luo have local names for childhood convulsions (Mijikenda–*nyago, dege, nyuni,* and *nyama wa dzulu*; Luo–*oriere*). Among the Mijikenda convulsions are attributed to a figurative animal or bird which enters children. It frightens them and induces fits in the process. The 'animal' may also reside in the child's mother. The child gets frightened upon seeing the mother's eyes (Mwenesi et al. 1995b). Luo informants attributed convulsions to intestinal worms which migrate into the child's head.

Initial treatment of convulsions involves sponging the child using the mother's urine, or that of a close female relative in the absence of the mother. The child is then taken to a traditional healer who decides which of the two 'animals' is causing convulsions, the child's or the mother's. According to Mwenesi et al. (1995b) if the 'animal' resides in the child, an herbal preparation, some to drink and the rest for bathing the child, is given as treatment. However, if the 'animal' dwells in the mother, both the mother and child are treated with herbal preparations, in addition to using charms and amulets.

The Luo use dried and crushed roots which the child sniffs. Sniffing causes sneezing which should get the 'worms' out of the head. No over-the-counter drugs were used by the mothers in the study population to treat convulsions (Mwenesi et al. 1995b). In fact, anti-malarial drugs were withheld or withdrawn from children with fits (Mwenesi et al. 1995a). The mothers did recognize, but did not link, convulsions to malaria (Mwenesi et al. 1995b).

In another study Ramakrishna and Brieger (1987) quote a mother in Nigeria as saying, "Yesterday I thought my child was having malaria, but today when the convulsion started, I knew it was another disease." Though the disease had signs of cerebral malaria, the mother identified it as *ile tutu*, a nonmalarious condition. Under these circumstances biomedical treatment may be abandoned midway because the malarious condition has advanced to a state not associated with malaria.

Cost of Treatment

Western medical care in many developing countries is quite expensive and the distribution of the medical facilities and personnel uneven.[4] In Kenya, high medical fee limits patients' health care alternatives. Poor households are likely to wait for a longer period before action is taken. If the disease persists they may attempt to use cheaper options, first, trying non-prescriptive medicines bought over the counter in shops and small kiosks and if this fails, going to the health center or hospital.

Families in developing countries spend between 2-5% of their income on private medical care (Gomes 1993). However the difference in health expenditure between the poor and the rich on a typical illness episode is large in some countries. In Kenya, the poorest 20% of the population spend 64% of household income on an illness episode compared to 1% spent by the highest quartile (Gomes 1993).

The most common non-prescription medicines that Abagusii buy over the counter are Panadol, Hedex, Action (these fall under the general category of pain relievers), Cafenol, Aspirin (to control body temperature), Malariaquin, Dawaquin, *Chloroquine*,

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[4] In Kenya, as in the U.S., urban areas have a higher concentration of doctors than the rural areas.

and Fansider. The choice of the drugs bought is determined by their cost. Malariaquin, the cheaper of the drugs and the one most widely used has become less effective against malaria due to chloroquine resistance of *P. falciparum*, the most common malaria-causing parasite. If the first treatment choice fails, people seek alternative treatment from government hospitals, clinics, mission hospitals as a next step, and sometimes a few of the patients seek care from indigenous healers. Cost of malaria treatment is a primary factor in Abagusii's illness behavior.

Sudden and life threatening attacks, for example from cerebral malaria, may force the decision-maker to disregard all other options in favor of taking the patient directly to hospital. For example, Molyneux et al. (1989) observe in a study of 131 Malawian children that mothers wait longer (averaging 47 hours) for non-cerebral malaria but then take children to the hospital within 8 hours of developing cerebral malaria. In serious cases economic factors are taken into account after the initial crisis is brought under control. The threat to life is enough reason to cause urgent decisions and immediate action.

Mothers in coastal Kenya wait for 3 days before visiting an health facility. Reasons given for waiting include: perception that the illness is mild; partner being absent; other important matters to attend to; lack of someone to mind the ill child's siblings; lack of money for transport; and use of over-the-counter drugs (Mwenesi et al. 1995a).

Household Composition

The composition of the household may influence household resource allocation in the home. It is known that in some societies children of particular sex are given preferential treatment while in polygynous households the husband may tend to like and provide more for the younger wife. Indeed, in Bomorenda a woman informant told me explicitly that "in a polygynous homestead, the husband is more affectionate to the younger wife" (see quote [7-10]). She further stated that this is manifest in the time and resources the husband spends on the younger wife. Differential allocation of resources by the husband strains the financial base of other households curtailing, in the process, people's health care choices for treatment of malaria and other health care problems. Such households may opt for less expensive treatment alternatives such as using cheaper drugs, and buying or taking an incomplete dose of prescribed medicine.

Studies have shown that in groups where male children are given preference over their female siblings, more resources are spent on the health care of the male children (Vlassoff et al. 1995). Differential expenditure on household members leads to an imbalance in the health status in the family and the community. For instance, where male children are favored the caretakers may take them to a health care provider earlier than they would for female children.

The relationship between household composition, size of land, and malaria incidence is discussed in Chapter seven in detail with data from the field. A direct effect of reduced plot sizes is on malaria incidence. People now live much closer than they did three decades ago. This has reduced the distance mosquitoes must travel between households and individuals. This implies that chances of being bitten by an infected

mosquito have increased in the same period. If the rate of bites is directly proportional to the probability of getting malaria, then people are more likely to have malaria now than in the past. There is, in fact, increased malaria incidence in Gusii.

Decision Makers

Decisions regarding health care choices are not always taken by one person. Usually the decision making process involves a period of informal consultations. Advice given during these consultations is not binding, but is taken into account when decisions are made. Frequently the person consulted is one who is knowledgeable about the disease in question and with whom a social connection already exists. People are likely to consult with and follow the advice of those they already know and can trust (see Feierman 1981).

The decisions may also reflect household experiences with earlier malaria episodes. For instance Jayawardene (1993) has shown that for rural Sri Lanka subsequent malaria episodes are more likely to be managed outside the home.

The Emics and Etics of People's Response to Malaria

It is clear that, all over the world, people's recognition of and response towards disease varies according to the prevailing circumstances (see for example Foster and Anderson 1978; Scrimshaw and Hurtado 1988; Molyneux et al. 1989; Jayawardene 1993). How does one account for differences in people's behavior towards illness? I will use the emic and etic distinction (Harris 1979) to group people's responses to malaria. I explain this in terms of recognition of malaria, cause of malaria, management of malaria, and disease progress.

<u>Recognition of Malaria</u>

Lay people recognize two forms of malaria according to its gravity (I use gravity to imply threat to life). The life threatening form closely parallels cerebral malaria–a serious and often fatal form. The less threatening form is mild but can be sometimes debilitating. Patients with mild malaria may go about doing light work. In this respect there is consensus between the lay and medical perceptions about the forms of malaria.

Some lay people do not classify cerebral malaria as malaria. Instead, it is put into categories of diseases that are considered to be the result of human actions–diseases that do not have a biological origin or due to supernatural forces. Human actions may be, as in the case of Gusii informants, the result of strained social relations or differential resource allocation resulting in mental instability. Mental instability manifests itself in the form of cerebral malaria. However, from the professional's position, cerebral malaria falls under the same category as other forms of malaria. It sets out in the same way as non-cerebral malaria. However, cerebral malaria has a different trajectory. It progresses faster and has serious consequences if untreated.

<u>Cause of Malaria</u>

Lay people say that mosquitoes cause malaria. From a medical point of view malaria is caused by *Plasmodium* parasites transmitted by mosquitoes. Because of its style of presentation some lay people associate cerebral malaria with evil spirits or witchcraft. When a patient has convulsions lay people often do not link the condition to malaria. The tendency is to link convulsions to other causes. The cause of malaria from the medical perspective is *Plasmodium* irrespective of its style of presentation.

Management of Malaria

       When one has frequent malaria attacks, lay people may seek non-biological explanations. In doing so malaria is removed from the realm of biologically caused diseases. The medical explanation for such malaria may be ascribed to chloroquine resistant *Plasmodium* parasites or to non-adherence to treatment regimen by the patient. The latter is a question of the patient's disease management. It is within the prerogative of patients to make decisions as to whether to take the prescribed dosage after the disease symptoms have gone.

Disease Progression

       Disease progress affects people's perceptions. When malaria progresses into the cerebral form, patients may abandon or change treatment in favor of a new form of treatment. Stopping or changing treatment occurs when patients or the therapy management group give the disease a new classification. Treatment choices depend upon the new classification. The emics of the lay people as well as of professionals evolve as conditions and knowledge change. For example, a professional may reclassify malaria as chloroquine resistant. In that case the new treatment regimen uses different drugs. This is usually a shift from chloroquine-based drugs to, usually more expensive, sulphur-based ones. The latter include Fansidar and Metakelfin.

Conclusion

       Studies of malaria focus on specific populations (e.g. pregnant women and children) or on the influence of a few constraints. The constraints include cost of

treatment, availability of transportation, distance to the nearest health care facility, and the quality of health care provided. Only a few researchers have attempted to develop models of people's response to malaria using a combination of infrastructural, structural, and cultural factors which could be used by health planners to facilitate the integration of control strategies.

Lay people make treatment choices that correspond to their emics. Social and behavioral responses include waiting for a time, stopping or changing treatment regimen, and consulting with kin or friends. Waiting for a time while observing the disease has its purpose. It enables people to spend economic resources on other pressing activities. Folk views do not always agree with the professional views, however. Those being studied may see things in a completely different way from the researcher (outsider). For effective control, malaria programs need to look into the folk/professional distinction. This will help us determine how lay people's knowledge and the professionals' knowledge interplay to influence malaria transmission in communities of interest.

Any improvement at the family level of the malaria situation, however small, will have far reaching benefits to families in areas where malaria is endemic. Benefits will come in the form of increased productivity, and lower spending on malaria management. Economic gains resulting can then be channeled to areas such as education and providing employment. At the national level, the millions of dollars spent on malaria management can be channeled into other areas of the national economy. Therefore, local benefits due to control of malaria can have a wider ripple-effect.
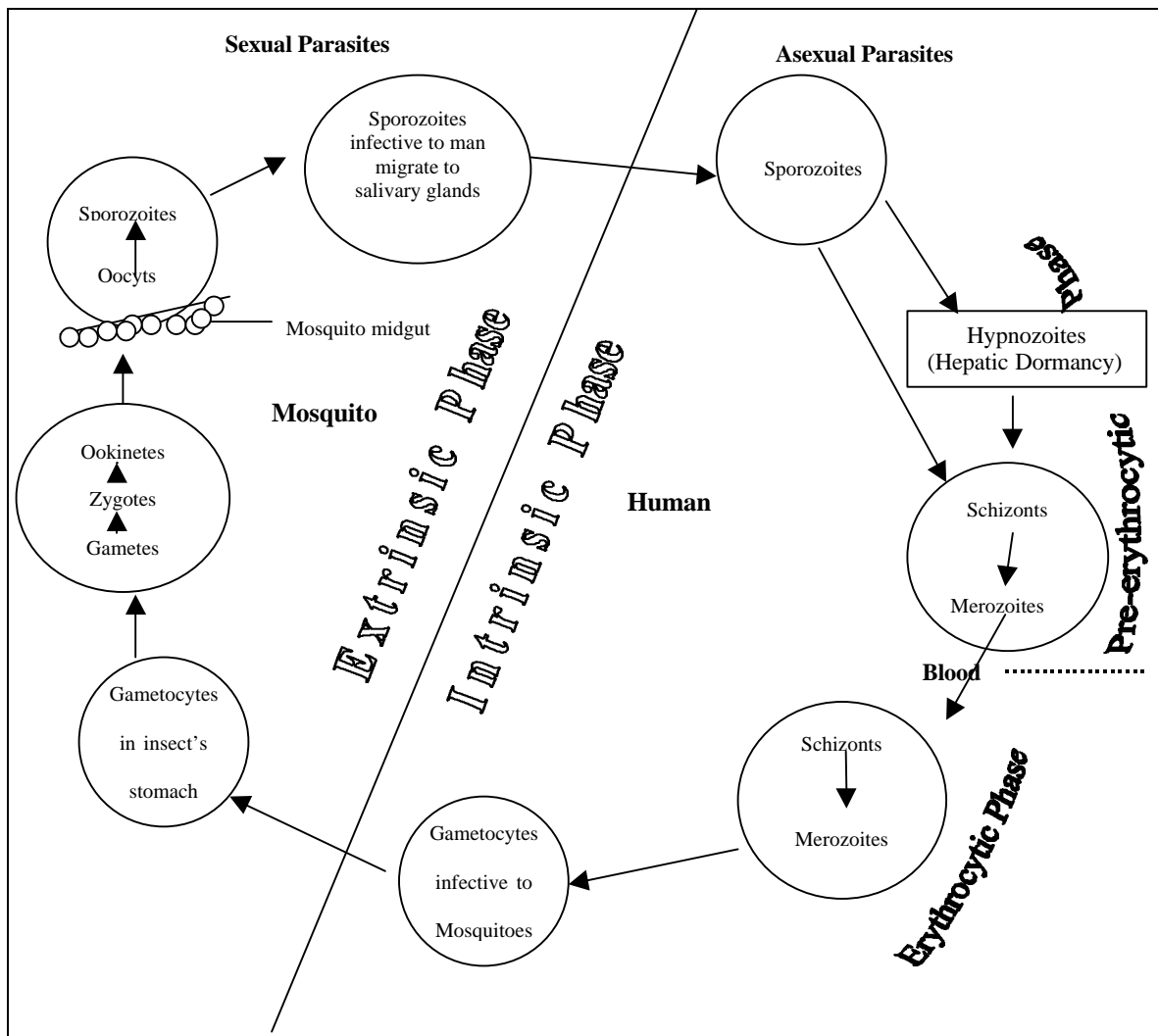
Figure 2.1: Life Cycle of the Malaria Parasite (*Plasmodium spp.*)
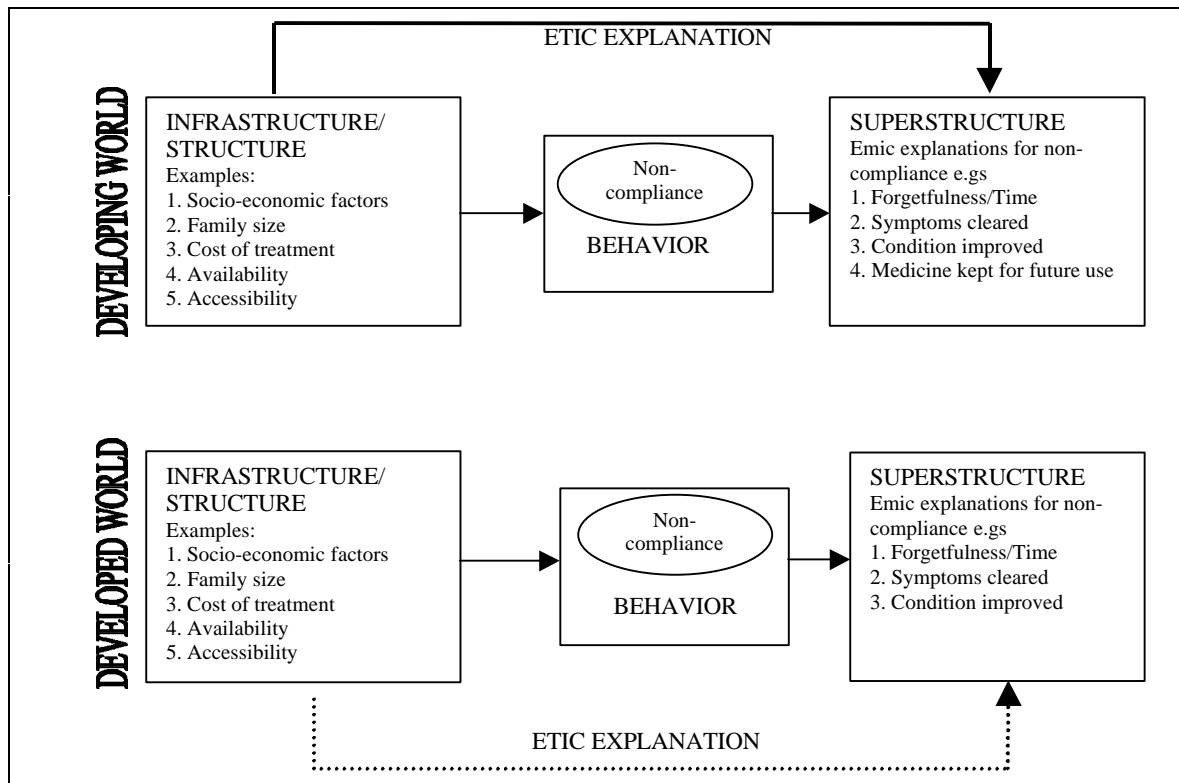
Figure 2.2: A Conceptual Model to Account for Patient Non-compliant Behavior

Table 2.1: Number of malaria cases reported, by WHO region (x 1000), 1983 - 1994[a] (WHO 1994: 4, 1997)

WHO Region	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 [d]
Africa[b,c]	3,168	4,422	13,207	17,927	20,588	24,712	29,381	12,302	8,994	8,384	2,590	27,644
Americas	831	932	911	951	1,018	1,120	1,114	1,058	1,231	1,188	984	1,115
South-East Asia	2,731	3,003	2,501	2,685	2,834	2,791	2,942	2,970	3,087	3,078	3077	3,514
Europe	73	62	57	47	28	25	21	14	16	22	50	91
Eastern Mediterranean	304	335	391	612	608	434	528	586	541	309	292	321
Western Pacific	1,842	1,410	1,177	1,307	1,145	1,002	1,071	1,032	968	733	674	2,121
Total (excluding Africa)	**5,781**	**5,742**	**5,037**	**5,602**	**5,633**	**5,372**	**5,676**	**5,660**	**5,843**	**5,330**	**5,077**	**7,162**

This information extracted from WHO Weekly Epidemiological Reports No. 42, 1994, Pp. 309 - 314;
No. 43, 1994, Pp. 317 - 321; No. 44, 1994, pp. 325 – 330, No. 36, Pp. 272.
[a]The information provided does not cover the total population at risk in some instances
[b]Mainly clinically diagnosed cases
[c]Incomplete figures
[d] The 1994 data include, for the first time, both slide confirmed and clinically diagnosed malaria cases for all regions.

Table 2.2: Malaria epidemiology in Kenya by type and area (adopted from Roberts 1974)

Classification	Spleen rate (age 2-9 yrs)	Area
(1) Endemic (a) holoendemic	> 75%	Coast Province, coastal area; Tana River, Kano plains, Taveta.
(b) hyperendemic	50 - 74%	North Nyanza, Bungoma, Busia, Simba Hills (Coast)
(c) mesoendemic	10 - 49%	Machakos, Kitui, Thika, parts of North Nyanza, Murang'a and Embu below 1,300 m.
(d) hypoendemic	< 10%	Meru, Pokot, Samburu, Isiolo, Baringo
(2) Epidemic	variable	Highland over 1,600 m. with high rainfall and dry areas with exceptional rainfall: Masailand, Nandi, Kericho, Kisii, NorthEastern Province, Eastern Kitui, Londiani, Elgeyo.
(3) No transmission	None	At altitude over 2,000 m: Aberdares, Mt. Kenya, and Mt. Elgon.

Table 2.3: Estimated economic cost of malaria in Sub-Saharan Africa[a]

	Population[b] (millions)	Population[b] (15 - 60 yrs) (millions) (P_p)	Days of output lost /person /yr due to malaria[c] (15 - 60 yrs) (D_o)	GNP[b]/yr (US $)	Average value of goods & services produced (US $) /person/day ($V_{gs}$)	Loses in US $ due to malaria/yr (P_p X D_o X V_{gs})	Estimated clinical malaria cases per year
SubSaharan Africa	559	274 (49% of pop.)	12[d]	-	0.82[d]	800 million[d]	100 million[e]
Kenya	25.3	11.6 (46% of Pop.)	15[f]	270.00	270/365 (0.74)	129 million	5.8 million[f] (reported - 1989)

[a]comprises all countries excluding Algeria, Egypt, Libya, Morocco, and Tunisia.
[b]World Bank (1995)
[c]In 1987, a case of malaria in Africa cost US $ 9.84 ($ 1.83 in direct costs and $ 8.01 in indirect costs).
By 1995 it was estimated to rise to US $ 16.40 (Shephard et al. 1991).
[d, e] Shephard et al. (1991)

[f]Kenya, Republic of (1992)

CHAPTER 3
INTERNAL FAMILY STRUCTURE AND DECISION MAKING:
ITS RELEVANCE FOR TREATMENT AND CONTROL OF DISEASE

Introduction

The family is central in health care decisions. Between 70%–90% of illness

management takes place outside formal health care system. Self-treatment within the

family provides a considerable part of illness management (Turk and Kerns 1985). As a

culture bearing unit the family influences health behavior of its members and yields data

that can be used in studying health care behavior.

In this chapter I discuss the impact of internal family structure, decision making,

and therapy management groups on the treatment and control of disease. I use family

structure to imply the social organization, the roles played by family members and the

hierarchy of authority in decision making. Authority may be gained through accumulation

of economic power. Throughout the chapter, I examine the influence of infrastructural,

structural, as well as cultural forces on health care behavior.

Infrastructure refers to the underlying forces such as technology of subsistence,

techno-environmental relationship, ecosystem, work patterns, demography, mating

patterns, fertility and medical control of demographic patterns. Infrastructural factors also

include the distance of health care facilities from the homes of patients, the presence or

absence of roads to these facilities and the availability of affordable transportation.

Structural forces influence the domestic as well as the political economy. These forces

include household income, education of decision makers, number of children in each

household, the people whom patients (or decision makers) know and trust to give them

advice (social networks), past experiences with disease, and whether households are

monogamous or polygynous. Cultural (superstructural) factors include people's beliefs

about disease, people's health care practices, and how people give meanings and context

to their illness experiences. For a detailed discussion of the differences between

infrastructural, structural, and superstructural (cultural) factors see Harris (1979).

Knowing the influence of infrastructural, structural, and cultural factors on health

care seeking is critical. It assists researchers to design new and better predicting models to

study patient health care seeking behavior, and in the design of new low-cost disease

control technologies. The information also assists planners in planning public health

facilities and in the design of public health programs.

In the second part of this chapter I critique the literature on determinants of health

care seeking behavior. I discuss how these determinants influence health care seeking

below. In the section following it, I use a case study from Kenya to show factors that

might influence patients' consultation of health care providers. This is followed by a

review of studies on decision making (e.g. Young 1981b; Mathews and Hill 1990; Ryan

and Martinéz 1996) and on therapy management in Africa (e.g. Janzen 1978; Feierman

1985; Feierman and Janzen 1992). I use these studies to examine the health behavior of

patients and their decisions within the context of the family, and the relevance of

understanding the internal family structure to treatment and control of diseases such as

malaria. In section four I discuss the role played by the therapy management groups in health care decisions.

Determinants of Health Seeking Behavior

There is an enormous literature on the determinants of health-seeking behavior (Suchman 1965–United States; Mechanic 1968 and 1969–United States; Colson 1971– developing countries; McKinley 1973–Arbadeen, Scotland; Fosu 1981–Ghana; Young 1980 and 1981b–Mexico; Mwabu 1986–Kenya; Mathews and Hill 1990–Costa Rica; Bentley 1992–India; Snow et al. 1994–Kenya; Ryan and Martinéz 1996–Mexico). For reviews see Mechanic (1969), Colson (1971), Young (1976), Kroeger (1983), and most recently, Ryan (1995). The studies identify factors which determine treatment choices made by patients or those who take care of them. However, few studies on decision making at the household level have been carried out in Africa (Doyal 1989). Ryan's (1995, 1998) study in Cameroon is the most recent to address health care decision making in Africa.

Determinants of health seeking behavior include the following: (1) illness characteristics and its perceived seriousness (Suchman 1965; Mechanic 1969; Colson 1971; Young 1980), (2) lay people's knowledge and categorization of the illness (Fabrega 1971, 1975; Lipowsky et al. 1992), (3) expenses that are likely to be incurred for each treatment choice (Gould 1957), (4) distance from the health care facility (Snow et al. 1994); social networks of the patient and the care takers (Zola 1973); and religion (Mechanic 1963).

Illness Characteristics and Perceived Seriousness

People everywhere recognize, and respond differently to, diseases that are serious from those that are not. In a sample of New York patients Suchman (1965) found pain (in 66% of the respondents) to be an important sign of things gone wrong. Fever or chills (17% of the respondents) and shortness of breath in 10% of the respondents were other main indicators. However, Suchman sampled patients who either (1) required at least three physician visits and who were incapacitated for more than four consecutive days, or (2) required hospitalization for one or more days (Suchman 1965). We have no idea how the results or their interpretation might have been affected had Suchman included patients who did not visit a physician or were not hospitalized.

In Malawi, Molyneux et al. (1989) found that mothers whose children had cerebral malaria waited less in taking their children in for medical help than did mothers whose children had non-cerebral malaria. In fact, mothers took children to the hospital within 8 hours if they suspected that the children had cerebral malaria, while mothers whose children had non-cerebral malaria waited for an average of 47 hours. Thus disease severity (or at least the perception of severity) affects the health-seeking behavior of patients or the decisions made by those who take care of the patients.

Perception of severity of illness is subjective. It depends on factors like recognizable symptoms and a person's prior experience with that or other illnesses. Quite often people have different perceptions about an illness. In fact, some people perceive the same illness differently at different times.

Lay People's Knowledge and Categorization of the Illness

There is now ample evidence to suggest that disease categorization influences health-seeking behavior (Fabrega 1971, 1975; Fosu 1981; Helitzer-Allen 1989; Lipowsky et al. 1992; Fivawo 1993). In Ghana, lay people classify diseases along a continuum from those diseases due to natural agents to those diseases thought to be a result of supernatural agents. In the middle are diseases that embrace both the natural and the supernatural agents (Fosu 1981). Diseases considered being the result of supernatural forces (but which according to the etic classification are not) may cause patients to seek a supernatural intervention.

In some communities cerebral malaria is thought to be due to supernatural agents. For example, some communities in Malawi (see Helitzer-Allen 1989) and in Tanzania (see Fivawo 1993) attribute cerebral malaria to spirits or witchcraft. Patients with cerebral malaria in these communities rarely utilize hospital care. Instead, they opt for a supernatural intervention.

In Colombia, Lipowsky and colleagues (1992) found that lay people and traditional healers use the hot-cold classification system of disease, body conditions, medicines, and foods (Lipowsky et al. 1992). They classify malaria medicinal plants into two categories: hot plants and cold plants. To reduce body temperature patients used "cold" medicinal plants while "hot" medicinal plants were used to reduce inflammation of the liver and spleen. (see Fabrega 1971, 1975; Frake 1961 for more examples of disease categorization and health care-seeking behavior).

Health Care Expenses

There are studies that document how expenses incurred for each treatment selected influence people's health seeking behavior (e.g. Gould 1957; Yoder 1989; Snow et al. 1994; Mwabu et al. 1995). In Swaziland, following an increase of up to 400% in hospital user fees at the government hospitals, average attendance in all health care facilities dropped by about 17% (Yoder 1989). This increase was designed to even charges that patients pay in government health facilities and mission hospitals where the average outpatient fee remained about US $ 1.00 per visit. The drop was 32.4% in government hospitals. Utilization increased by about 10.2% in mission hospitals. Yoder also observed a decline in patient visits for childhood diseases (16%), Bacillus Calmette Guérin (BCG) and Diptheria, polio, and Tetanus (DPT) immunizations (19%), and in programs designed to reduce dehydration in children (24%). A study in Kenya by Mwabu et al. (1995) reveals a similar trend in health care utilization. After introducing cost sharing in government health facilities patient attendance dropped by 50%. When these charges were suspended patients moved to government facilities from the private health sector over the next 7 months.

When the cost of health care increases, some patients will drop out of the health care system while others will alter their health care seeking behavior. In the Swaziland study, at least three types of patients were expected to change their health-seeking behavior. First, there are the low-income patients for whom the fee is no longer affordable. Next are, patients who decide their ailment is not serious enough to justify the costs. Finally, there are patients who make multiple visits are likely to reduce the number of

visits if they pay for each visit. Up to 34% of the overall decline in attendance was among

patients who had previously paid the least for health care (Yoder 1989).

In Figure 3.1 I present a model of the relationship between people's rating of the

likelihood of getting well for various medical options and the cost incurred. I view each

health care alternative as having a diminishing effect. Thus for any particular health care

alternative once the maximum likelihood of getting well is reached any further increase in

cost is of no value to the patient. Increasing the cost does not lead to an increase in the

likelihood of healing. Therefore, if patients are given several health care options which

have varying degrees of success, they should opt for those options which offer the best

chance of getting well at the least cost.

However, if the chance of healing for all of available treatment options remains the

same, patients will tend to take into consideration the cost involved in each of the options.

Patients will tend to cost minimize while maximizing returns (success). Yoder (1989) has

shown that when the fee paid by patients is the same between the mission and government

hospitals, but the perceived quality of health care is different, patients will opt for the

sector providing the higher quality care. In Swaziland, this will be mission hospitals.

Mission hospitals provide better quality health care than do government run hospitals

(Yoder 1989).

The model I present in Figure 3.1 has limitations. It does not account for personal

preferences nor does it account for other factors which may have an additive effect on

people's choice making. Following the model, a person should choose the most likely to

succeed treatment at the least price. However, a person may use other criteria to choose

treatment. For example, if cost is not a consideration in a treatment choice, a patient may

opt for an expensive treatment for other reasons although the likelihood of success is the same for all the available alternatives. The reasons why people opt for an expensive treatment may include the desire to maintain the power differential as a means of controlling forces of production.

Distance to the Health Care Facility

Health care seeking behavior is affected by distance and other factors such as availability of affordable transport. Distance affects health care seeking behavior in the following manner. First, transportation cost that is incurred when living further off the nearest health care facility will be high. This cost will be proportionately higher in rural areas where patients live further from the main roads and where there is less competition among transport operators. Second, people in remote and difficult to access areas will tend to allocate more time to health seeking (and visits to patients in hospitals) thus taking time available for other activities such as farming. Hence distance will tend to hinder utilization of some health care resources.

Distance has been studied to identify critical thresholds for different levels of health care. It has a direct relationship to the cost incurred. Morrill and Earickson (1968) observe that demand for a hospital declines as costs of reaching it increase. Cost is a function of distance, such that if the distance to be traveled is big the cost of access will tend to be high also. Consequently building more clinics should help in reducing the distance traveled by patients. The alternative is to construct more roads. Building more and better roads does not reduce the mosquito population but brings in more competition in the transport sector. Increased competition, in turn, lowers fares as competitors struggle to capture the

market. Therefore, more clinics and roads should help to reduce the cost of accessing

health care facilities, and lead to an increase in care utilization of hospital (and other health

care) facilities.

In Chogoria, Kenya, construction of a new road has led to an increase in outpatient

hospital attendance (Airey 1992). In 1983 patients traveled between 11.5 and 13.6 km. to

a hospital. Since the construction of the new road, travel distance has been reduced by

about 39%. The road led to increased competition among transport operators.

Competition in turn led to reduced fare charges. This reduction had a dramatic effect on

outpatient hospital attendance–an increase of 78% compared to 37% increase for inpatient

attendance.

To explain the differential increase in hospital utilization between outpatients and

inpatients Airey (1992) considered the cost of health care in Chogoria. The fee charged for

health care services is higher than transport costs. Transport costs are a minor proportion

of the total costs of inpatient hospitalization. There are hidden additional costs incurred by

inpatients due to lost days of work. Since the new road reduced both distance and the fare

costs, a higher number of outpatients were more responsive than inpatients (see also Snow

et al. 1994).

Social Networks of Patients and Caretakers

A social network refers to a finite set or sets of actors and the relationship between

them (Wasserman and Faust 1994). It is composed of friends, relatives, and acquaintances

(Shelley 1992). The presence of relational information is a critical and defining feature of a

social network. Networks play a role in health care decisions that patients make. They

facilitate the transfer of information, and they are a mechanism by which social pressure can be exerted on individuals to take action about their health or that of others.

The decision to seek medical care may be initiated by persons in the social life of the patient and by institutions that may demand medical attention (Stoeckle et al. 1963). Patients themselves make decisions based on their knowledge of particular doctors and medical institutions, and by opinions among their network alters (cf. the lay referral system, Freidson 1961: 267).

Zola (1973) outlines conditions under which decisions may be made in a sample of Massachusetts General Hospital patients. His analysis of patient decisions reveals that the decisions are based on extra-physical factors such as ethnic group membership. The decision to seek medical care was triggered by: (1) the occurrence of interpersonal crisis; (2) *the perceived interference with the social or personal relations*; (3) urging from relatives and friends; (4) the perceived interference with vocational or physical activity; and (5) symptom recognition. Italians tended to seek medical aid when their symptoms interfered with social or personal relations and Irish patients tended to go for medical care when they received approval of others (Zola 1973).

Zola (1973) gives the following account of an Italian patient, 18 year old John Pell, in his senior year of high school. John had headaches over his left eye and pain in and around his right, artificial, eye for almost a year. Pell claimed little general difficulty until asked whether the symptoms affected how he got along. "The last few days of school it bothered me so that I tried to avoid everybody ... and I wanted to go out ... (but) I get the pains at 7 or 7.30 p.m." When Pell saw an announcement of an upcoming Prom, and noticing the starting time of 8 p.m., he immediately went to the school nurse (Zola 1973:

684). In another account, the O'Briens, an Irish family suffering from myopia claimed difficulty in seeing. Mrs. O'Brien's decision to seek medical care was a response to her husband's urging. Several months later her husband went in for medical care at her urging (Zola 1973: 684).

Religious Affiliation of Patients and Caretakers

Religious affiliation is a factor in illness behavior. Mechanic (1963) studied illness behavior among four groups of people: Jews; Protestants; Catholics; and those who had no particular preference to any religion. The groups were each divided into two social classes: high and low. Mechanic found differences in illness behavior between Jews, Protestants, and Catholics. In the higher social group more Jews (78%) than Protestants (55%), Catholics (46%), and non-denominational (52%) reported a higher tendency to visit a physician. These differences remained the same in the lower social group also. However, they were less pronounced.

Religion may cause patients to seek medical intervention or restrict them from visiting hospitals. For instance, I have observed that the Akorino (a religious sect in Kenya) urge their faithful to seek medical intervention through prayers. They advocate faith healing. Among the reformed Islamic movement (known as Halali Sunna) in coastal Kenya treatment decisions are strongly influenced by religious ideology. In the Halali Sunna movement, adherence to a religious ideology has led to illness being attributed to nonmystical causes (Beckerleg 1994). Under Halali Sunna "the possibility of invasion of a person by another human or a spirit is rejected ..." (Beckerleg 1994: 299). For a sick person daily reading of the Quran is considered adequate protection.

Affiliation to a particular religious group may also be a factor in the use of certain health care facilities. In Gusii, Seventh Day Adventist (SDA) followers travel a long distance to visit Kendu Mission Hospital run by the SDA church. Patients often pass health care facilities provided by the government at Nyamira and Kisii District Hospitals, and by other denominations (the Lutheran Church at Tabaka Mission Hospital) (personal observation). However, due to lack of appropriate data on quality and cost of health care at these institutions it is difficult to discuss the specific factors causing this behavior. Their behavior might be a function of the cost involved, and perhaps quality of the services.

Differences in illness behavior and religion may relate to underlying factors such as low level of drunkenness and alcoholism in some religious groups such as among the Jews (Mechanic 1963) and SDA followers. Differences may also be due to other factors associated to the health advocacy of the specific religious groups.

Health Seeking Behavior: A Case Study from Meru District, Kenya

In a study on rural household decision making in Meru district, Kenya, Mwabu (1986) found that patients use multiple health care providers. According to Mwabu this is because: (1) generally patients are unable to choose with certainty the provider who will cure them; (2) successful treatment of some illnesses require more than one health care provider; and (3) patients believe that in order to get cured they need treatment from more than one provider (Mwabu 1986). Mwabu does not, however, tell us which illnesses require more than one health care provider nor the priority that patients give to each of the three reasons. Mwabu (1986) found that patients' visit patterns vary according to the type

and the stage of the illness. For example, in cases of diarrhea, malaria, leprosy, swellings,

tuberculosis, and heart problems patients went to mission clinics more frequently than to

other health care providers.

Mwabu calculated the conditional probabilities[1] (Table 3.1) of choosing health care

providers. Results reveal that: (1) the probability of a patient returning to government

health clinic for follow-up is small; and (2) patients or care takers (the therapy

management group[2]) are independent of health care providers in making health care

decisions. Mwabu (1986) points out that conditional probabilities for the diagonals should

be 1.0 or close to 1.0 if health care providers had a significant influence on patients' visit

decisions. Conditional probabilities for the diagonals would be 1.0 if patients returned to

the same health care provider for subsequent treatments. He assumes that providers would

ask patients to return to the same health care facility. This is not always the case. Health

care providers consider many factors before making recommendations to patients. We

should not assume that their tendency is to ask patients to come back to the same facility

for follow-up visits. Some health care facilities are better equipped than others. Health

care providers will ask patients to go to better equipped facilities if the patient's condition

warrants. Thus health care providers in government health centers might refer patients to a

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[1] Conditional probabilities provide information about an event (E_2) occuring given that another event (E_1) has already occured. Probabilities are re-evaluated in the light of partial information about the outcomes. The conditional probability of B occuring given that A [p(B|A)] has occured is defined by the equation $p(B|A) = p(A \cap B)/p(A)$ where p(A) is the probability of A occuring and $p(A \cap B)$ is the probability of A and B occuring together.

[2]The therapy management group is that group of people who make critical health care decisions for a sick person. They may be relatives or close friends. I discuss at length the role of the therapy management group later on in this Chapter.

government hospital. On the other hand, patients might want to visit mission or private clinics because of the better services they provide.

What we know is that patients or their care takers and health care providers are always faced with situations under which decisions must be made. Both the patients (or the therapy management groups) and the health care providers must make decisions on the best course of action, one that would yield best results. It is assumed that choices are governed by the desire to maximize benefits and minimize the risks (Siminoff and Fetting 1989). This is the classical approach (of expected utility) used in decision making widely utilized by economists. In the next section I highlight the key issues in decision making with an emphasis on the health care seeking behavior.

Studies on Decision Making

The traditional view of decision making is that decisions are made in a series of steps that involve: (1) problem definition and analysis, (2) the search for and formulation of alternatives, (3) selection of maximizing alternatives, (4) decision implementation, and (5) follow-up. This conceptualization of the decision making process is founded upon two assumptions (Duncan 1973: 2). The first assumption is that decisions are made in accordance with some predetermined goal(s). The second assumption is that maximization is the objective of the decision maker.

Duncan (1973) states that conditions which bring about maximization may not hold true though decision makers may be tempted to think that they do. These assumptions are relevant in many cases. However, they oversimplify the problems that

decision makers have to overcome as well as the criteria that decision makers take into

account. For example, in a decision making process where maximization is used as the

criterion several alternatives may be accessible or acceptable, but all alternatives may not

be available to the decision maker. In such circumstances the payoffs may not be the

maximum possible for the problem being solved.

Decisions Under Risk and Under Uncertainty

Decisions are made under conditions of risk and uncertainty (Luce and Raiffa

1957). When decisions are made under risk, the probabilities of the outcomes are known

to the decision maker. If a choice is made between getting $2,000 outright and taking a

50–50 gamble to get $0 or $5,000, such a decision is made under risk (Fishburn 1988).

However, sometimes decisions are made under conditions in which the

probabilities of succeeding are unknown to the decision maker. Decisions made under this

condition are reached under uncertainty. In medical decision making choices are made

under uncertainty. Patients do not know the probability of success for each of the available

options. Under these circumstances patients (or care takers) make use of individual

preferences.

Approaches in the Study of Decision Making

Decision making studies aim at constructing theories about how decisions are

made by an individual or within a social group, such as the family. Garro (1986) reviews

the various methodological and theoretical approaches employed by anthropologists to

study decisions to seek help and how patients make treatment choices from available alternatives.

Two theories, normative and descriptive, have been proposed in studies on decision making (Garro 1986). In normative decision theory, decisions come from rational behavior of human beings. People evaluate the alternatives available to them, and ultimately come up with a choice which best suits the prevailing circumstances. From the observed behavior mathematical models can then be constructed and used to predict how people are likely to make choices under new situations. This approach is motivated by a desire to produce accurate predictions of decisions being made.

Some researchers have argued that normative approaches are not psychologically realistic. Quinn (1978), for example, argues that in everyday life people do not make use of complex mathematical probabilities in order to arrive at the most economical choice and one that will produce the required results. Instead, decision makers use strategies known as heuristics which simplify the decision making process. According to Quinn such strategies eliminate the need for recall, summarization, and computation (Quinn 1978). This second approach is known as descriptive decision theory. Under this theory people make decisions that differ substantially from decisions that they should make according to normative theory (Mathews 1982).

What these approaches have in common is that their ultimate aim is to tell us decision outcomes, actual (descriptive decision theory) or expected (normative decision theory). Normative decision theory does not tell us about the cognitive processes that take place in a person's mind. In normative decision theory the cognitive process is a "black box."

To overcome this shortcoming descriptive decision theory researchers (e.g. Gladwin 1989; Young 1981a) have suggested the use of decision models (also known as process models) built using information elicited from informants. To build a model, informants should share a cultural domain. A cultural domain can be anything from shared knowledge about disease symptoms, various types of cures available, to types of health care providers and the disease they treat. Caution should be exercised in delimiting boundaries within which a cultural domain may be studied. It is difficult to build a stable model if the boundaries for a cultural domain are not well defined. Weller and Romney (1988) treat this topic in detail.

If indeed a criterion for decision making exists, one can construct a stable model from a small group of informants who share a cultural domain. This model can then be tested on a new set of informants from the same cultural group as the first set of informants. The new group's decisions are compared against the model's predicted outcomes. According to Gladwin (1989), good models predict at least 85% of the decisions. Ryan and Martínez's model predicted 84% of childhood diarrhea treatment decisions made by Mexican mothers (Ryan and Martínez 1996).

It is appropriate to ask whether informants agree on what decisions are reasonable under different conditions. This is considered under the domain of consensus theory. Romney et al. (1986) have developed techniques that can be applied to determine the level of agreement about the choices that people make. Consensus theory makes three assumptions. First, participants share cultural knowledge. In the case of health care behavior the shared cultural knowledge is the appropriate set of health care choices available for any particular health problem. The second assumption is of local

independence: experts within a group will produce the same answers without having to consult each other. The third assumption is that there should be homogeneity of items–the questions should be of the same difficulty level and from the same domain. Borgatti (1992) has developed a suite of computer programs, ANTHROPAC, that can be used to assess the level of agreement among respondents. Consensus analysis can identify culturally correct answers to a given set of questions. ANTHROPAC can also estimate the competence of each respondent relative to other group members.

Once the three assumptions in consensus theory are satisfied, it can be shown mathematically that competent informants will tend to agree (Romney et al. 1986). These informants represent the cultural knowledge of a group people. Boster (1985) asked Aguaruna Jívaro informants to identify manioc plants growing on two experimental gardens. He walked them one by one through the gardens, stopping at each plant to ask what kind of manioc the plant is. The first garden had 61 different varieties of manioc. The plants on this garden required very fine discriminations. The second garden had 15 common varieties. Each variety was represented six times (total of 90 plants). Boster analyzed his data by comparing whether a pair of informants agreed on the identity of particular plants. He then computed two measures of agreement. Proportion of agreement indicated the amount of agreement between pairs of informants while overall agreement provided a measure of each informants' average proportion of agreement with the rest of the population (Boster 1985: 181). Boster concluded that people who agree with one another on manioc names tend to know more about manioc (p. 192). Those people, it turned out, were related to one another.

A third approach in the study of health care is the use of explanatory models (Kleinman 1980). This approach focuses on people's lived experiences with an illness. Explanatory models (Kleinman 1980; Good 1986) produce rich understanding of how people experience illness but are not meant to predict what people will do during an illness. An explanatory model is a set of beliefs about the etiology and onset of symptoms, the pathophysiology, and severity of illness, and the type of sick role and treatment of illness (Kleinman 1978). According to Good (1986: 167) explanatory models are "frames provided by culture that we do things with." These frames can be (and sometimes are) applied widely by patients to include other issues of concern to them. Therefore, when these frames are being interpreted by the physician they must be put placed within a wider social context of the patient.

Explanatory models provide "a means of exploring patients' understanding of their conditions, for explicitly comparing and contrasting the perspectives of close avenues of care seeking, for research into the micro-level changes in patients' understandings, and for comparisons across cultures and across ethnic groups" (Good 1986: 165). The purpose is to understand how patients interpret and deal with illnesses. That is, there is a cultural meaning placed on an illness by patients. For example, in the early New England puritan world and in the twentieth-century Africa witchcraft symbolizes fear. In both societies witchcraft emerged as a "major explanatory model of malignant illnesses" and it offered "a magical means to exert control over seemingly unjust suffering and untimely death" (Kleinman 1988: 19). It is evident from the foregoing that the main focus of explanatory models is on how the afflicted represent and interpret their suffering. Nevertheless, we

would like to predict people's behavior as a result of illness. Predicting behavior is important as it lets us forecast the likely demands on health care resources.

Framing Decisions: Its Influence on Decision Making

The manner in which a decision is framed determines the decision making process. McNeil et al. (1982) and Tversky and Kahneman (1981, 1988) used vignettes (see Box 3.1 for an example) to show how problem framing can lead to different decision choices. In their study McNeil and his colleagues provided respondents with two reference frames: the survival frame and the mortality frame and a choice of going through surgery or radiation therapy. In the survival frame, of 100 people going through surgery, 90 live through the post-operation period, 68 are alive at the end of the first year, and 22 are alive at the end of five years. For radiation therapy, of 100 people going through this treatment, all live through the post-operation period, 77 live past the first year, and 22 live past the fifth year. In the mortality frame the exact information found in the survival frame was repeated but was negatively framed. Thus of 100 people having surgery, 10 die within the post-operation period, 32 die by the end of the first year, and 66 die by the fifth year. Of the 100 people who have radiation therapy none die in the post-operation period, 23 die within one year while 78 die by the end of the fifth year. This framing of the problem produced a marked effect on the respondents' decisions.

Tversky and Kahneman (1988) found that when problems were framed negatively (for example when there is risk of death) people tend to make choices that sometimes involve higher risks. However, when problems were framed positively (for example where the risk of death is minimized) people tend to be risk averse.

Imagine that the US is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:

Problem 1 (N = 152)
If program A is adopted, 200 people will be saved. [*72%*]
If program B is adopted, there is $^1/_3$ probability that 600 people will be saved, and $^2/_3$ probability that no people will be saved. [*28%*]

Problem 2 (N = 155)
If program C is adopted 400 people will die. [*22%*]
If program D is adopted, there is $^1/_3$ probability that nobody will die, and $^2/_3$ probability that 600 people will die. [*78%*]

(The number of respondents (N) is given in each case. The percentage who chose each of the options is indicated in brackets. In problem 1 the outcomes were positively framed (lives saved). The majority of the respondents were risk averse. Problem 2 was negatively framed (lives lost). The majority of the respondents were risk seeking.)

Box 3.1: Example of a vignette used by Tversky and Kahneman (1981) to investigate the effect of problem framing on decision making.

In an earlier study Tversky and Kahneman (1981) showed the effect of certainty on people's decision making. In a hypothetical epidemic problem they found that respondents preferred an 80% chance to lose 100 lives to a sure loss of 75 lives. However, when the probabilities were reduced by a factor of 10 people's preferences were completely reversed. Thus respondents preferred a 10% chance to lose 75 lives to an 8% chance of losing 100 lives. Outcomes perceived with certainty are given more weight relative to uncertain outcomes (Eraker and Politser 1982).

The manner in which decisions are framed can lead to making of different choices by the actors. Since framing of decisions is mostly subjective, people will tend to frame similar situations differently. If this is done, a prevailing medical situation can lead to

different treatment seeking decisions that will have various medical outcomes. In fact as a result of decision framing people may opt for choices with fewer benefits leaving other choices that have better returns. This is consistent with the Müller-Lyer illusion in which the shorter of two lines appears longer depending on how the lines are framed.

Decision framing can also determine who gets involved in the decision making process. Where a medical condition is sudden and life threatening fewer people are likely to be involved in decision making. This is because little time is available to make wider consultations. The circle of people involved will increase after this initial period, as time becomes available to consult, and as more of them get to know that there is a medical problem that requires attention. In chronic and potentially fatal medical conditions more people from a social group may be involved in decision making. However ultimate decisions are made by the person (or a limited group of people) who has juridical authority (Feierman and Janzen 1992: 18).

Decision Making: External and Internal Factors

Many anthropological studies on decision making focus on factors external to the decision maker. Nardi (1983) notes that when agricultural decisions are being made external factors like the weather conditions, labor supply, and landholdings are considered. However, the way people frame decisions depends on a number of external and internal factors. According to Nardi (1983), people's values, beliefs, aspirations and ambitions are rarely considered.

Nardi argues that external factors are subject to change from time to time. Our focus on ever changing external factors also implies that decisions made are based on

conditions current in people's lives. "This focus on the immediate present tends to deflect attention from the more stable, enduring factors in the decision process: the decision maker's internal attitudes, beliefs, and world view" (Nardi 1983). Internal factors can be influenced by external factors. Attitudes and beliefs are learned from society. Once they are learned, attitudes and beliefs get internalized by individuals. The extent to which these attitudes and beliefs influence behavior depends on how the people have interacted with the external factors. People's behavior is, therefore, more likely to be influenced by external factors rather than by internal factors. Most external factors are structural and infrastructural, while internal factors (attitudes, and beliefs) are superstructural.

Kayser-Jones (1995) studied factors that influence decisions to send patients to nursing homes in the United States. She found that external factors in the decision making process include the following: unpleasant nursing home environment; lack of supportive services and equipment; and the practice of medicine by telephone. Internal factors include values, attitudes, beliefs, goals, plans, and expectations held by decision makers.

The unpleasant nursing home environment. The environment that surrounds nursing homes is seen as depressing. The staff who work in nursing homes are overworked. The elderly people are poorly groomed and dressed in bathrobes and slippers, and are usually restrained in wheelchairs. This reputation of nursing homes puts fear in many elderly people. They fear being admitted to a nursing home. In addition, the unpleasant working conditions makes most nurses prefer working in other health care institutions.

Lack of supportive services. Nursing homes do not offer the latest high-technology care. Most nursing homes do not provide basic supportive services such as laboratory,

pharmacy, and X-ray. Many elderly patients admitted to these homes usually come from the high-technology atmosphere of an acute care hospital. Due to lack of supportive services in nursing homes many may not want to be admitted.

Practice of medicine by telephone. Physicians prefer to provide services by telephone without the benefit of a clinical evaluation. This is because they go through a lot of paperwork in order to get reimbursed for visits to nursing homes. Providing services by telephone and the unavailability of the physician may have adverse consequences. First, the physicians do not get to see their patients frequently, even as the patient's condition deteriorates; second, the physicians are usually busy and therefore telephone conversations are hurried and brief; and lastly, in order to provide diagnosis and treatment of residents, physicians must rely on the nurse's assessment of the resident.

Life/biographies and goals. In addition to three key internal factors (goals, plans, and expectations, see Nardi 1983) that influence decision making, Kayser-Jones (1995) expands the conceptualization of internal factors to include life/biographies and goals. Goals are considered as the aims and aspirations held by people, plans are the means by which we achieve those goals, and expectations are forecasts about the future (Nardi 1983; Kayser-Jones 1995). Kayser-Jones views goals and plans as the basic aspects of the decision process that provide people guidelines needed to make choices. When physicians attend to patients they have to deal with them and their families as people who respond to various health situations and who have a life/biography that influences their goals, plans, and expectations. Similarly, physicians and other health care professionals rely on their past experiences (biographies). These experiences influence the decision making processes.

Nardi (1983) and Kayser-Jones (1995) point out that external and internal factors are important in decision making studies. However, they do not tell us the relative importance of each of these factors. Under what circumstances would external factors be more important than internal factors? Or, if a person were to make a choice when is it necessary to drop either of the two? Cultural materialists argue that infrastructural factors take priority over structural factors in explaining people's behavior, and that structural factors are more important than superstructural ones. In Harris' words

> ... infrastructural determinism ... provides a set of priorities for the formulation and testing of hypothesis about the causes of socio-cultural phenomena. Cultural materialists give highest priority to the effort to formulate and test theories in which infrastructural variables are the primary causal factors. (If they fail to determine such causal factors, then theories are formulated in which the structural variables are the primary causal factors.) Cultural materialists give still less priority ... to the behavioral superstructure. (Harris 1979: 56, parenthesis mine)

Many studies have shown the priority of infrastructural and structural factors (e.g. Handwerker 1986; Iverson 1992--demographic transition) over superstructural factors in explaining aggregate phenomena. At the level of individual decision-making, however, emic cultural factors play a very important role. External factors are either infrastructural or structural while the internal factors are superstructural. If we can account for behavior using external (infrastructural and structural) factors then we ought to do that since they are the primary causal factors.

It is far easier to change external than internal factors. Once external factors are changed, people are more likely to change their internal factors (values, beliefs, and attitudes). For example, increased employment opportunities for women (Handwerker 1986; Iverson 1992) have led to rapid demographic decline in many countries. This is in

contrast to areas where women's access to employment outside the home is not available.

People's attitude towards having large families have altered as infrastructural and

structural changes take place. For a discussion of how this takes place see Bernard and

Pelto (1987).

Decision Models and their Prediction Power

People appear to use ordered criteria when they make treatment decisions. Young

(1981a) developed a decision tree model to predict treatment choices in a Mexican village.

The model incorporated the following criteria: (1) perceptions about the seriousness of an

illness, (2) knowledge regarding available home remedies, (3) faith in the likelihood of a

cure, and (4) availability of money and transportation. Young's model predicted 95% of

the time for first treatment choices, and 84% of the time for the second treatment choices.

Young's model made two important contributions to our knowledge about illness

treatment choice. First, Young differentiated those treatment choices which were usually

made and agreed upon as strategies of first resort from those that were not. Second, he

accounted for the sequence in which treatment options were likely to be made. Individuals

employed ordering strategies in their choice of treatment. Ordering strategies enabled

those individuals to rank options on the basis of cost or likelihood of cure. Ranking

strategies/options is important to decision makers because it simplifies the decision making

process, although, as Duncan (1973) points out, the best strategies may not be available to

decision makers.

Mathews and Hill (1990) developed a model to study treatment choices in Costa

Rica. Their model predicted only 62% of the decisions correctly using nine rules. Errors in

the prediction of the model resulted from ethnic differences in the interpretation of illness symptoms, preference for curing sources, and due to a constant change in the population composition of the community.

In another study, Ryan and Martinéz (1996) found that rural Mexican mothers consider several factors in deciding what treatment to give in case of infantile diarrhea. The mothers gave the following list of factors: duration of the diarrhea episode; perceived cause (mothers in San José perceive diarrhea to be caused by dirty food, teething, *empacho* (the sticking of the food in the stomach or intestines), heat, green fruit, worms, presence of mucus in the stool, presence of blood in the stool, whether the child had fever, color of the stool, whether the child had a dry mouth, whether the child had dry eyes, whether the child was vomiting, and whether the child had swollen glands.

Mothers in San José choose treatment modality from seven alternatives that they know. The treatment alternatives include: teas, carbonated beverages, rice water, sugar-salt solutions (SSS), pills, physical manipulations, and western medical personnel (Ryan and Martinéz 1996). By looking at the pattern of circumstances for all the seven treatments, Ryan and Martinéz built a model which had just six rules and three constraints. This model gave a postdiction of 89% of the treatments. On a new group of mothers the model predicted 84% of the treatments correctly.

Weller et al. (1997) have reassessed the model of Young (1981a) and that of Mathews and Hill (1990). She compared the models' predictive power due to chance. Young's four treatment options could be predicted by chance 59% of the time. In the case of Mathews and Hill's data, treatment behavior could be predicted by chance 23% of the time. However, Weller and her colleagues concluded that Young's model still has a 88%

better than chance[3] accuracy rate while Mathews and Hill's model has a 51% better than

chance accuracy rate.

I have argued in this chapter that infrastructural and structural conditions have a

greater effect on people's health care seeking behavior than superstructural conditions.

Included in infrastructural conditions is distance of health care facility from the homes of

patients, the presence or absence of roads to these facilities, and availability of affordable

transportation, while structural conditions include household income, education of

decision makers, number of children in each household, the patients' social networks, and

past illness experiences. Yet, the decision model built by Young (1981a) had three

superstructural factors and only one structural factor as the main determinant of the health

care behavior. If infrastructural or structural factors have greater effect, we would expect

to see more of these factors in Young's model. Young's model provided a high prediction

power of people's illness behavior. In fact, the model's accuracy was 88% better than

chance (Weller et al. 1997). Does this violate the principles of cultural materialism?

Young (1981a) identified patient perceptions about illness severity, patient

knowledge regarding available home remedies, faith in the likelihood of a cure, and

availability of money and transportation as the main criteria used by patients. Three of the

criteria appear to belong to the superstructure. Perception about illness severity is

influenced by illness characteristics such as temperature, length of period the patient has

been sick, and the patient's own physical reaction to the illness all which are infrastructural

[3] Better than chance is calculated as the difference between observed accuracy rate and chance accuracy rate divide by 1 minus chance accuracy rate. For Young (1981a) this equals $[.95-.59]/[1-.59] = .88$ and for Mathews and Hill their model's predictive power = $[.62-.23]/[1-.23] = .51$ (Weller et al. 1997).

or structural factors. Knowledge regarding home remedies is influenced by social networks, earlier contacts with health care facilities or health care providers. Thus home remedies are derived from structural factors which leaves faith alone as the only superstructural factor. Faith appears not to have a direct underlying infrastructural or structural forces. If this is the case, then Young's model is consistent with the first principle of cultural materialism. Similarly, Ryan and Martinez's (1996) as well as Mathews and Hill's (1990) models can be shown to be driven by underlying infrastructural and structural factors. Cognitive models do not violate the infrastructure and structure priority principle of cultural materialism, though cognitive anthropologists rarely connect their theories to a materialist base (for an exception see Bernard and Pelto 1987).

Decision Making and the Family

Decisions and treatment choices must be made by the patient or by those in charge of the patient. A patient is part of a "family." Therefore the family shares their illness experiences. The family helps in the decision making so as to come to an acceptable treatment choice. Families may be considered as groups composed of members who have mutual obligations to provide a broad range of emotional and material support, particularly at times of crises or threatening events (Dean et al. 1981). Dean and his colleagues argue that social support buffers the impact of stressful life events, and may also directly influence the occurrence of various disorders.

According to Turk and Kerns (1985) families do not necessarily consist of blood relatives. Members do not have to live together, but they must have "mutual obligations" to support each other. However, Turk and Kerns do not specify whether, for example,

children have mutually obligatory roles in the family. They further point out that families have (a) structure, (b) functions and assigned roles, (c) modes of interacting, (d) resources, (e) a life cycle, (f) a history, and (g) a set of individual members with unique histories.

The structure of the family refers to characteristics of the individual members that make up the family unit. These characteristics include gender, age, spacing and number of family members. Function refers to tasks the family performs for society and its members while assigned roles refer to responsibilities, expectations, and rights of the individual members. A person's responsibilities will determine their behavior when they or a member of the family is sick. Further, responsibilities may overlap. For example, mothers may be in charge of the health of the children as well as managers within the household. The mode of interaction determines the style adopted by family members to deal with the environment and with one another with regard to problem solving and decision making.

The family members' general health, social support and skills, personality characteristics and financial support constitute the resources. Social support includes the relationships of the patients to their families, the medical staff, friends, neighbors, co-workers, and other social agencies while personality characteristics include age, intelligence, cognitive development, philosophical or religious beliefs, and previous coping experiences (Turk 1979). These factors influence each individual's coping with disease. According to Turk, patients who have satisfactory adjustment employ a wider range of personal and environmental resources. However, it does not imply that patients with satisfactory adaptive responses are always successful in coping with disease. Thus resources influence the interpretation of and coping with disease.

Family history includes socio-cultural factors and prior illness experiences and modes of coping with stress. A family's past experiences determine the manner in which they respond to new illness episodes. With each new illness phase, the family goes through a life cycle. In each of these phases family members have roles and obligations that relate to a person's station in life. Roles played by various family members are transient. Members of a family assume new roles as they move into a new social classification within the family or society. The roles "assigned" to (or assumed by) members determine the amount of time they spend out in the field farming, taking care of animals, or doing any other activities.

Family members are exposed to certain disease causing agents depending on the type of activity they do. For example, women who cook in poorly ventilated and smoky kitchens (using cow-dung) are more likely to suffer upper respiratory infections than are those who cook in well ventilated kitchens. Snow et al. (1988) have calculated the relative risk of mosquito bites faced by people at night. The greatest risk is between 5.00 a.m. and 6.00 a.m. Risk is calculated as the proportion of each hour that people spend outside their houses multiplied by the amount of biting in each hour. In societies where a certain group of people (e.g. women milking cows in the early morning and late in the evening) are outside at this time their likelihood of suffering from malaria is increased. Their chance of having a mosquito bite is greatly increased as a result of the activities they perform between 5.00 a.m. and 6.00 a.m. Families are made up of individual members each of whom has unique experiences. Their experiences affect illness behavior, including decision making and treatment choice.

Across Africa–indeed, in most of the world–the sick are cared for within the framework of the family. In the next section I will discuss the importance of the family as the primary therapy management group.

Therapy Management Groups

Therapy managers in Africa constitute the heart of African healing. Therapy management fulfills two functions. The first function deals with authoritative diagnosis and control over the treatment and, the second function is supportive care (Feierman and Janzen 1992: 18). Authoritative diagnosis and control over the treatment is usually in the hands of one person (or a limited group) who has juridical authority over the patient. Adult patients sometimes make their own therapy management decisions. However, the extent of their independence is determined by the nature of their illness. If the disease is serious, a therapy management group may take over the therapy management decisions. Even then adult patients can not be forced to accept treatments against their will. If the therapy management group is unanimous in their choice of treatment, it may be provided without the knowledge of the patient.

Supportive care may be provided by anyone: neighbors, old friends, passers-by, and distant relatives, but their suggestions will be accepted only if allowed by authority holders. Unlike juridical authority, supportive care is distributed more widely (Feierman and Janzen 1992: 18).

In many households decision making is sometimes left to individuals who are regarded as the central figures. These individuals make all major decisions on what is to be

done in the family (see for example Silberschmidt 1992). However, granting decision making powers to one person is not a universal phenomenon. In some communities intrafamilial negotiation contributes a lot to family decisions.

Feierman (1985) discusses ways in which family structure and responsibility of family members affect medical activity. Within the extended family, the structure of the therapy managing groups (Janzen 1978) allows input from a wider circle of relatives. Relatives in this circle contribute in terms of disease recognition (diagnosis), treatment, and choice of health care. However, Feierman (1985) argues that where therapy management groups are involved, it is difficult to determine their composition and the contribution of each group member. The groups are not well defined.

Group composition is fluid with ever changing membership. Some members within the group express opinions, which are never acted upon, and yet these members are considered as part of the therapy management group. The fluid nature of the therapy management group hides the primary difference between the sets of people, who have jural responsibility for the patient's welfare and the other which may provide voluntary assistance but have no rights or obligations in the transactions.

Therapy management groups have one other feature. They do not have a distinctive institutional hierarchy (Feierman 1985). Instead the groups are embedded within the general patterns of control over domestic and community affairs. The implication of this is clear. Because of the link between lay therapy managers and generalized authority in the domestic and community arena, factors that act on the local community will also affect healing.

In rural areas of the non-industrialized world, many people migrate to towns in search of jobs. Migration of people may have altered the structure of the family and the therapy managing groups but such groups do still get involved in decision making. However, their involvement is limited (Pearce 1993: 151). Their involvement might depend on factors such as their closeness to the patient, and the seriousness of the disease. Close relatives such as siblings will usually be informed at the earliest opportunity. Although they might not get involved in direct decision making, they help in the implementation of the decisions by making contributions towards treatment costs or social support.

Kinfolk play a central role in therapy management. In some communities such as the Abagusii of Southwestern Kenya, key decision makers may be overruled by certain members within the immediate family. I discuss circumstances under which this might occur among the Abagusii in Chapter five.

Conclusion

In this chapter I have laid out factors that influence people's health care seeking behavior. I have reviewed literature pertinent to decision making, on the determinants of health care seeking behavior, and on the role of the family and therapy management groups.

What emerges is a complex relationship between the determinants of health care behavior, the family, and the therapy management groups. The relationship between the various determinants of health behavior can be broken down into blocks that consist of

infrastructural, structural, and superstructural components. But still we remain with the primary question: Can we model illness behavior more accurately given our knowledge about the various factors that influence it? Predicting people's illness behavior is important. It lets us forecast the likely demands on health care resources.

Three models have been widely used to study illness behavior of patients. These are: explanatory models (Kleinman 1980; Good 1986); determinants models (Mechanic 1969; Ryan 1995); and process models (Young 1981b; Ryan 1995; Ryan and Martinez 1996). They are a good beginning point in the study of illness behavior.

Explanatory models produce a rich emic understanding of people's illness experience. They provide a way for exploring the patients' understandings of their conditions, a means for explicitly comparing and contrasting the perspectives of clinicians and patients, [and] for investigating how cognitive orientations influence avenues of care seeking (Good 1986). Explanatory models, however, do not predict patient health seeking behavior.

Determinant models produce a rich etic understanding of people's behavior, but they do not provide us with enough emic information. Determinants of health behavior include the following: patient-based factors; provider-based factors; care taker perceptions; social and demographic factors; availability of funds; distance from the health care provider; social networks; and biological signs and symptoms (Ryan 1995). Determinant models predict about 20%–30% of people's illness behavior and they provide some understanding of people's illness behavior.

Process models have high prediction rates, typically about 80% (Gladwin 1989). They provide high emic understanding of people's behavior but give us little etic

understanding. In order to provide a better understanding of illness behavior, a synthesis model (Figure 3.2) that uses information gained from explanatory and determinant models and the powerful prediction of the process models should be possible. Such a model should take advantage of the strong areas of each of the three models.

Unfortunately, I have not been able to systematically test this in the present study because of limited resources and time. In my future research, however, I will work on and build a synthesis model so as to take advantage of the relative contribution of these three models. I expect such a model to predict better than the determinant models, and, because of increased variation, less than a process model. A synthesis model will have the advantages of a large sample size–thus capturing a lot of variation–and will provide us with rich understanding of lay people's (emic) as well as the researchers' (etic) perspective.
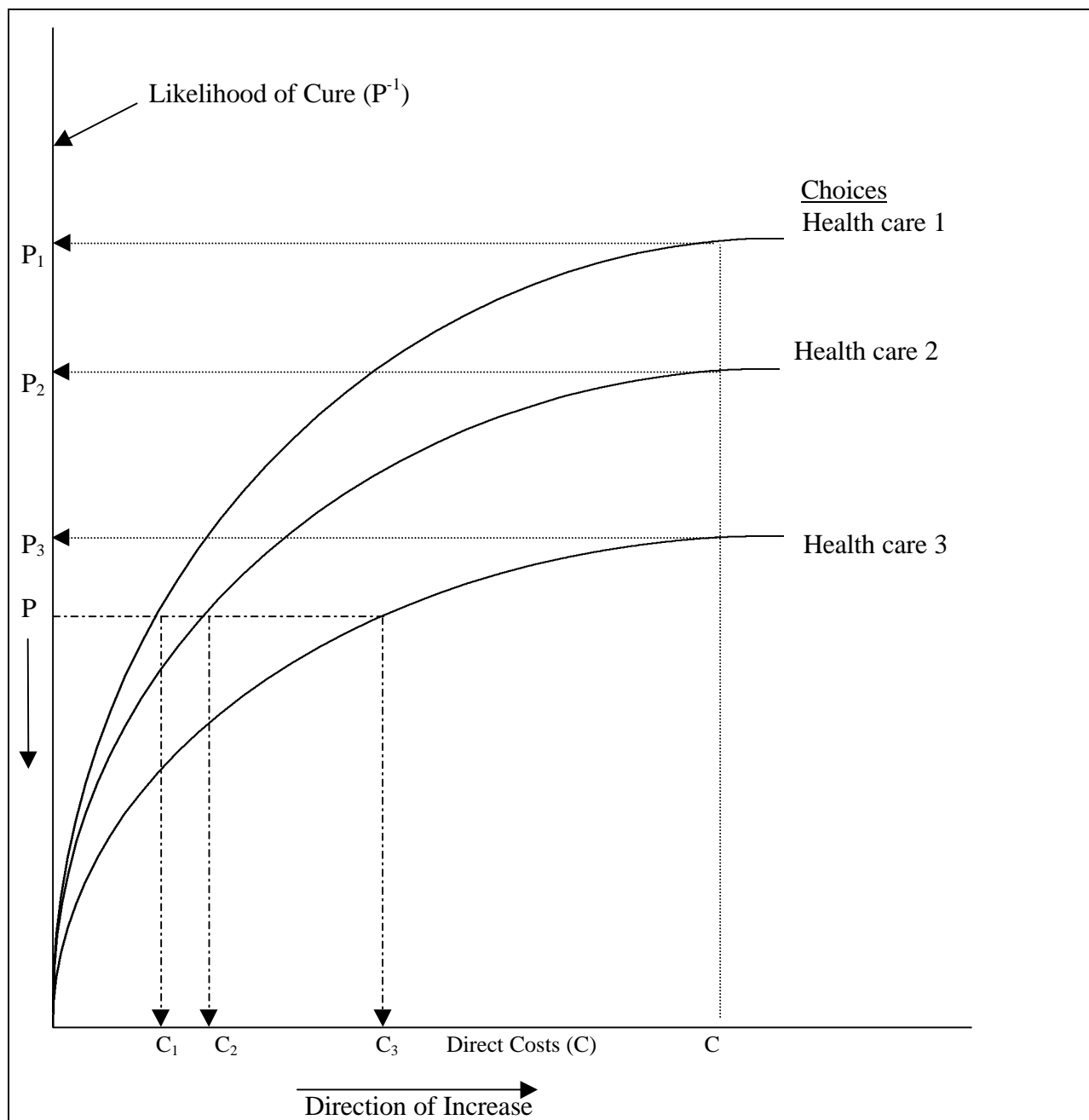
Figure 3.1: Choice of treatment by patients[*].

[*]Note that patients will tend to minimize the cost while maximizing the likelihood of a cure. Likelihood of a cure (P) is expressed as P^{-1} such that the higher the chance of cure the smaller the value of P^{-1}.

EXPLANATORY MODELS
Illness concepts,
Illness experiences

High emic/Low etic

Low prediction

Small

PROCESS MODELS
Ethnographic decision
tree models, Cognitive

High emic/High etic

> 80% prediction

Small

SYNTHESIS MODEL
Illness experiences, Illness
concepts, cost, distance, social
networks, cognitive processes,
ethnographic tree models

High etic/High emic

> 30% and < 80%

Large

Figure 3.2: Conceptual framework showing the relationship between the synthesis model, explanatory and process models

Table 3.1: Conditional probabilities of choosing health care providers in Meru, Kenya (from Mwabu 1986)

Period 1	Period 2							
	1. Govt. clinic	2. Mission clinic	3. Private clinic	4. Govt. hospital	5. Pharmacy or shop	6. Traditional healer	7. Self	8. None
1. Govt. clinic	.194	.343	.065	.056	.110	.083	.046	.102
2. Mission clinic	.131	.410	.066	.033	.098	.016	.016	.230
3. Private clinic	.267	.400	.067	.067	.067	.066	.000	.066
4. Govt. hospital	.091	.545	.091	.182	.091	.000	.000	.000
5. Pharmacy or shop	.166	.208	.042	.014	.153	.042	.042	.333
6. Trad. Healer	.370	.297	.000	.111	.037	.148	.037	.000
7. Self	.320	.160	.000	.040	.160	.000	.080	.240
8. None[*]	.000	.000	.000	.000	.000	.000	.000	1.00

(N = 479 patients for period 1 and 320 for period 2).

* = If the patients did nothing in period 1 they also did nothing during period 2. Therefore the conditional probability in (8,8) is 1.

CHAPTER 4
POLITICAL AND ECONOMIC DIMENSIONS OF HEALTH CARE DELIVERY IN
KENYA: IMPLICATION FOR THE NATIONAL MALARIA CONTROL

<u>Introduction</u>

A nation's health care system is influenced by political and economic factors. Public health ordinances, health care policies, administrative structure of

> *"health of the mind and body is so fundamental to the good life that if we believe that men [and women] have any personal rights at all as human beings, then they have absolute moral right to such a measure of good health as society and society alone is able to give them." (Aristotle in Politics, quoted in Falola 1992: 3).*

the health care system, investment priorities, and national budgetary allocations are political-economic factors. These factors influence adoption (and the development) of new disease control technologies, epidemiology of disease, and, in some instances, the ability of citizens to pay for health care services received. Successful implementation of public health policies depend on the ability of the state to muster the necessary resources. Sometimes this is a venture that involves mobilization of resources beyond national boundaries.

In this chapter I investigate the effect of political and economic factors on health care delivery in Kenya. First, I discuss the role of the state in providing health care to citizens. I compare the political and economic system in Kenya and Tanzania, two countries that have followed divergent ideologies since the 1960s, to show how these ideologies have directed the health care system to illustrate that states play an important role. However, health care is not influenced at the state level alone. The community plays

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an important role too. The community's role in disease intervention is discussed in section three.

In section four, I focus on the history and the geopolitics of health care in Kenya. For nearly a century western health care systems have interacted with indigenous ones. This has produced, in some cases, systems that combine elements of western and indigenous health care. Plural systems are a characteristic of many Kenyan societies. In other cases, people alternate between applying western and indigenous elements of health care without noticeable pattern. Sometimes the two systems may be used simultaneously. In section five, I give an over view of global malaria control programs. I provide two examples, from Florida and Mauritius, of states which managed to control malaria. These two examples reveal the importance of infrastructural and structural conditions in malaria control programs. Finally, in section six I discuss the role of the Kenya state in controlling malaria.

The State and the Provision of Health Care

What ought to be the role of the state in providing health care? Good health is a fundamental component of well-being. It results from individual health care practices as well as from health care services provided by various agencies in the private and public sector. Most health services like health information and control of infectious diseases are public goods. When a successful malaria control program is in place everyone within the

area is likely to benefit. Private markets provide few of these public goods. State involvement then becomes crucial.

Improving the health of people contributes to economic growth in several ways: (1) it reduces production losses due to ill health and death; (2) it increases school enrollment; (3) it permits the use of natural resources which are otherwise inaccessible because of disease; and (4) it frees up resources that would otherwise be used to treat illnesses (World Bank 1993).

In the Middle Ages regulations of Leviticus were applied to combat leprosy. When bubonic and pneumonic plague (Black Death) struck Europe in the 14th century legislation was enacted to control its spread. Cities kept their gates closed and guarded to prevent plague invasion. The administration of public health became an increasingly significant part of the general administration of the state (Sigerist 1943). European states began to invest in the health of their citizens to reduce disease burden and to prevent new outbreaks. Investments were in the form of new legislation–public health ordinances that were enforced by the police and courts–and improving the facilities that provide health care to citizens.

The involvement of states in health care management expanded greatly in the last century. Expenditure (in absolute amounts) on public health is ever on the rise. In 1990 world spending on health was about US $ 1,700 billion, or 8% of global income. The world's governments spent about 60% of total world expenditure (World Bank 1993). Due to their huge expenditure on health care, governments actively take part in formulating public health care policy, and providing information about the cost, quality, and outcome of health care.

Although governments play a visible role in health care, there is no legal obligation on any state to provide health care services to its people. If such a legal obligation were to exist, the state would be required to provide health care services no matter its ability. Patients who die in areas where medical facilities are lacking or are inadequate would be entitled to legal compensation. If legal compensation were to be sought by each person affected, some states' ability to provide would be crippled. No state could accept such a position, so, for the most part, people are left to take care of their own health care needs.

On the other hand, as Aristotle wrote in *Politics*, society (the state) is morally obliged to provide health care to the people. In *Politics* Aristotle's major concern was in the functioning of the political state. By virtue of the authority given to the state to govern and collect taxes from the people, citizens have a right to good health care facilities and other social services. Taxes collected provide the state with the resources to build health care provision centers and to purchase equipment and medicine, which would be too expensive for individuals to acquire. The collection of taxes makes it possible for governments to develop specialized health care facilities. In exchange for services provided by the state, citizens provide support to government activities. The state must continue to provide health care and other social services for continued voluntary political support from those they govern.

Despite the obvious advantages that come from the states' investment in health, some adopt policies that hinder the development of a good health care system. Such states achieve less in health care delivery. The example of two East African countries, Kenya and Tanzania, is instructive. At independence, in 1963, Kenya continued the capitalist mode of

production introduced by Britain, while Tanzania in the Arusha declaration of 1967, opted

for a socialist system (Gish 1975: 8). In Kenya, people were encouraged to start private

businesses and farmers were urged to boost agricultural production in order to promote

the country's economy. In Tanzania, after the Arusha declaration, there was a decline in

the number of private health care facilities. Between 1970 and 1973 as many as two-thirds

of the private practitioners stopped providing services (Gish 1975: 13). Belmartino (1994)

argues that leaving facilities in the private sector leads to increased efficiency and reduces

irrationality in the use of services because no direct government payments are made for the

services. The policies adopted by these two countries may have affected efficiency and the

rational use of public facilities which, in turn, affected the health of the population in

differing ways (Table 4.1 and Table 4.2).

Between 1965 and 1991 Kenya's crude birth rate, crude death rate, infant

mortality rate, and under 5 mortality rate dropped faster than Tanzania's. The average life

expectancy at birth for Kenyans increased at a rate of 0.36 per year from 49.5 years in

1965 (cf. 0.19 per year for Tanzania from 42.5 years in 1965) (Table 4.2). If we use health

care statistics as a measure of the quality of health care provided to citizens, then Kenya

clearly had an advantage over Tanzania. By 1991 Kenya had a higher life expectancy at

birth, lower infant mortality rates, lower crude death rates, and lower crude birth rates

compared to Tanzania (Table 4.1).

After 1991, there are feasible changes in some of the health status indicators. For

example, crude birth rate, crude death rate, and infant mortality rate drop much faster. In

fact, for Tanzania infant mortality rate drops by 27% between 1991 and 1993 (cf. 9% for

Kenya) while the average life expectancy increases by 2.25 years each year over the same

period. The corresponding change for Kenya's average life expectancy is -0.5/year (Table 4.2). These changes correspond to a period during which donors and the World Bank required Kenya and Tanzania to adopt Structural Adjustment Programs.

Under Structural Adjustment Programs Kenya and Tanzania were to open up to private enterprises and reduce public expenditure by introducing cost sharing in government programs, particularly in health care. Kenya did introduce health care cost recovery changes in 1989, while Tanzania is considering the required changes (Nolan and Turbat 1995: 17). These changes had an impact on health care utilization. In Kenya, after introducing cost sharing in government health facilities patient attendance dropped by 50%. Alarmed, the government suspended the fees for about 20 months. Over the 7 months following the suspension attendance at government health centers increased by 41%. More patients moved over to government facilities from the private health sector (Mwabu et al. 1995). These data do not take into account the extent of satisfaction in those who seek health care services nor does it take into account the cost incurred and distance traveled to access the services. However it does show that the political-economic system adopted by the state influences health care.

<div align="center">Disease and Community Intervention</div>

Intervention to avert disease is not limited to the state. Disease is a socially destructive agent (Young 1976). When members of a group get sick, they withdraw from customary responsibilities. Thus society must provide an interim solution until the sick

recover or until their labor is replaced by that of structurally equivalent actors. Group interventions include getting another person to take responsibilities of the sick person and providing health care for the sick person. In state-level societies several kinds of health care are available, including self-medication, visits to traditional healers, and visits to clinics and hospitals (Colson 1971; Young 1981a; Feierman 1981; Hunte and Sultana 1992; Snow et al. 1992).

Society can also intervene before disease strikes to ensure that there is no disruption in the social order. In the past, the Kikuyu intervened by sending children to a community suffering from smallpox. The children used sticks to symbolically drive the disease out of their area by invoking the help of good spirits (Beck 1974: 100). These actions indicate that the Kikuyu linked environment to occurrence of smallpox. Green (in press) sums it up in indigenous contagion theory (ICT).

According to Dawson (1992) the Kikuyu performed two different ceremonies to drive away smallpox. In the first ceremony women of one ridge (*rugongo*), sung and yelled to drive the disease away to the next ridge. The women of the neighboring ridge would themselves gather and do the same so a to pass on the disease to the next ridge and so on until the disease was driven away. The second ceremony involved a goat sacrifice. The head of the homestead or the lineage took charge of the ceremony. After prayers to god (*Ng'ai*), old men cooked and ate parts of the goat. Stomach contents were taken and sprinkled around the borders of the lineage territory. This, it was believed, offered protection to the community. This would seem to imply that the Kikuyu believed that their was something inherent in the environment that might have caused them danger, through smallpox, if appropriate actions were not taken.

These tactics could backfire. If some children or the women came into contact with smallpox, they could themselves be infected and bring it back with them and then infect others. While these gestures might prove counter-productive, the intentions of the participants were to drive away disease. In western health care systems, society intervenes through disease prevention programs and quarantines (as was the case in the middle ages) in areas where a contagious disease emerges. For example, immunization is effective in controlling childhood diseases such as whooping cough while quarantine has been used to prevent the spread of plague and other highly contagious diseases.

History of Health Care in Kenya

The earliest western health care systems were set up in areas occupied by Europeans--missionaries, military personnel, farmers, and administrators. Areas away from European settlers or missionaries remained without western health care facilities until late in the colonial period. Some areas remain inadequately covered even after independence.

According to Falola (1992: 4) the history of health care in Kenya consists of several phases. Each phase involved different roles for the individuals, health workers, the local community, and the state. These changing roles were associated with changes in the understanding of illness and how to cure it, with increase in health awareness, and with changes in the infrastructure of health care delivery. There were three phases: the pre-

colonial (the period preceding 1890), the colonial (1890–1963), and the post-colonial

(after 1963).

Pre-Colonial Phase

Medicine in pre-colonial societies is characterized by a number of features. Falola

(1992: 4) divides these features into five categories: (1) diseases were considered to be the

result of supernatural causes beyond human control. These forces could be machinations

of enemies, the wrath of gods and witches; (2) cures dealt with the sick individual and the

supernatural forces; (3) dealing with the supernatural forces involved offering sacrifices by

the sick individual or the entire community; (4) every community had health experts.

These experts were either household members who relied on history and knowledge of

medical problems in the household or "trained experts" on various aspects of different

diseases. The former group consisted of older members of the household who had gained

expertise over a period of time. The "trained experts" never got formal training. They

gained their expertise through apprenticeship; and (5) the community involved itself in

health matters by accepting the experts' qualified diagnosis and prescriptions.

There is little known about pre-colonial indigenous health care systems because of

lack of written records. Almost all of the information available from this period is from

oral traditions, linguistic and ethnographic data (Waite 1992: 212). Using linguistic

evidence some experts (e.g. Guthrie 1971) have argued that Bantu groups had medicinal

knowledge. However it is not possible to tell how much medicinal knowledge they had nor

to point out the variety of illnesses that they could treat. In Eastern Africa the Bantu

groups share several linguistic terms. Two common roots ~gàŋgà or ~ŋgàŋgà, and ~tí for

the word "medicine" or "medicine-man" are used. Guthrie (1971) suggests that ~gàŋgà

originally meant "medicine" while the root ~tí meant "tree" and "stick."

In many Bantu communities in the Eastern Africa regional words derived from

these roots exist. The Swahili of the Kenya coast use *mganga* (*waganga*, pl.) to refer to

medicineman and *mti* (*miti*, pl.) to refer to trees. *Miti-shamba* refers to various medicinal

plants. Abagusii use the word *omonyamete* to refer to the herbalist. From oral literature it

is clear that various societies in Kenya had their own medical care systems. These systems

enabled them gain control over the supernatural forces. Whenever they could not

overpower these forces, explanations were sought in the nature of sacrifices offered. If the

sacrifices offered were not appropriate it was believed that this could lead to misfortunes

in society. Misfortunes came in various forms, including diseases.

Pre-colonial societies did not attribute illness to spirits and witches alone. There

were other causes of illness known to them. For example, the Bantu speaking communities

identified and treated common ailments and endemic diseases such as malaria, sleeping

sickness, and measles (Waite, 1992: 214). These communities knew about transmitting

agents or vectors such as mosquitoes and tse tse flies. They used various pharmaceutical

products derived from barks, leaves, roots, saps, and other natural products (Waite 1992).

Most of the health problems were taken care of in the household. However, conditions

that were caused by spirits and those caused by sorcery required the intervention of

society.

In many pre-colonial African societies emphasis on health was placed in preventive

care. The introduction of western medicine to Africa brought with it new features

unknown to the indigenous populations. The new features included an emphasis on curative care. The new approach emphasized on the construction of hospitals, dispensaries, and medical schools. The response of the people was not good at first. This approach was expensive to patients and their care takers. It involved traveling long distances to the health care facilities. Furthermore, the facilities covered the country inadequately because some regions were inaccessible. Priority was given to urban areas where people were more concentrated and could be easily reached.

The introduction of western medicine resulted in the decline of indigenous health care methods. This decline was reinforced by missionaries who taught indigenous people to drop their 'wicked' ways and adopt teachings of the Bible. In some cases transition from indigenous to western health care system was not smooth. In central Kenya, the Kikuyu resisted the church's and government's plans to outlaw clitoridectomy. Resistance included withdrawing their children from missionary schools. In fact, the Kikuyu later set up their own schools free from missionary influence (Kenyatta 1953: 130).

Colonial Phase

The first settlers came to Kenya before the turn of the last century, in 1888, when the Imperial British East Africa (IBEA) Company was established. Shortly afterwards missionaries arrived in 1890. By 1920, when Kenya became a British colony, there was a large group of European settlers on land referred to as the "white highlands". These were areas which had a favorable climate and a high agricultural potential. Most of the white highlands were to the north of Nairobi. By 1905 European farmers had taken over a million acres of land in the area. The independence movement which began in the early

part of the century was a reaction to this occupation[1]. The IBEA was the main body governing the white farmers. IBEA's main role was business, a factor that required a healthy population. Together, the three bodies (the missionaries, IBEA, and the colonial government) performed their activities harmoniously.

Many of the health care policies were directed towards the working class. People were tiered on the basis of race with the Europeans at the top, followed by Asians, with Africans last. The quantity and quality of health care provided declined as one moved down from the Europeans to the Africans (Mburu 1992: 93). At first the British in East Africa were served by a small group of doctors who were employed by the trading companies (Doyal 1979: 241). By the time Kenya became a British colony, health care had been transferred to the colonial state.

The first western medical systems were set up in areas occupied by the European farmers, away from the Africans and Asians. Little effort was made to have medical care in areas occupied by the Asians and the Africans where the laborers lived (Mburu 1981 and 1992: 94). "The East African medical department was instructed firstly, to 'preserve the health' of the European community, secondly to keep the African and Asian labor force in reasonable working condition, and lastly, to prevent the spread of epidemics" (Doyal 1979: 241). Thus, medical care was given to the non-European populations based on their contribution to the settler economy. Governments and private corporations everywhere use the same principle. High ranked employees receive better medical care and more health benefits than those in relatively lower positions.

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[1] For a detailed discussion of this see Kenya Colony and Protectorate (1960) and Rosberg

Generation of wealth for the European farmers was crucial in deciding who could

get medical care. Those people whose economic contribution was considered less

important were accordingly given less medical attention. Where medical care was

available, it was limited. Since the Europeans tended to concentrate in some areas such as

the "white highlands" and in towns, it was easy to direct available funds to health

personnel and health care facilities in these few areas (Doyal 1979: 241). This left most

rural areas with no health care facilities.

It was impossible, however, to deny the African population medical care

altogether. They provided an important labor force that the European farmers needed.

Thus the African laborers were in constant contact with the farmers. In view of the high

presence of infectious diseases, medical experts recommended the promotion of health for

populations living in native reserves and settled areas (Mburu 1981). As early as 1927 the

Director of Medical and Sanitary Services, Dr. John Gilks, wrote in his annual report that:

> Employers of labor and township or municipality authorities must realize that the
> native living under insanitary conditions is a danger to the public health of the farm
> or township and that proper provision must be made for his accommodation under
> sanitary conditions if the health of the other communities is to remain satisfactory
> and economic progress is not retarded.(Colonial Office 1927, Quoted in Mburu
> 1981: 522)

He further pointed out that among the far-seeing employers there was a feeling that the

government should formulate policies governing conditions under which laborers lived and

worked.

The missionary factor in health care promotion is important. During the colonial as

well as in the post-colonial period various religious groups set up health care facilities and

and Nottingham (1966).

mission schools throughout the country. Initially these facilities and schools were used as a rallying point to gain support from the local elite. Catholics and Protestants recognized from an early period that health care provision was an important rallying point for converting people into their respective denominations (Mburu 1992: 95). The missionaries opened health care provision centers in most remote areas where they had a large following of people, but their impact nevertheless remained low in some places and negligible in most communities.

Mburu (1992) argues that the relationship between missionaries and the colonial government were complementary. However there were certain conflicts of interest between the medical missions and colonial authorities. It was the view of the colonial authorities that the medical missions often employed less qualified staff (Doyal 1979: 252). The colonial administration was also concerned about its own authority over the churches and their African converts. These concerns were expressed in the Annual Medical Report for Kenya in 1921. The report stated that:

> A government hospital is a tangible sign of government activities which is understood by every native, but it is doubtful whether a subsidised mission hospital is in any way connected in the minds of the majority of the patients as being anything more than a token of benevolence of the missionaries who therefore reap the credit and resulting influence. It is a fact which cannot be gainsaid, that the provision of medical attendance, even of the crudest and most primitive description, is the best form of advertisement for any form of activity among the natives. (Quoted in Doyal 1979: 252–253)

Clearly the colonial government was concerned about its authority over the local people as well as over the missionary activities. If they lost this authority to the missionaries the government felt that they could lose control over, an important source of labor–the natives.

During the colonial period the missionaries attempted to discredit indigenous health care services (Wanyande 1993: 91). However, these attempts did not succeed. Kenyans continued to use indigenous health care during this entire period and after. Reliance on indigenous health care continued because of inadequate coverage provided by western health care facilities, and because indigenous health care services were easily accessible to the people. Furthermore, people perceived the indigenous systems as their own. It is difficult to tell people to just stop using what they had been accustomed to. Whatever changes the missionaries were advocating needed time in order to succeed.

Post-Colonial Phase

On many occasions after Kenya gained its independence from Britain in 1963, Jomo Kenyatta, the first President, promised that his government would work to eliminate three social problems: poverty, ignorance, and disease (see Kenyatta 1964 :88–95). But the promises were slow at being implemented. Gradually people became disgruntled with the new regime. They accused Kenyatta of not following a socialist system, principles on which the Kenyatta government was elected to power. In 1965 Kenyatta responded to these concerns by announcing that henceforth health care services in government health institutions would be free.

Out-patients would get free health care services while in-patients were required to pay a fee of 20 Kenya shillings. The move to announce free out-patient care and a minimal fee for in-patients in governmental health care facilities was political. It made it possible for the Kenyatta government to appeal for support directly from the people (Wanyande

1993: 103; 121). In order to provide free health care in government-run institutions the government had to raise revenue from the citizens.

Over the years since the first white settlers, the health care sector had grown to cover more people. In 1946 there were 0.9 hospital beds per 1,000 people. The number of hospital beds increased to 1.3 per 1,000 people in 1962 (Beck 1981: 52). The existence of these health care services was considered a major factor in health care service provision. Diseases such as cholera, plague, relapsing fever, typhus, and onchocerciasis were said to have nearly vanished, but insect-borne diseases like malaria and sleeping sickness, leprosy, tuberculosis, and parasitic diseases continued (Beck 1981).

Since 1963, Kenya's health care sector has continued to grow. In 1964 there were 148 hospitals and 160 health centers (GOK 1966). This increased to 308 hospitals and 569 health centers in 1993 (GOK 1994a: 195). Overall, there were 3,144 health care institutions in 1993, including 308 hospitals, 569 health centers and 2,267 health subcenters and dispensaries (Table 4.3).

Between 1963 and 1993, the number of beds/100,000 population increased from 112 to 156 (see Table 4.4). This increase does not take account of regional differences, however. For example, Nairobi has always had over 390 beds/100,000 population while in North-eastern province the number of beds/100,000 people has remained below 100. North-eastern falls below the target of a bed ratio of one per 1,000 population (Onyango 1974: 109), set by most developing countries. Occasionally there are sudden jumps in the number of beds reported for some areas. It is not clear why, for Nairobi, there is a sudden jump from 447 to 720 beds/100,000 people in a four-year period and then a drop to 483 in

the next four years. Similarly North-eastern province recorded a sudden increase of beds

from 68 in 1989 to 342 in 1993. These may be due to problems in data reporting

procedures.

The government, through the Ministry of Health, is an important player in the

health care sector. It provides about 60% of the services while the indigenous health care

sector and other agencies, represented mainly by church organizations provide the

remaining. The Ministry of Health is responsible for several activities. These activities

include the following: (1) formulation of national health policy and development plans,

health acts and regulations; (2) promotion of medical science and maintenance of medical

and health standards; (3) organization and administration of central health services; (4)

training of health and allied personnel; (5) liaising and coordination with other government

departments and non-government agencies; and also (6) coordinating compliance with

international health regulations.

In the area of primary health care, the Ministry of Health organizes programs to

control communicable and vector-borne diseases. Other programs focus on applied

nutrition, environmental health, family planning and health education (Onyango 1974:

120).

Kenya and the Bamako Initiative

In 1987 the Bamako Initiative was launched at a meeting of African Ministers of

Health in Bamako, Mali. The Initiative is an attempt to strengthen primary health care

through community financing and community participation and management. It was meant

to ensure universal accessibility of primary health care by people through: (1)

decentralization of health decision making to the district level; (2) community level management of primary health care; (3) user-financing under community control; and (4) adequate supply of essential drugs. Emphasis was placed on promoting maternal and child health (WHO 1988).

The Bamako Initiative was an important step because it explicitly and officially recognized the problem of drug shortage in poor African countries (Vogel and Stephens 1989). However, the Initiative suffered from a number of problems: (a) it was almost silent on the politics and logistics of raising hard currencies required to purchase pharmaceuticals; (b) it did not envision a system through which health care financing could be achieved; (c) it assumed that cost recovery paid by patients for drugs could subsidize the drug consumption by other poor patients and pay for the operating costs of the primary health care system; and (d) it did not take into account the demonstrated inability of the public sector to effectively distribute drugs (Vogel and Stephens 1989). The Initiative also underestimated the annual cost of the program.

Kenya started its first Bamako Initiative projects in 1989 when community pharmacies staffed by community health workers were established. The pharmacies were managed by both the village health committees and the community health workers' pharmacy committees (McPake et al. 1993). The village health committee is the lowest level of the Ministry of Health organizational structure (see Figure 4.1). Malaria control activities such as sale of impregnated mosquito bednets were included in the Bamako Initiative programs towards the end of 1989. Bamako Initiative programs in Kenya, are

planned to provide basic services to areas inadequately covered by existing health

structure (McPake et al. 1993).

Kwale on the Kenya Coast, Baringo in the Rift Valley, and Kisumu in Western

Kenya are among these areas. The Bamako Initiative led to a reduction of financial and

geographical barriers to accessing health care (McPake et al. 1993). However, drug

shortages is still a problem[2]. No part of the revenue collected is reserved for drugs

repurchase (Nolan and Turbat 1995: 20). This has led to inadequate drug supplies, the

very problem that the Bamako Initiative was supposed to alleviate. Although McPake et

al. (1993) argue that the Bamako Initiative has led to a reduction in financial barriers,

available evidence contradicts this assertion. Studies on the impact of introduction of user

charges on health care utilization in Kenya have shown a drop in attendance at the health

care facilities. In some cases this drop reached 50% (Mwabu et al. 1995).

The Health Care and Administrative Structure

The health care set-up is based on a pyramid of referral institutions. The set-up is

based on patients' and government's cost-minimizing behavior (Mwabu 1987). At the

base, dispensaries and sub-health centers provide some health care. They serve people

within a radius of 4 to 8 kilometers. Their basic responsibility is to dispense drugs to

patients and provide other forms of less specialized care. More serious cases are referred

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[2] See for example the Daily Nation, July 14th, 1998. It was reported in the Daily paper that hospitals in the coastal province lacked drugs because according to the Provincial Director of Medical Services "they had not received their drug kits from Nairobi." As a result patients were being referred to private pharmacies for their medication. This was coupled with "a shortage of nurses to run some of the health facilities" which had led to closure of some of the health centers.

to the health centers. Health centers are better equipped with staff and drugs than the dispensaries. They have about 10 maternity beds. The paramedical personnel in health centers are trained to diagnose and treat diseases at the basic level.

In the next higher level are the district hospitals. District hospitals are equipped initially with about 200 beds, an operating theater, and some radiological and laboratory services (Ikiara 1988). Usually one medical doctor is in charge of these facilities. The district hospitals refer all serious cases to provincial hospitals and, sometimes, to the Kenyatta National Hospital. As the national referral hospital, Kenyatta provides health care services and serves as a teaching and research institution. It has a 2000 bed capacity.

Kenyatta hospital absorbs over 54% of all the doctors in government employment. Despite its huge expenditure (about 34% of total recurrent expenditures allocated to the Ministry of Health; Ikiara 1988), Kenyatta Hospital's functions are seriously constrained. Many patients seek care at the hospital without being referred from lower health care facilities.

Similarly the administrative set-up of the Ministry of Health (MOH) is set in a pyramidal form with the Minister, the Permanent Secretary and the Director of Medical Services (DMS) at the top of the hierarchy (see Figure 4.2). The Minister is in charge of political affairs in the Ministry, while the Permanent Secretary is in charge of administration. The DMS is the professional head in the Ministry.

The DMS and Permanent Secretary are assisted by several deputies who oversee the functioning of various sections, departments and subdepartments. The major departments within the central level are: training, personnel management, finance, hospital

administration, hospital insurance, pharmacy, environmental health, nutrition, supplies,

drugs inspectorate, communicable diseases, epidemiology and statistics, public health

laboratory services, vector-borne diseases, health planning and family health including

family planning (Onyango 1974: 115).

At the provincial level is the Provincial Medical Officer (PMO) in charge of

District Medical Officers (DMO). The PMO is also in charge of the organization and

administration of health services in the province and coordinates government and non-

governmental health services. He is assisted by professional, technical, and administrative

staff.

The District Medical Officer of Health (DMO) is in charge of the district. The

DMO coordinates health services at the district level and all the units below at the rural

level–health centers, health sub-centers, and static and mobile clinics. Clinical Officers

work under DMOs.

Malaria Control–A Global View

By the end of the Second World War WHO had recognized that malaria caused

many deaths and that this led to a reduction in agricultural and industrial development

(Bruce-Chwatt 1980: 280). As a result of this recognition, malaria control programs were

started world-wide. These control programs were successful in western nations but not in

many tropical areas.

Formal endorsement of the malaria eradication program took place at the eighth

World Health Assembly in 1955. In 1957 WHO took over coordinating activities and

provision of technical assistance. Control programs were converted to malaria eradication programs. Eradication programs were initiated in the Americas, Europe and in the majority of countries in Asia and Oceania.

Unfortunately for Africa only pilot projects were attempted (Bruce-Chwatt 1980: 283). This is, perhaps, because during this time many countries in Africa were involved in liberation movements. The colonial administrations were in a political dilemma. Violence was widespread in many areas. Political activities of the time may have contributed to low concern for malaria control.

By the 1970s malaria had been eliminated from Europe, the Asian part of the former USSR, several countries in the Near East, most of North America (the whole of the USA, most of the Caribbean), some northern and southern parts of South America, Australia, Japan, Singapore, Korea and Taiwan. In Africa, there were successes in the islands of Mauritius and Réunion (Bruce-Chwatt 1980). Most of the areas that had problems with malaria eradication are found along the equator. From South America through Africa to South East Asia countries on either side of the equator have high mosquito population and malaria transmission rates. Regions away from the equator have marked seasonal climatic changes. Survival rates of mosquitoes and malaria parasites outside the equatorial belt is low. For survival, mosquitoes need a humid climate with temperatures not exceeding $35\,^{\circ}$C. The parasites do not develop at a temperature below $16\,^{\circ}$C. Best conditions for their development in the mosquito and transmission is when the mean temperature is between $20\,^{\circ}$-$30\,^{\circ}$C (Bruce-Chwatt 1980: 116-117; 132). The tropical environment provides a good environment for mosquito survival.

Why did malaria control programs succeed in some areas with a favorable climate for mosquito breeding? Below I present two success cases, Florida and Mauritius, of malaria eradication. Both these cases show that changes in the infrastructural and structural conditions were necessary for the malaria eradication programs to work.

Florida

In the early part of this century malaria was a major cause of death in the state of Florida and other southeastern US states. Today malaria is not a problem in the area. A number of factors account for this decline. As the country became wealthier, people started building better houses with mosquito screens on windows and doors, they could afford to buy mosquito repellents, and they began to handle water better through agricultural drainage and reclamation (Martin D. Young, personal communication November 1995; Hollis 1944).

The health department used resources at their disposal to start spraying and water drainage programs, and to build more clinics which became a ready source for early malaria treatment. In the 1930s over 86,000 miles of drainage ditches were constructed in the southeastern United States. In early 1940s 13,000 acres were cleared for larvicidal operations, 5,000 miles of ditches cleaned, and over 5,000 acres of breeding surface were eliminated by 1,100 miles of drainage in the US (Hollis 1944). The road network also contributed to some extent to the decline of malaria. Road construction was accompanied by drainage of the areas where the roads passed. Drainage eliminated mosquito breeding sites along the roads and railways.

Mauritius

In Africa, Mauritius is a success story in malaria control where the disease was declared eradicated in 1973. For more than a century malaria, probably imported into the island by immigrants mainly from India, was a major cause of death and a threat to the island's economy (Bruce-Chwatt and Bruce-Chwatt 1974). In 1873, an American Consul Colonel Nicolas Pike wrote:

> Those who inhabited Port Louis during the terrible mortality ...will never forget the sad spectacle the city presented daily. Fever, fever, was the only word on every lip, the only thought in every heart. Mourning and desolation was everywhere. Scarcely a person [was] visible that did not wear the garb of woe. Song and laughter had ceased.... One dreaded to ask the news, as one was quite sure to hear of some friend ill, dying or dead.... No change in weather seemed to arrest the plague. (Pike 1873: 105 - 106, parenthesis mine)

And yet there was not enough medicine. Sir Walter Besant (1902) noted:

> All the quinine ... was exhausted; that which had been ordered from Europe was by mistake sent out round the Cape [of Good Hope] instead of by the overland route.... The number of dead rose from 300 a day for the whole island...the shops were closed; the streets were silent; the funerals went on all day long.... (p. 143, parenthesis mine)

After Sir Ronald Ross, in 1897, found a developing form of the malaria parasite in the body of *Anopheles* mosquito, drainage of marshes and afforestation were undertaken. Ross was invited to Mauritius in 1907 to advise on the best method of malaria control. His final plan for the reduction of malaria was estimated to cost $ 9,000.00, about 1% of Mauritius' yearly revenue. Ross' emphasis was on the destruction of *Anopheles* breeding sites combined with widespread distribution of quinine. These greatly reduced the incidence of malaria. For his services, Ross was paid £ 1,000.00 (Bruce-Chwatt and Bruce-Chwatt 1974).

During World War I and World War II additional malaria control programs were introduced. These programs yielded good results in the center of the island and in the capital city, but not along the greater part of the coastal area. In 1948 residual spraying with DDT and hexachlorocyclohexane (HCH or BHC) was carried out and, after 3 years malaria incidence was reduced considerably (Bruce-Chwatt and Bruce-Chwatt 1974). The number of malaria cases dropped from 46,000 in 1948 to 6,000 in 1950. Total coverage by DDT insecticide spraying ceased in 1958, but intensive malaria surveillance continued into 1960.

The year 1960 marks the final phase of malaria eradication program in Mauritius. In 1960 surveillance revealed 1179 cases of malaria. The number of cases dropped to 955 in 1961, 226 in 1962, 30 in 1963, 20 in 1964, 14 in 1965, and 12 in 1966 (Bruce-Chwatt et al. 1973). During 1963-1971, 148 cases of malaria were reported, but only 11 were due to local transmission. In 1968 Mauritius entered the maintenance phase of malaria eradication. Seroepidemiological survey in 1972 confirmed the absence of local malaria transmission. This paved the way for WHO to certify that eradication of malaria from the Mauritius had been achieved (Bruce-Chwatt et al. 1973).

Outside the tropics, use of DDT and other insecticide residual sprays coupled with a marked seasonal climate may have caused differential reduction in mosquito population. Seasonal climatic changes may account for changes in mosquito population. Use of insecticide sprays and other malaria control measures could lead to a further reduction in the number of mosquitoes. A reduction in the population of the mosquitoes must have led to a lower transmission rate of the malaria-causing parasite in subsequent generations.

However, malaria is making a comeback in almost all areas of the world, particularly in the tropics.

Statistics from WHO show an increase in the number of malaria cases reported since the mid '70s. It is estimated that probably the real malaria figures are much higher than currently reported. (I have addressed this topic in Chapter two).

Malaria Control in Kenya

The administrative structure of the Ministry of Health (MOH) incorporates malaria control activities. These activities are split into preventive and curative programs. The preventive program is itself divided into several departments: Division of Vector Borne Diseases (DVBD), Division of Environmental Health (DEH), Division of Health Education (DHE), and Health Information Systems (HIS) while curative programs include the National Public Health Laboratory Services (NPHLS), Primary Health Care (PHC), and EDS (see Figure 4.2). The Division of Communicable Disease Control (DCDC) and a special malaria control unit are under the DVBD. At the district level the District Health Committee in conjunction with the District Development Committee (DDC) and the District Health Management Team (DHMT) run the malaria control activities. The lowest level of the organizational structure is at the community level, where village health committees play an active role in the control of malaria.

Kenya's malaria control programs were designed to provide a three pronged attack (Fendall and Grounds 1965). First, urban malaria was tackled by sanitary engineering,

drainage, and larvicidal measures. This approach was successful, at least until the '60s.

The second approach was through programs in selected epidemic areas. These areas

included Kericho in 1947 and Nandi from 1955 to 1957. The third approach was through

combined use of chemoprophylaxis and insecticides. Epidemic and hyperendemic areas

which were of economic and social importance were targeted (Fendall and Grounds

1965). The areas included Nandi in the Rift Valley province, Malindi and Shimba Hills in

the coastal region, and several of the large-scale resettlement schemes (Fendall and

Grounds 1965).

Focusing on economically and socially important areas was rather unfortunate. It

lacked foresight on the part of the planners. In areas like Kericho and Nandi where

Europeans had large tea plantations and dairy farms most of the labor was supplied by

immigrant workers. Most of them came from malaria endemic areas in Nyanza province.

For effective control of malaria in areas targeted, it was necessary to eliminate the vectors

or the parasites. It also meant preventing the introduction of new vectors and parasites.

Clearly this was not possible because of labor demand on European owned farms.

History of Malaria Control in Kenya

Malaria was nearly absent in the highlands above 1600 meters when the first

Europeans traveled through the country in the later part of the 19th century. To the west

of Nairobi, Nandi and Uasin Gishu plateau (at 1900 meters above sea level) was reported

free of malaria (Roberts 1974: 306). However by 1902 malaria epidemics were reported in

Nairobi. Malaria was reported on the highlands to the west of Nairobi after the First

World War. Probably malaria was imported into the area by soldiers returning from that war in Tanganyika–now Tanzania (Roberts 1974: 306).

Roberts (1956) reports sporadic outbreaks in Nandi district by 1920, and by 1930 well defined outbreaks of malaria every three to four years. A severe epidemic occurred in May and June, 1944. Over 600 confirmed deaths due to malaria occurred. Epidemiological surveys in 1951 revealed rates of 40 to 50 per cent in the 0 - 10 years age group (Roberts 1956). The spread of malaria into areas that were initially malaria free was due to increase in migration, the construction of roads, the building of towns, and the increase in the trade and commerce (Roberts 1974).

Before the second World War, malaria control programs in Kenya were limited to larger urban centers. The programs consisted of drainage and larviciding. After 1946, newer methods of control were incorporated into the malaria control programs (Gelfand et al. 1980). These programs include house screening, entomological surveillance and vector control (GOK 1992a). Health care programs were usually a response to a disease outbreak or due to an increase in incidence of an existing one. For example, in Nairobi rat control was undertaken in 1902 after a plague epidemic occurred. Next, intestinal diseases and malaria were targeted (Beck 1974: 92). During the early years mosquito control was problematic and killing the malaria-causing parasite in humans was difficult.

The successes of malaria control programs were few and sporadic. After the First World War, a survey was conducted to map out the extent of the malaria problem in Kenya. The survey revealed that even in Nairobi, which was initially considered malaria free, the disease was present. Malaria was linked to poor living conditions. In 1921 a new

public health ordinance gave the Kenya Medical Department broader powers for the suppression of infectious diseases (Beck 1974: 101). The department proposed that the life of Africans could be improved by providing "better nutrition and healthier style of life." Malaria was identified as a social disease "dependent for its continuation in areas where it is endemic on among other factors, a low standard of living among the bulk of the population."

In the period after the Second World War, malaria control programs became active in parts of Kenya. The methods of control used included residual spraying, mass chemotherapy and prophylaxis (e.g. Nandi district from 1953 - 1955, Malindi district in 1958, Kwale and Shimba Hills in 1958, and Kisumu in 1966) larviciding, and environmental and biological control methods (Roberts 1974: 313–315). Residual insecticide indoor spraying using DDT was first used in Kenya in 1946 in Kericho district. Houses were sprayed twice each year for 2 years. This reduced the parasite rate from 37% to 10% (Roberts 1974).

Pyrimethamine trials in Makueni, an hyperendemic area to the southeast of Nairobi, reduced malaria parasite rates in children from 46 per cent to 3 per cent. In the following seven months parasite rates rose to 15 per cent (Roberts 1956). Roberts notes that under established epidemic conditions with a relatively short transmission period (May to July each year) a single pyrimethamine dose to the resident population could cut short transmission during the period after the onset of the rainy season.

According to Roberts (1956) interruption of transmission would take place in the following ways:

1. removal of the source of infection to vectors in a short period. Very few of the existing adult vectors would have the chance to acquire potent gametocytes and to develop viable sporozoites before death; and

2. adult vectors carrying viable sporozoites would be unable to transmit infection to treated people before death due to prophylactic action of pyrimethamine.

This would be achieved only if every individual received treatment, and there was no entry of infected population into the area. In practice this would be a difficult task to achieve.

After the Makueni experiments, control programs were started in Nandi district, a region with unstable malaria epidemic. From 1953 to 1955, 156,000 people were given an annual single dose of pyrimethamine at the beginning of the transmission season. Over the two-year period parasite rates were reduced from 23% to 3%. A total of £1,220.00 was spent on pyrimethamine, equipment, and transportation. The cost of treatment was shared between the Medical Department in Nandi and the Nandi African District Council.

Dieldrin was used for the first time in Nandi district. This program was supported by WHO and UNICEF. It lasted three years from 1955. At the end of the third cycle of spraying malaria cases had been reduced to less than 0.5 per cent (Roberts 1964c). Just under 40,000 houses were sprayed annually for three years; 42,000 lbs of dieldrin were used to protect 112,500 people at a cost of £32,100.00 (Roberts 1964b). The program led to virtual disappearance of *P. falciparum* malaria for nine years (Roberts 1974: 314).

Despite these successes in the early phase of the dieldrin campaigns, by the end of the first spraying in 1955 there was concern over the emergence of dieldrin resistant house-flies (Roberts 1964b). In 1963 small localized malaria outbreaks were detected in

Nandi and other high altitude areas through active surveillance methods. These methods

included blood slides, the detection and treatment of fever cases, surveys of all age

groups, and mosquito collections (Roberts 1964a; 1964b; and 1964c).

Control programs included dispensing of quinine to the people. This strategy

proved futile among the Waduruma and the Wadigo in the Digo Reserve in the Kenya

coast (Beck 1974). As a first step to malaria control, Dr. C. R. Philip tried to generate

enthusiasm among the people to build better houses. Next he tried to eliminate hookworm,

and, after creating a desire for better nutrition, housing and farming, he started a campaign

to educate people on malaria control.

In Malindi district, a malaria hyperendemic area, chloroquine, sometimes offered

with pyrimethamine was given every two weeks beginning 1958. In addition residual

house spraying was done. The parasite rates were reduced to 2.5%. Residents of Kwale

and Shimba hills also received chloroquine prophylaxis on a two weekly basis beginning in

1958. Chloroquine prophylaxis was introduced in 1963 in irrigation and settlement

schemes. The areas included are Mwea Tebere in Meru, Kano in Kisumu, Hola in Tana

River, Bunyala and Mumias in western Kenya and Ramisi in the coast. This was extended

to Kisumu municipality in 1966.

From 1972 to 1976 WHO and the Kenya government carried out epidemiological

trials with fenitrothion in Kisumu district. These trials cost US $ 261, 320.00 (Fontaine et

al. 1978). Fenitrothion was sprayed in houses and animal shelters for 2 years at a 3-

monthly interval. This residual spray proved effective against *Anopheles gambiae, A.*

arabiensis, and *A. funestus.* Populations of the three malaria vectors were reduced

significantly during the period of spray and thereafter for 12 months. The chemical sprayed

also showed pronounced airborne effect lasting 8 to 10 weeks after each spraying. Fenitrothion led to a 90 per cent reduction in the risk of contracting malaria. Fenitrothion has toxic effects on mammals. However, no clinical symptoms of toxicity were observed in spraymen or in the inhabitants of the area.

The 5-year Development Plan (1989-1993) for Kenya identified malaria as a major cause of morbidity and mortality. It causes more than 30% of all illnesses (GOK, 1994b). Six percent of the deaths in cases admitted to health care institutions are due to malaria. In highly endemic areas mortality due to malaria accounts for 30-50% of child death. Coast, Nyanza, and Western provinces have the highest number of malaria cases. This is not the first time malaria has been considered a major problem in the country. In 1968 malaria ranked third as the leading cause of death in government hospital in-patients (Roberts 1974: 306).

The government plans to intensify malaria control activities (GOK 1994b). Various control technologies are proposed. These will involve use of environmental as well as biological means. Spraying of houses with insecticides that have a prolonged residual effect, use of mosquito nets impregnated with insecticide, clearing of mosquito breeding sites and bushes, and prompt treatment of malaria cases will be employed in these efforts. Inexpensive vector control technology is being developed and tested by various Kenyan institutions (e.g. Mutinga et al. 1993; and Beach et al. 1994). The institutions that are currently actively involved in this venture are the International Center for Insect Physiology and Ecology (ICIPE), the Kenya Medical Research Institute (KEMRI), and the African Medical and Research Foundation (AMREF).

The use of these technologies has helped reduce infection rates and the rates of clinical symptoms associated with malaria. For example, the use of *mbu cloth* developed by ICIPE helped reduce the population of mosquitoes in houses by between 43% and 94% in one area of Marigat, Baringo district. There was a significant reduction of up to 73% of malaria parasite prevalence in school children (Mutinga et al. 1993).

In Nyanza field trials have been going on since 1990 to determine the effect of permethrin-treated bed nets and eave, window and door curtains on mosquitoes and malaria (Beach et al. 1994). Initial results from this study indicate an overall reduction in the prevalence of *P. falciparum* infections in the 1-4 year old children in the first 12 months. The prevalence rates dropped to 34% (from 43%) in areas with bed nets and to 29% (from 52%) in areas with insecticide treated curtains. In contrast prevalence rates in the control village dropped only marginally from 51% to 48%. However, there was no significant difference in observed mortality rates in the intervention and control villages (Beach et al. 1994).

KEMRI has developed mosquito screens from sisal material. Sisal material is cheap and locally available. The screens are then impregnated with insecticide and then made available to the people. By the end of the current development period (1994-1996) the government aims to achieve a 40% use rate of mosquito nets in the malaria zones.

In addition to efforts being made by governmental institutions, some private groups are involved in mosquito control programs. The East African Industries manufactures body smears (Vaseline) that have mosquito repellent chemicals. The use of repellents can considerably reduce mosquito bites. Other industries are involved in the manufacture of insecticides that can be used against mosquitoes.

Political and Economic Factors: Implications for Malaria Control in Kenya

A favorable political and economic environment is necessary for malaria control and other health care programs to work. In many areas (for example the USA and Mauritius) it is infrastructural and structural factors that were key to malaria control. Kenya must invest in programs that will change infrastructural as well as the structural conditions. An improved political and economic environment will attract more investment. Investment in turn will lead to general improvement in the socio-economic status of the people making it possible for them to build better and well-protected houses. The government will be able to build new and improve existing health care facilities. Improved roads should lower transport costs by causing increased competition among public service vehicle operators.

Conclusion

States play a crucial role in health care delivery. Only states can muster the resources to build roads, drain sewage, dig networks of ditches to allow easy drainage, and lay the necessary infrastructure for a good health care system to develop on a wide scale. Their investment in health is important for their economies and in increasing life expectancy of the citizens. However, investments in health have not been done to the same extent in various countries. Clearly some states have invested more than others. The example comparing health care data from Kenya and Tanzania reveals differences in health care achievements. In the first part of this Chapter I have considered one possible

condition under which this differences might occur, namely the administrative policies that are followed by the states.

The second part of the Chapter focuses more closely on health care in Kenya. Kenya's health care system has undergone change over the last century. However, the health care facilities continue to be inequitably distributed in the country. Certain areas have higher population/bed ratio. This could be the result of political factors. We cannot, however, exclude environmental factors. In certain regions of Kenya population is sparse and some areas inaccessible. Other areas, such as the North Eastern province, are occupied by pastoral nomadic communities who must move in search of pasture and water for their livestock. Under these conditions government policy makers argue that it is not cost effective to develop expensive infrastructure in areas like North Eastern province. They reason that soon nomadic people will move on and leave the infrastructure behind.

This may not be a valid argument. In some places in northern Kenya missionaries set up centers to supply food during the drought of 1984. Most people who settled around these centers opted to stay permanently. It is possible then to have people settle if useful facilities are put up. The centers were people have settled should be used as focal points to develop useful infrastructure like health facilities. Given that investing in health contributes to a nation's economic growth and development, eventually if the investments are made the country will benefit. The prevalence of diseases like malaria will come down and more people will be available to contribute to economic and social development.

The Kenya government attaches a lot of significance to the proper functioning of the public health department. One of the primary activities of this department since the 1950s is malaria control. Within the Ministry of Health's public health unit, there is a

special malaria control unit. This unit is engaged in many malaria control programs. The unit encourages the use of technology such as bed nets and the development of cheaper malaria control technology. Money is being spent along this line. However, as in other parts of the World, it is not possible to say that the use of mosquito nets will give sufficient protection to control malaria. Curtis et al. (1990) give reasons why this is not possible: (1) nets may be torn or they may not be properly used; (2) mosquitoes may feed through nets on parts of the body which touch the net during the night; (3) people may get mosquito bites before going to bed; and (4) if people get up before dawn, mosquitoes may bite them.

Administrative, political and social factors emerge as important aspects of health care. In Kenya, malaria programs cannot function, indeed they cannot succeed, unless the administrative, political, and social environment is conducive. There must exist, first enabling infrastructural and structural conditions at the national level and then down to the local level where we have malaria community health workers. An enabling environment was crucial in the control of malaria in areas of the world such as Florida and Mauritius.
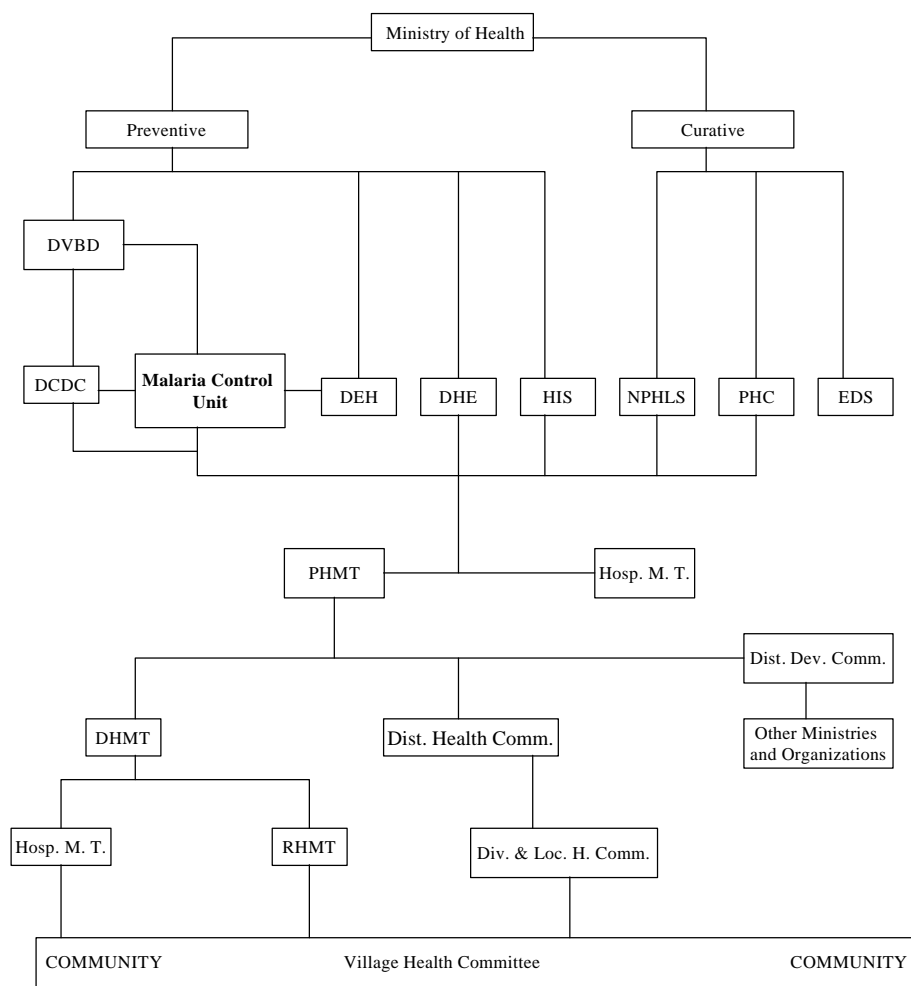
Figure 4.1: Organization and Coordination of Ministry of Health Departments

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┌─────────────────┐        ┌──────────────────────────┐        ┌──────────────────────────┐
│    Minister     │────────│  Director of Medical     │────────│   Permanent Secretary    │
│ (Political Head)│        │       Services           │        │  (Administrative Head)   │
└─────────────────┘        │  (Professional Head)     │        └──────────────────────────┘
                           └──────────────────────────┘
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| DDMS (A) | DDMS (RHS) | DDMS (P) | CHIEF DDMS | DDMS (DCDE&E) | DDMS (NPHLS) | DDMS (DVBD) |

Provincial Medical Office

| Provincial Hospital Secretary | Provincial Public Health Officer | Provincial Nutritionist | Provincial Matron | Provincial Nurse Trainer/Supervisor |

Provincial DVBD

District Medical Officer of Health

| Assistant Hospital Superintendent | District Public Health Officer | District DVBD Unit | District Matron |

Rural Health Unit

Figure 4.2: The Administrative Structure of the Ministry of Health

Table 4.1: Health statistics for Kenya and Tanzania between 1965 and 1993[a]

	1965		1970		1975		1981		1985		1991		1993	
	K	T	K	T	K	T	K	T	K	T	K	T	K	T
IMR	124	138	102	129	51	*	85	101	91	110	67	115	61	84
<5MR	*	*	164	223	*	*	133	202	121	185	105	162	94	167
ALE	49.5	42.5	50	45.5	50	45	56	52	54	52	59	47.5	58	52
CBR	51	49	53	50	50	47	55	47	54	50	45	46	36	43
CDR	17	22	18	19	15	19	13	15	13	15	11	18	9	14

[a] Data compiled from various World Bank Development Reports;
K = Kenya, T = Tanzania; IMR = Infant Mortality Rate; * = Data not available;
<5MR = Under 5 Mortality Rate/1000 live births; ALE = Average Life Expectancy at Birth; CBR = Crude Birth Rate/1000 population; CDR = Crude Death Rate/1000 population.

Table 4.2: Rate of change in health indicators for Kenya and Tanzania between 1965 and 1993

	1965 – 1991		1991 – 1993	
	Kenya	Tanzania	Kenya	Tanzania
IMR	-2.19	-0.88	-3.0	-15.5
<5MR	-2.81	-2.90	-5.50	2.50
ALE	0.36	0.19	-0.5	2.25
CBR	-0.23	-0.12	-4.5	-1.5
CDR	-0.23	-0.15	-1.0	-2.0

Table 4.3: Number of Health Care Institutions by Province[a]

Province	1964[b]	1977	1981	1985	1989	1993
Nairobi	17	142	87	158	185	304
Coast	21	157	179	189	220	357
Eastern	23	226	247	272	308	499
North-eastern	3	22	24	21	40	52
Central	25	232	263	271	321	405
Rift Valley	36	445	501	447	578	976
Nyanza	13	176	219	224	342	359
Western	10	102	93	101	119	192
National	148	1,502	1,613	1,683	2,113	3,144

[a]Data for 1962, 1969, and 1973 not available. [b]GOK (1966). This is the number of hospitals. It does not include other health care centers (see Ikiara, 1988)

Table 4.4: Number of Hospital Beds and Cots per 100,000 Population[a]

Province	1964[b]	1977	1981	1985	1989	1993
Nairobi	453	447	720	483	399	392
Coast	172	173	211	171	159	168
Eastern	89	117	136	122	113	113
North-eastern	40	129	91	73	68	342
Central	119	170	179	160	142	151
Rift Valley	115	162	147	135	123	129
Nyanza	59	141	109	113	102	117
Western	74	99	130	117	102	164
National	112	159	177	153	138	156

[a]Data for 1962, 1969, and 1973 not available. [b]GOK (1966). This does not include beds and cots in health centers (see Ikiara, 1988)

CHAPTER 5
GUSII: THE LAND, IT'S PEOPLE AND SOCIAL SYTEMS

Introduction

Abagusii occupy the three fertile agricultural districts of Kisii, Nyamira, and Gucha

in Nyanza province. The area they occupy is collectively known as Gusii (or the Gusii

Highlands) and the language spoken by them, Ekegusii, is part of the larger linguistically

related Bantu cluster of languages. The people who occupy this land, Abagusii, are

patrilineal and patrilocal deriving their name from that of the area. Literally, Abagusii

means 'of Gusii' or 'belonging to Gusii.' They collectively refer themselves as Omogusii,

Mogusii being the father of all Abagusii. Along with the Luhyia, Samia, and the Kuria,

Abagusii belong to Kenya's western Bantu cluster.

This Chapter provides background material on the Gusii and the land on which

they live. In the first section of the chapter I discuss the geography and climate of the area

arguing that the geographic and climatic characteristics provide a conducive ecology for

the development of the mosquito vector. I devote the second section to the people who

inhabit Gusii. I highlight their migration into the present day location, the emergence of

Gusii totems, and some of the past and present social factors that might have a bearing on

disease. Abagusii have undergone social as well as economic transition since the arrival in

Gusii of the first European settlers in 1907. Influenced by an increasingly global economy,

these changes have accelerated in the latter half of this century. I discuss the changes that

have taken place in sections three and four. The role of the therapy management groups is

discussed in section five. Finally, I discuss my role as a native ethnographer in Gusii in

section six.

Geo-climatic Factors

Gusii covers an area of 2,196 km^2 and had a population of about 1.14 million

people in the 1989 national census (CBS 1994). Currently the population is estimated to

be 1.75 million people (Blacker 1996). In 1989 the average density was 517 people per

km^2 and now is estimated to be about 796 people per km^2. This makes Gusii one of the

most densely populated rural districts in Kenya. In some rural areas of Kisii District (for

example Bogiakumu in Suneka Division–where this study was conducted) population

density reaches 1,068 people per km^2.

Gusii is hilly with several ridges on the eastern side. Altitude ranges from about

1,500 meters on the west side to over 1,800 meters on the eastern side. The Gusii

highlands lie between 2,000 meters and 2,350 meters above sea level. The high altitudes

influence the mean annual temperatures. In the northwest the minimum mean annual

temperatures are between 14° C and 18° C. On the east side where altitudes are higher, the

minimum mean annual temperature ranges between 10° C and 14° C. The maximum mean

annual temperatures ranges between 26° C and 30° C on the west side and between 22° C

and 26° C on the eastern areas (Nyamwaya 1986:9). The higher altitudes experience

seasonal malaria epidemics (also known as highland malaria).

The climate of Gusii is highland equatorial with a bimodal rainfall distribution. The rainfall distribution is influenced by the InterTropical Convergence Zone (ITCZ). March to June constitute the long rains season while October to December constitute the short rains season. Rainfall exceeds 1,500 mm per year (Nyamwaya 1986:3, 8).

The high amount of precipitation provides adequate water supplies for the region's drainage system. Several permanent rivers and streams from Gusii drain into the Lake Victoria basin and eventually end up in Lake Victoria. The three major rivers are Gucha, Sondu, and Mogonga. In fact, River Gucha runs through the three districts.

These geo-climatic factors influence the epidemiology of malaria. There is generally a high incidence of malaria on the lower western areas where the temperatures are relatively warmer, and at the higher altitudes during the long rains and soon after. Because of their favorable ecological factors these areas provide good breeding grounds for mosquitoes making malaria one of the single most important causes of deaths in Gusii. Between 1991 and 1995 malaria alone was the cause of 1690 diagnosed deaths compared to anemia (630 deaths), gastro-enteritis (347), broncho-pneumonia (308), and tuberculosis (134) in Kisii district (Kenya, Rep. of, n.d.). In the first two months of 1998 malaria caused 139 reported deaths while 77% of the 750 in-patients at the Kisii District General Hospital were suffering from malaria (Daily Nation, March 4th, 1998).

The number of people dying from malaria could be much higher than given. First, malaria parasites cause the destruction of the red blood cells. Therefore, in areas where malaria is high one gets anemic patients whose condition is the result of malaria infection. In high altitudes the effect of highland malaria is significant. Because of its seasonality many people develop only partial immunity against malaria leading to high death rates

during the malaria outbreaks. The other reason is related to utilization of health care facilities by patients. Some patients never get to hospital for treatment. Thus when they die at home the area Chief certifies that the person has died of natural causes without identifying the specific cause. The result is that some deaths due to malaria go undetected by medical authorities.

Abagusii Totems and Lineage

Abagusii consist of seven contiguous but politically autonomous groups. These groups are Abagirango (North Mugirango and South Mugirango), Abagetutu, Abanyaribari, Abanchari, Ababasi, and Abamachoge. They have four totems to which they relate. Abagirango (or Abachorwa) relate to *engo,* leopard; Abasweta (consisting of Abagetutu, Abanyaribari, and Abamachoge) relate to *engoge,* baboon; Abanchari relate to *engubo,* hippopotamus; while Ababasi relate to *enchage,* zebra. This classification is the basis for exogamy and establishes a sense of mutual obligation to group members (Bogonko 1986: 15). Abagetutu were the largest and politically most organized group. It is because they were in a position to organize resistance that they suffered the wrath of the British administration during the early part of this century.

Each group performed its affairs independently of other groups but they came together for common purpose, such as to fight attacking contiguous tribal groups in order to defend the common interests of the Gusii people. Within the clan, members were responsible for clan welfare under the guidance of clan elders. Aggression in each group, however, was dealt with within the group. There are many accounts of internecine fighting

with their neighbors–the Luo, the Kipsigis, and the Maasai–in which Abagusii people lost

(see for example Ochieng' 1976).

Prior to the nineteenth century Abagusii were unable to collectively defend

themselves because of internal differences occasioned by the scramble for land (Ochieng'

1976). The neighboring Kipsigis and Maasai found it extremely easy to raid the constantly

feuding Gusii groups. However, the feuding seems to have reduced during the nineteenth

century which may have enhanced their collective military strength. According to Sutton

(1976: 43) the Gusii "inflicted upon the Kipsigis at least one staggering defeat." Sutton is

referring to the most famous war between Abagusii and Kipsigis–*esegi ya Saosao*–fought

in 1891/1892. It was a war that brought together armed forces of Abagetutu,

Abanyaribari, and Ababasi to defend Abagirango of North Mugirango against constant

attacks by the Kipsigis warriors. "At river Saosao … Abagusii attacked the Kipsigis as

they retreated from Luoland. [They] were massacred almost to a man …" (Bogonko

1986: 23, see also Mokamba et al. 1974).

Hostility between Abagusii and the agro-pastoralist Kipsigis persist to this day,

albeit, sporadically. It results from cross-border invasions to take cattle from the Abagusii.

Involvement of the government in controlling border raids through the establishment of a

special police force, the anti-stock theft unit, has led to a reduction of these cross-border

incursions. Nowadays, raiding of Gusii homesteads to take cattle involves use of Gusii

informers. Sometimes the animals are driven across the border by the Abagusii and

exchanged for Kipsigis cattle at the border. Hostility can flair into full scale confrontation

when one side tracks the animals into the other's territory.

The history of how or why these totems came into being is obscure. Oral tradition has it that Abagusii migrated from Kisumu on the shores of Lake Victoria to the Kano plains about AD 1650 (Bogonko 1986: 15). Before then they had moved down following the Nile to Mt. Elgon from where they reached Kisumu. It is at the Kano plains settlement that the Gusii groups took up their respective totems. This could explain why Abagusii, for example, have *engubo* (Hippopotamus) as one of their totems. Hippopotamus are not found in Gusiiland, a mountainous area. There are many of them in Lake Victoria and, formerly, in swampy areas in the Plains. Their mixed economy seems to have started evolving during the 100 years or so that they lived in Kano.

Later, because of constant attacks from the Luo and, probably, the Nandi to the north, Abagusii moved first to Kabianga in Kericho district and then on to present day Gusii. At Kabianga their cattle died in large numbers, probably as a result of rinderpest. This caused the Abagusii to move to the present day Gusii Highlands. Kabianga is a Gusii word meaning 'after they refused,'–their cattle must have 'rejected' the Kabianga area so they had no option but to move on. Due to this long association with cattle, they are an integral part of a Gusii family's economy. High rainfall and fertile land makes it possible for them to keep cattle and goats.

Like other people in the region (the Luo, the Kipsigis, and the Maasai), Abagusii live in homesteads dispersed across the countryside. They are organized by patrilineal descent, practice polygyny (although the practice of polygyny has reduced considerably over the years), and use cattle as bridewealth. Evidence for the decline in polygyny is seen in the data from the LeVines (1966). In 1956, 44% of the men and 55.8% of the women were in polygynous unions in the 'Nyansongo' area. (Nyansongo is a fictitious name given

to the community where the LeVines carried out their six culture studies in the late 1950s.) By 1975 these figures had dropped to 8.9% for men and 27.9% for women in polygynous unions. This decline took place despite the fact that "polygyny remained a possibility for affluent men …" (Hakansson and LeVine 1997: 263). In 1956, for every one man in a polygynous union there were 1.27 women in such unions. By 1975 there were 3.14 women in polygynous unions for every such man. Incidentally a few able men kept practicing polygyny with even more wives.

A number of factors have led to the decline in the proportion of people in polygynous unions. The reasons are summarized by Hakansson and LeVine thus: 'the relationship between polygyny and political influence is disappearing.' Polygyny is no longer a means for men to accumulate wealth and political influence. Most local political leaders are monogamous and continuously espouse the position that polygyny represents 'underdevelopment and a primitive lifestyle.' This position results from the prevailing Christian ideology, ideas about development, and education (1997: 262).

The second reason is linked to economic factors (Hakansson and LeVine 1997: 262). Throughout Kenya economic changes are taking place. These changes accompanied with population pressure on the land have led to decreased land base and shrinking opportunities to earn money off-farm. If a husband must marry two or more wives, he must be prepared to provide enough land for each of the wives to cultivate food for her children. He must also have the resources to send his children to school. But lack of land and money earning opportunities off-farm militate against polygyny. This, is my opinion, has had the greatest impact on polygyny in Gusii.

The major difference between Abagusii and their neighbors, the Kipsigis and the Maasai, is in their greater reliance on agriculture, and less dependence on cattle for subsistence. However, cattle play an important role by ensuring continuity of the lineage. Use of cattle for bridewealth payment is the basis of social approval of new marital alliances. It is on this basis that existing lineages come together to create new ones.

The use of cattle for bridewealth, however, has reduced in significance although cattle are still considered an important component of bridewealth and marriage. Nowadays bridewealth payment has become monetized. When bridewealth negotiations take place cattle are used as the unit for negotiation but, when the number of cattle to be paid has been agreed upon, they are valued and their equivalent in Kenya shillings paid to the girl's parents. It is easier to carry money over long distance than to take cattle. A number of things may have led to this recent development.

First, young men and women are opting to making their own marital arrangements and they are getting spouses further away from their homes. As a result parents have become less involved in establishing marital alliances for their children. Improved communication makes it possible for young people to meet friends from far. The second reason could be related to opportunities created in school. Schools bring together students from a wide area. They establish, during their four years together, lasting friendships. The friendship networks are used to get spouses for friends. Lastly, those who get jobs do so in bigger towns where again opportunities of meeting people from a larger area are greatly enhanced. Recent studies reveal that young couples are staying together longer before bridewealth is paid than they used to four decades ago (Hakansson 1994a). Between 1957-1962 couples on average stayed together for three years before completing

bridewealth payments. Ninety-one percent completed payments by the second year. A decade later (between 1969-1974) 68% had made payments by the second year and in 1981-1983 only 28% had done so (Hakansson 1994a). Because they occupy a relatively disadvantaged and marginal position in the natal home, "and with difficulties finding men willing to pay bridewealth before cohabitation, [young women] are forced to elope" (Hakansson 1994a).

However, the real reason why use of cattle for bridewealth has reduced in significance, I think, is due to structural changes that are taking place. The population growth rate of Gusii is one of the highest in Kenya. It was growing at an average rate of 3.6% per year in the first half of 1980s; currently the population growth rate stands at 2.72% per year (Kenya, Rep. of (n.d.)). In Gusii male children inherit a part of their father's land. The land is subdivided among the sons. Continued subdivision has led to a reduction in plot sizes. People can no longer keep many animals on the smaller plots they own and still have enough land left for food and cash crop production. Parents in rural areas use the money to pay for their children's education and other family upkeep expenses. Furthermore, since young people are increasingly making their independent spousal choices, parents have become less involved in making bridewealth arrangements. Young couples are unlikely to have raised enough cattle to use for bridewealth. Using money for bridewealth, therefore, has become an acceptable alternative to livestock.

Abagusii practice circumcision for boys and clitoridectomy for girls. This rite of passage is considered an important one because it, they argue, transforms a person into adulthood. It is a period during which the initiates were given education regarding what is expected of them as members of society. There are detailed accounts of Gusii initiation

rites in Mayer (1953). Due to influence from Christianity and western education changes

regarding initiation rites are taking place among the Abagusii. For example, the age at

which clitoridectomy is performed has gradually reduced from around 10 - 11 years at the

beginning of the nineteenth century to between 6 - 8 years in 1992 (Gwako 1995). Gwako

attributes the trends to the desire to have young girls continue with their education

undisturbed by worries of what is awaiting them. His study reveals that only 4.3% believe

that women who have not undergone the ritual are more likely to have loose morals–a

reflection of the ever changing values on clitoridectomy among the Abagusii.

<div align="center">The Gusii Social Order</div>

Social Structure

      The culture of Abagusii from the pre-colonial period continues to influence their

experience and behavior. It is characterized by a domestic model of social order and its

concept of avoidance (LeVine et al. 1994: 60). The concept of avoidance is taken

seriously in Gusii. The family is divided roughly into four groups: the parents, initiated

sons, initiated daughters, and uninitiated children–with parents at the top of these social

groups and uninitiated children at the bottom. Sons generally have a higher social rank

than their sibling sisters who will eventually get married and move out to their marital

homes.

      Uninitiated children are least restricted on what they can do or say before their

parents and older siblings. They are going through the learning process during this period

of their lives. By the time they become initiated their social paths are defined for them.

Initiated children can not say or do certain things before the parents. For example, they can not talk about sex before or with their parents. In fact any such talk ceases immediately when a parent (or a person who can claim that status) appears. By rule, all uncles and aunts fall in the category of parents. In order to avoid any embarrassing moments parents will usually warn the children of their presence by talking from a distance as they approach a place where their children are gathered. Sons can not sit on their mother's bed, just as girls cannot sit with their father to have a relaxed chat. The father may not sleep in his married children's houses.

The ethical principle which governs their conduct is known as *nsoni*. Within each generation, however, there is no restriction of what can be said. People in the same generation do not have matters of *nsoni*. *Nsoni* exists between generations once removed from each other. Further up the ladder are the grandparents. Grandchildren have no matters of *nsoni* with grandparents. They can talk about anything without restriction. "Grandparents usually have a relaxed and informal relationship with their grandchildren, which allows them to discuss topics such as sexuality that cannot be mentioned to parents" (Hakansson and LeVine 1997: 257). This relationship is illustrated in Figure 5.1.

Living Arrangements

Autonomous homesteads *emechie* (*omochie*, sing.) represents the domestic group (what might be considered in a limited sense as the extended family because they consisted of homesteads of siblings who together were under their living father). *Omochie* is the locus of productive and reproductive activities. Women were married into *omochie*. Many

things have changed in Gusii or are in the process of changing. In this section I will discuss life in Gusii as it was, later I will discuss changes that have taken (or are taking) place.

The domestic group consisted of the elder of the homestead, *omogaka bw'omochie*, his several wives, and unmarried children, his married sons and their wives and children (LeVine 1962). This is the traditional productive unit. The work ethic within this productive unit was determined by sex and age of the person. Thus, women and middle aged men worked on the fields, young men herded cattle in the grazing fields while uninitiated children herded goats and sheep near the homestead. The old men were judges settling local disputes among and within families. The woman cultivated the fields assigned her by the homestead head.

The homestead is referred to as the man's and it is known by his name while individual houses and yards owned by the various wives in the homestead were known by the respective wives' names. The male children lived in the bachelors' houses (*chisaiga; esaiga*, sing.) while initiated males or those who are recently married lived further away from home, out in the cattle camp, *gesarate.* They jointly herded the father's herds and defended them from raids. *Omogaka bw'omochie* would himself rotate his residence among the wives' houses. If he was wealthy, he might have had another house, *etureti,* in which he entertained his guests over a clay pot of beer. Wealth is the basis of power and prestige among the Gusii. A wealthy man, *omonda*, commands respect, a poor one, *omotaka*, is despised.

The Gusii model of social order is organized in a manner that gives those of higher status more powers than the rest. Those of high status made decisions and gave orders which were followed by those below (LeVine et al. 1994: 65). At the domestic level

omogaka bw'omochie was at the top of the decision making hierarchy while small children were at the bottom. He had the rights in formal decision making and in allocating the extended family's cultivated land, produce, and wealth (Mayer 1975, Hakansson 1994b). When there was need for neighbors to pull together a labor force (*risaga*), *omogaka bw'omochie* would be invited to send his women to do the work and, he to participate in the beer drink rewarded for the work afterward. As long as he was alive, he officiated sacrifices to ancestors whose goodwill controlled the health and fertility of the entire family (Mayer 1975). All these acts reinforced his patriarchal standing in the homestead.

There was a significant measure of autonomy for each of the *chinyomba*. The elder gave orders to his wives and adult sons who in turn delegated to those below if it was appropriate to do so for the specific task to be accomplished. It was inconceivable for someone lower in the gender-age hierarchy to challenge the command of their seniors. Such challenges would be considered disobedience and insubordination. The father maintained authority over his sons as long as he was alive. However, the services of his married sons changed in character to political support in community affairs (Hakansson 1994b). Men who were successful in organizing their homesteads gained considerable power. Such men became members of an *ad hoc* council of elders called to resolve disputes. Often they exercised influence and authority.

Sacrifices: Keeping Misfortunes at Bay

Omogaka bw'omochie performed an important role in presiding over sacrifices offered in the homestead. Sacrificial offerings among the Abagusii provided a vital link between the living and the departed. They were used to appease the spirits of those gone

before. It is believed that the departed could cause deaths, diseases, and serious misfortunes within the home if the appropriate sacrifices were not offered. Efforts were made by the living to maintain the good relations with those spirits by making sure that they fulfilled their obligations.

Death and disease could be brought through the action of human agents. *Abarogi*, witches, could be implicated here for these misfortunes. It is not uncommon in Gusii to read newspaper reports of people whose houses have been burnt because they are accused of practicing witchcraft. Whether such accusations are proven or not is not the point. In fact people never bother to find proof of any accusations made. They have a deep (and unfounded) fear and they feel threatened by the acts of witches and the consequences of those acts. Abagusii have a saying–'*tiyanyagokwa etaberegeti*,' implying that for each death there is an ultimate human cause.

To counter the actions of witches Gusii people could turn to a diviner, *omoragori* (pl. *abaragori*). For example, if a death occurred in the homestead and witchcraft was suspected, the affected family could seek the services of *omoragori*. *Omoragori* has special powers which enable him to communicate with the other world, to diagnose misfortune, and prescribe remedies (LeVine 1963). They also have the power to identify the cause–witches responsible for the misfortune.

Omoragori could then hire a witch-smeller (*omoriori*, pl. *abariori*). *Omoriori* could 'smell' objects secretly buried in the home of the victim. However, a victim could also turn to *omonyamosira* (professional sorcerer). *Omonyamosira* (pl. *Abanyamesira*) counters the actions of *abarogi* by engaging them in a duel which they expect to win and by so doing result in the killing of *abarogi* (LeVine 1963). If *omonyamosira* was called in

before a death of a person, then his actions were purely to protect the threatened family by

burying secretly a protective magical objects (*omosira*). *Omosira* gave magical powers of

protection against the actions of *omorogi*.

After a death occurred and witchcraft was suspected, a postmortem was

performed by the men to determine the true cause of the death. A post-mortem involved

checking of the internal organs for any abnormal signs. In many cases the spleen was often

found enlarged–proof enough to say witchcraft was involved (LeVine 1963). However,

because of high malaria endemicity in the area enlarged spleens may have been due to

elevated malaria parasite counts. Abagusii recognize a disease, *endwari ya inda*, in which

the spleen, usually in children, is palpable. *Endwari ya inda* (enlarged spleen) is most

common in children, but it also affects adults. Treatment of this illness was with herbal

medicine and, in recent times, Mepacrine pills bought retail over the counter.

Changing Life Situations and Decision Making in Gusii

Over the past half a century changes have taken place in Gusii at an accelerated

pace. In fact changes started taking place from the time Abagusii came into contact with

British rule and Christian missionaries in the early part of the century. For example, when

the cattle camps were abolished by the British, young men were forced to come back from

the camps to spend their time at home. The cattle camps is where young men, the

Abagusii army, received their combat training. The Gusii reacted violently when the

British entered their land. In 1908, Assistant District Commissioner G. A. S. Northcort

was wounded in Kitutu by a Gusii warrior, Otenyo, in an open rebellion against the British

administration (Nyasani 1984: 20). The armed uprising was put to rest when

reinforcements were brought in from Kisumu and the Kings African Riffles (KAR)

stationed to the north of Gusii in Lumbwa in the present day Kericho District.

After the abolition of the cattle camps, a few of the returning men found their way

into schools built by Seventh Day Adventist and Catholic missionaries. The entry of the

British administration and missionaries started to change the power structure of the Gusii

family a process that has continued to this day.

When the British Colonial Office introduced taxes many men went to look for

wage employment. Initially they worked on road and bridge construction in Gusii.

Payment for services rendered by the local people was made with the cattle earlier taken

by the British in the 1908 Kitutu armed uprising (Orvis 1997). Demand for short-term

labor by young men striving to get their cattle back from the British surpassed the

available jobs (Maxon 1989: 55). In response, more men started migrating out to search

for jobs elsewhere. Male migration left many women on their own at home, they were now

faced with making decisions regarding family farming activities and management of illness

on their own. Unless there was a major crisis, the women made decisions without

consultation. They became more independent of their husbands often relying on their own

social networks to get support.

Male absence from home has continued to the present period. Silberschmidt

(1992) concludes that Gusii men find it more and more difficult to live up to their role as

omogaka bw'omochie. Increasingly their decision-making role is becoming less influential.

The principle that it is better to apologize than to ask for permission is alive and well in

Gusii. Women interviewed by Silberschmidt (1992: 248) "admitted that men should be

consulted on all sorts of issues, and they were supposed to determine various actions that must be taken." However, Silberschmidt found that many women, while avoiding open confrontation with their husbands, nevertheless, got things going according to their wishes. For example, a wife might disagree with her husband in what should be done on some piece of land but she would seldom say so. She would simply plant where she thought it appropriate. If the husband later finds out that his instructions were not followed the wife "will apologize but explain that because the seeds did not germinate [in the previous season] they had to be replanted in a different manner/plot" (:249). Decision making is not limited to family farming activities. It extends to other areas such as health, schooling, and investment away from the family land.

<div align="center">Therapy Management in the Gusii Family</div>

The family is the person's first important social group and usually the primary source of societal values. Knowledge of disease and family authority are key intervening variables in a person's medical orientation: knowledge of disease assists in recognition of disease symptoms while family authority influences health care decisions (Geertsen et al. 1975). Among the Abagusii the role played by the head of homestead in health care decisions is significant. The head of the homestead is consulted when decisions involving monetary transactions are made. In the event that a person is sick, the head of the homestead assumes a central role in the decision making process more so because they make actual payments for any medical services received by those under 'their' care.

There are instances, however, when the head of the homestead's decisions may be overruled. Old women may overrule their married sons. But usually this depends on the relationship between her and the daughter-in-law. For instance, in cases where the homestead head consistently rules against taking a sick individual for treatment, his wife may approach her mother-in-law for help. The mother will quietly ask her son to 'take' the sick for treatment. If this also fails, a wider circle of people may be involved. Usually this group of people are those who, according to Abagusii social order, are of higher social status. This group can make decisions that are binding to those below (LeVine et al. 1994: 65) and may impose social sanctions on those who become non-compliant or become reluctant to accede to decisions reached.

As in many other communities in Kenya the composition of the family is being redefined. More people especially in urban areas are moving away from the traditional African family (with an extensive network of relatives) to a nuclear family. In rural areas this is also the trend. Among the Abagusii, gender power relations, particularly in decision making are changing. Women are taking over decision making (see Silberschmidt 1992) and are diversifying more into a variety of non-agricultural activities that provide them with an independent source of income (Orvis 1997: 15). In some cases women engage in local brewing to get the extra income. Unlike in the case of income from agricultural output women can invest this money independently with little or no involvement from their husbands who are away looking for off-farm work. This money might for example be used in paying health care expenses that are incurred when the children are sick. The money is also spent in the purchase of household items like sugar, cooking fat, salt, tea leaves, and detergent–items that do not need substantial amounts of money.

<u>What Place do I have in Gusii? Doing Native Ethnography</u>

I was born in Gusii at the time the British were handing over political power to Kenyans in 1963. By then a lot of change had taken place in Gusii since the arrival of the first British. Many schools and health care facilities had been built by the Colonial government, and churches by the missionaries. Many of the present day Gusii elite went through these schools.

One other change that had taken place is the concept of land ownership. Before the arrival of the British and in the early part of their administration land was owned by clans (a set of contiguous homesteads) rather than by individuals. The British administrators sought to achieve greater control of the Gusii people through the abolition of the cattle camps. This necessitated settling of people on individual landholdings. At the dawn of independence land boundaries were more evident and ownership of land was declared the property of individuals rather than the community or clans (Orvis 1997: 78).

It is into this changed Gusii that I was born in 1963; Kenya gained political independence on December 12th, 1963 and it became a Republic on June 6th, 1964 with Jomo Kenyatta as its first President. Three years after political independence my parents moved from Bonyunyu to Nyansiongo (one of the newly created settlement schemes) to occupy land left behind by departing white farmers. The schemes were part of the million-acre program that was meant to resettle Kenyans countrywide on the farms, formerly owned by the white settlers, bought and sub-divided by the Kenya government through a loan grant from the British government. Though this program started in 1962 and ended in 1971, the greatest activity of resettlement took place between 1963 and 1967 with

approximately 70% of the people settled throughout the country. On average families got

13.5 hectares (Maxon 1992: 274).

As a result of my parent's migration I spent little time with my grandparents.

Grandparents are the main vehicle through which oral tradition of the Abagusii is passed

to the young largely because there was no written word in the pre-British days. (At

independence the only major work in Gusii language was the New Testament Bible.)

Children, then, spent a lot of time with grandparents during which time they learned

tradition and other aspects of life. For me, life in school comprised much of my contact

with the Gusii during most of my early life.

Growing up as a young boy in the newly established settlement schemes was

another experience for me. I, like other boys in the area, had access to a more comfortable

life than an average Gusii boy had. Most of them lived in areas classified as reserves

(ancestral land) by the Colonial government. This classification meant that the settler

farmers could not claim the land set aside for the natives. The economic growth, brought

by opportunities in the agricultural sector, were key in providing a stable financial base to

migrant farmers. The schemes had what I might call the bourgeoisie class of Abagusii.

Back in Bonyunyu my grandparents had a retail shop; my late grandfather was a

pioneer Seventh Day Adventist pastor after a brief service in the teaching profession. The

first time I went to visit them my view of life was already beginning to take shape in

another direction. I was surprised by what I saw. Looking all around beyond the small

Bonyunyu shopping center, I saw only grass thatched houses. In the settlement scheme I

was used to seeing iron-sheets roofed houses, where the adults (parents) slept, and the

grass-thatched kitchens. To this day I still remember these words to my grandfather 'these

people only have kitchens.' The people here referred to us as *abesikimu*, meaning from the

settlement scheme. They had started recognizing us as different from them.

By the time I underwent my second initiation, at the age of 10 years, I had

completed four years of primary schooling. The initiation was done by a person trained in

the western health care system, not the person who traditionally did the circumcision,

omokebi. I was never secluded along with other initiates to receive training on how to be a

true Gusii young man. Life in the scheme was different. This was a melting pot of Gusii.

People were much more reserved. (Having come from all parts of Gusii (representing the

seven contiguous clans) they did not know each other well and they were just beginning to

break the social barriers.)

On my part, the boys I knew were those I met at our local church and those who

were agemates and playmates from the neighborhood. By then social classes were

emerging. Among this bourgeoisie group, there were those who were less bourgeoisie.

The rank one attained within our playgroups was based on the rank of your parents.

Ranking pretty much followed what playmates knew about your parents' profession,

businesses, type of house you lived in, and other properties owned. On our part as boys,

owning things such as a soccer ball was a real status builder–you became first among

equals; you got to decide on the composition of the playgroups. The boys gave you

protection and in return you provided them access to the soccer ball.

It is this playgroup that partly taught me how to behave 'appropriately' in health

and in suffering. Having health problems like malaria and common cold is a widespread

thing in Gusii. I have had many malaria and common cold episodes. As this study indicates

of all the illnesses mentioned by respondents malaria has the highest salience (salience =

0.816, see Table 6.1). In Gusii we do not talk about common cold as a health problem. Abagusii have a saying, '*ikuba india mioro*' (common cold is of the nose). It is regarded as insignificant, this could be one of the reasons why it is reported by only 43% of the respondents despite its being common. I learnt that if you had common cold you did not say you are sick, much less take a rest. Instead you were expected to perform all duties pertaining to your station in life. From folk knowledge people know that common cold goes after a while even without effort to treat it. This is different from what I am told when I consult a physician. If I visit a doctor with common cold, I am told to go take a rest. I will be given antibiotics which are not for treating the common cold–it is a viral infection. The antibiotics are for taking care of opportunistic infections.

Response towards malaria is quite different though. Unlike common cold, malaria is a legitimate health problem to talk about. When I was a young boy, contracting malaria meant extra days off school and off farm work. I never looked forward to having malaria though. Having malaria is a very debilitating experience. Furthermore the drugs for treating it, such as chloroquine, are bitter and they never seemed to be in is short supply at our home. But, as soon as I discovered what to do, 'malaria' and I became the best of friends. I could now feign 'malaria' without having to endure the agony of swallowing bitter tablets. As soon as it was about time to swallow the tablets I retreated to bed. Each time the medicine was brought (usually with water) I asked for milk. If the medicine was brought with milk I asked for water. This gave me extra minutes to tuck away the medicine under my pillow. As soon as the caretaker came back I simply pretended to take the tablets. I made sure to throw away the tablets later on lest they be found under the pillow. I suspect that many boys of my age did this; it was common talk in primary school.

With this new discovery I could stay at home, avoid school, avoid farm work, and avoid the medicine. I could also then ask for my favorites such as Fanta (a soft drink).

These pretenses taught me one lesson. I had to know well the symptoms of malaria at an early age. My father had a salaried job so he was away most of the time. I had to convince my mother that I had malaria. I had to act like one with malaria. I learned malaria symptoms well so I could respond correctly whenever asked "how are you feeling?" Conspicuously absent from the list of symptoms was fever. I never knew quite how to feign fever.

Avoiding school was not the only reason I feigned malaria. Sunday was day for picking pyrethrum–a taxing job. With my father at home, it was the longest day on the farm. We stayed on the farm from early morning through the afternoon. After lunch break we returned when the afternoon sun had cooled to continue with farm work. If it was not pyrethrum we picked tea. It was hard work. This is one other reason why I usually feigned malaria. Because I was a boy, I had breaks to go and water the cattle. (Yes, some work in Gusii is gendered.) That gave me an hour of break from other more demanding farm work.

I spent the first 17 years in Gusii, four of those in secondary boarding school learning to be a good scientist, for my father was deeply entrenched in the sciences. I was taught to think that mathematics, chemistry, physics, and biology were the only subjects that mattered. This, as it turns out, has given me a deep appreciation for science and the scientific approach to the study of social phenomena.

The primary school I went to was three kilometers from our home. I walked to school and back with some of my older sisters. The rest were in boarding school. Walking to school and back is how I spent my first seven years of schooling. After joining

secondary school, I became more independent, and I learnt to handle my own finances.

During first term of my first year in secondary school my father sent me money through

one of the teachers in school. I had malaria (for real) and had used my out-of-pocket

money to buy medicine. The money that I was sent never reached me. From then on I was

given enough money (which included an emergency fund) to last me the term in school.

That meant disciplining myself to spend the money carefully. Usually I returned the

emergency fund at the end of the school term. By the time I went through high school I

had an account at the Post Office Savings Bank.

In 1980 I sat for my ordinary level examinations and joined High school in Nandi

district in 1981. Nandi district is the home of the Nandi, a people who belong to the same

group as the Kipsigis. Since then I have spent, on and off, a total of one and half years

(<10% of the time) in Gusii. Despite the long absence from Gusii I have not severed my

links to Gusii.

All these experiences put me in a good position to study malaria among the

Abagusii. My upbringing and early training makes it possible for me to appreciate better

problems faced by the Abagusii. It also makes it possible for me to interpret the

experiences of people with malaria from an insider's view point. At the same time, as an

insider you are "spared having to worry about and solve the sort of settling-down

problems." You also experience fewer problems in establishing rapport (Altorki 1982).

However, doing fieldwork at home has its own challenges. Insiders often have to

deal with several issues. For example, as I found out, the insider researcher has to divide

time between research work and their family and relatives, especially in communities

where extended family relations are strong. I had to take time off to visit sick relatives, at

home and in hospital, to attend to misfortunes such as deaths of a family member, and to

attend to happy moments such as celebration of a wedding. The researcher is expected by

the community to meet his/her part of social obligations in the community first and then

attend to the research work. The community judges the native researcher against a

different standard of social norms compared to the foreign researcher. Koentjaraningrat

(1982: 177) notes that the people you study put you "a priori … in a definite social

category in which [you remain] trapped, usually throughout the entire research period."

When Altorki (1982) conducted her fieldwork in Saudi Arabia, she had to make

certain adjustments. First, she had to change her research site from Egypt to Jiddah, in her

native country, Saudi Arabia–she had planned to study folk religion in Egypt but political

realities of the day forced her to abandon the site. In Saudi Arabia she had to deal with

problems of another nature. Here is what she writes about her experience:

> My status did not afford me the immunity, usually granted to visiting
> anthropologists, from observing all the taboos and attending to all the obligations
> my culture prescribed for me. I had to accept severe restrictions on my movements
> and on my interaction with other people. For example, I had no freedom to move
> in public on my own, and challenging any norms of conduct would have
> jeopardized my relationships with the families I decided to study. Had I not
> conformed, I would have risked being ostracized and having my research
> terminated (Altorki 1982: 169).

Her being a native did not afford her unlimited access, but constrained the data gathering

exercise. She continues to write that:

> … [her] general familiarity with these people had an irksome drawback: my
> informants presumed that I knew my culture; and for a long time they either
> misinterpreted my questions as implying an unbecoming skepticism or failed to
> appreciate that I truly did not know what I had asked them to explain. My being a
> woman who had been educated abroad, even beyond college, made the women–
> particularly the older generation–cautious in discussions with me about their beliefs
> and practices (Altorki 1982: 169–170).

One has to be constantly on the lookout to seize opportunities that will enhance data collection and on guard against those that might jeopardize the quality of data collected.

When I first thought of studying health care behavior Gusii came to mind. Studying and writing about your own people is by no means an easy task. But, Kenyatta (1953) wrote the famous ethnography of the Kikuyu and Salinas (1978; Bernard and Salinas 1989), a native Indian, wrote about his people–the Otomi. They each provide powerful ethnographic accounts of the Kikuyu (Kenyatta) and the Otomi (Salinas). I was aware of the challenge that studying your own community posed. I had to overcome my own biases and the tendency to be protective of your 'own.' It is difficult to completely rid yourself of your biases whether studying your own culture or another culture. Depending on the role you take, you tend to overlook certain elements, take others for granted, and question some. It happened recurrently to Koentjaraningrat (1982) when studying his own Javanese society and when studying Dutch fishermen. I have tried to follow my scientific roots and to remove myself emotionally from the people while keeping close enough to the data. Whether I have succeeded in doing so I leave to others to judge.

As a native anthropologist I interacted with Gusii people as an insider, interested in getting an account of what the people know and say about malaria. Having grown up in Gusii I knew from reading informant cues just when to stop pushing for more information. Being a Omogusii also provided me with an advantage: it took me less time to be accepted as one of them. I speak Ekegusii well, know the terrain well, understand the customs and did not have to deal with culture shock. This reduced the amount of time I would have normally taken to do the research if I had to learn the language, master the terrain, and

customs of the people, and to overcome culture shock. When I found myself in a tight

situation, as I did some of the days, I could work my way out.

Late one afternoon I was visiting a homestead without prior arrangement. During

an earlier visit my two field assistants had been chased from this particular home because

they were suspected of spying on those who brew an illegal local drink, *chang'aa*. When I

entered the compound, a group of young men and the elder of the homestead were

drinking *chang'aa*. I had met some of them at the local market. As proof that I was not

spying they demanded that I join them in taking *chang'aa*. Now, I do not drink alcohol

but to say so would have raised more suspicions. I politely explained to them that because

of the respect I had for the elderly man I could not sit to drink in his presence, that I

considered him to be like my father and I did not want to be disrespectful by taking

alcohol in his presence. Immediately the elderly man came to my rescue jokingly

reprimanding the young men for having little respect. This changed the course of the

discussion and by the time we left we had secured an appointment for an interview which

we carried out the following day early in the morning.

I would have told them that I am an Adventist, but this might have affected my

relations with the people. Seventh Day Adventists, who constitute about 18% of the

population in the area, are known for their anti-alcohol stance. Could they trust me? It

would have made them uncomfortable associating with me. The other, perhaps more

important point, is that in some areas there is simmering struggles between Seventh Day

Adventists and Catholics over who has an upper hand in the local affairs. Catholics

constitute about 67% of the population in Bomorenda. These struggles sometimes come

to surface during meetings with some groups boycotting or not going along with the

reached consensus if they feel that they are being forced to go along. To avoid creating strained feelings with my informants I kept my religious affiliation out of sight. It is knowledge of the local politics and situations like this that give the native anthropologist an edge over other researchers.

But being an insider is not always a passport to information. People in Gusii learn malaria symptoms from an early age because the disease is endemic so asking them to tell me about malaria seemed odd. They expected me to know malaria symptoms. In that case I told them that I wanted to compare what they know with my knowledge and if the informant was elderly, I told them that I had come to learn more from them. And they were all too happy to be my teachers. It took some time before people fully understood what I was doing. Explaining to people what I was doing never stopped, right to the end of the study.

Can one do native anthropology and still be objective? A caution often given to a participant observer is that they should take care not to become all too attached to the study community and become protective of them. How much more so for a native anthropologist? When you have lived among the people you are studying that task becomes all the more daunting. Furthermore, you have to guard yourself against taking "a lot of things for granted" that a person from the outside would not do (Bernard 1994: 154).

As Sörbö (1982: 154) notes:

Objectivity in the strict sense of the word is a goal that is not fully attainable because our background, biases, likes, and dislikes cannot be entirely suppressed. But the impossibility of attaining it perfectly does not mean that the idea is not worth pursuing. … we have come far in developing a body of research procedures,

techniques, and methodologies that overcome the observer's limitations and biases as they arise ….

Properly applied, science has the tools to minimize our biases and limitations. But whether you are an outsider or insider we are never completely clear of those biases and limitations.

Anthropology by natives, I think, is an eye opener to the way natives view their own society–they provide a view from the inside, of the inside. To study and write about the Gusii, gives me the opportunity to take a position, as a native anthropologist, among the Abagusii. In Figure 5.2 I give my genealogy which goes back several generations to Mogusii, the father of all Abagusii. A few words about Auma Nyamongo II. Any Gusii would note that Auma is a Luo name. My grandfather was the only child in his family. His siblings passed away at birth or at an early age. The Gusii people have a naming system in which children born in such homes are given names other than names of family members and relatives. The purpose is to trick ancestral spirits so that when they 'visit' the home the child will not be identified as part of the family. Thus, one finds names such as Auma and Nyang'au which do not have Gusii origins.
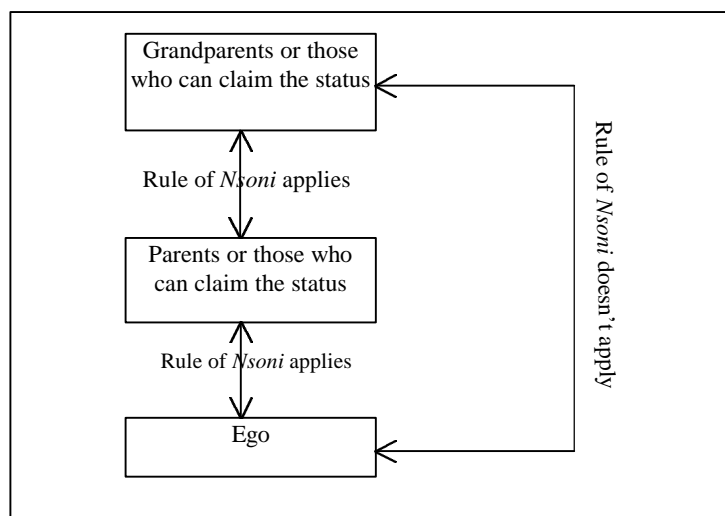
Figure 5.1: An illustration of the rule of *Nsoni*

15	MOGUSII (the father of all Gusii people)
14	MOCHORWA
13	OYOGO
12	KIBASWETI
11	TABICHI
10	Mokiambori – MOGICHORA – Monyaiguba – Mosinange
9	Omorito – Osagara – OMURWA (Manono) – Onyamoro – Kimwei
8	OGETII
7	KEBIRIGO
6	KEIGAMI
5	MANONO
4	NYAMONGO I
3	AUMA NYAMONGO II
2	NYAMONGO III
1	NYAMONGO IV
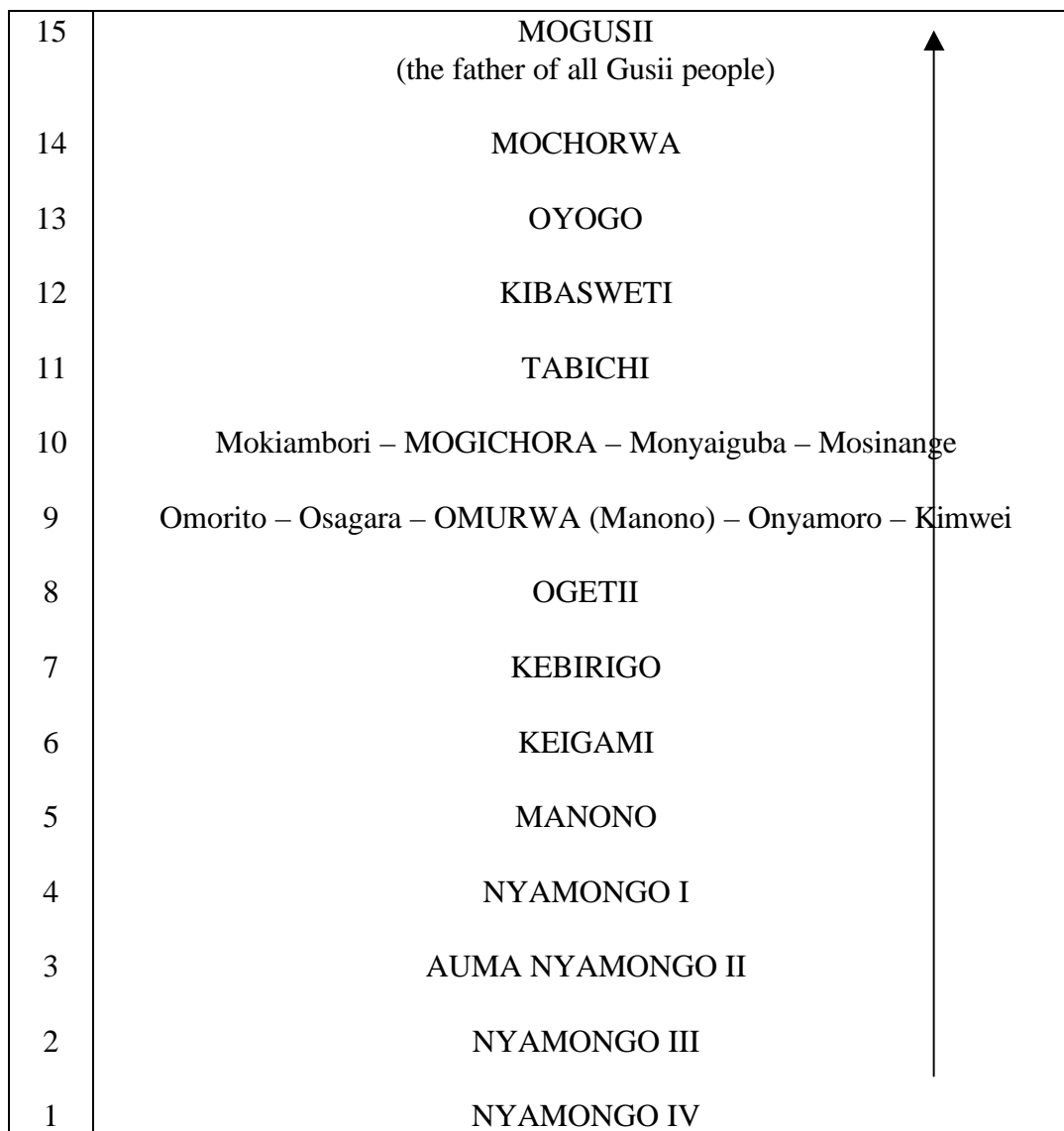
(The names in lower case are brothers to the individual whose name is in upper case)

Figure 5.2: The genealogy of my family going back to Mogusii (the father of all Abagusii)

CHAPTER 6
STUDY SITE CHARACTERISTICS AND DATA COLLECTION

Introduction

The data present here was collected over a 10-month period from February 1997 to November 1997. I had a team of two full time research assistants in the field and two who were on call during the ten months of data collection. (I will discuss this later.) As the research team leader I directed the research activities during the entire research period. In this chapter I lay out information concerning the study site, characteristics of the study population, the methods that were used in data collection and how I managed the field work exercise. In the first section I describe the administrative structure of the research site, its characteristics, and the relation of Suneka division to other administrative units within Kisii district. The characteristics I deal with here include population size and density as well as the distribution of health care facilities within Suneka division.

The distribution of health care facilities in the division as well as distance that users have to travel to these facilities are discussed in section two. In the section on characteristics of the study population, I discuss family size, religious affiliation, and occupation, their sources of income, and education. Education is defined as the total number of years spent schooling. Socio-economic status of the people residing in Bomorenda of Suneka division is also discussed in this section. A combination of methods

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were used to collect data for this field study. These methods, the management of the data

collection exercise in the field, and post-field data processing are discussed in section four.

In some instances preliminary results of the analysis are presented to clarify some issues

that are relevant to this chapter.

In the last section I discuss the selection, training and management of field research

assistants and my role at the University of Nairobi. I also discuss the characteristics of the

research assistants in this section.

Study Site

Administrative Characteristics of the Suneka Division

Suneka division, the site of the study, is located 15 km. to the west of Kisii

Municipality–the headquarters of Kisii district. Along with Keumbu, Masaba, Mosocho

and Marani Divisions they together constitute Kisii district. The headquarters of Suneka

division are at Suneka township–which had a population of 3,802 people in 1997.

Covering an area of 126.1 sq. km., the population density of Suneka division at present is

estimated to be 660 persons per sq. km. (Kenya, Rep. of, n.d.).

The division has smaller administrative units known as locations which are

themselves further divided into sub-locations. The five locations that make up Suneka

division are Bomorenda, Bogiakumu, Iyabe, Riana, and Bomariba. The study was carried

out in Bomorenda. Bomorenda covers an area of 18 sq. km. (about 15% of the Division).

Population. In 1989 Bomorenda had a population of 14,000 people (48% of them male) living in 2,646 homesteads (CBS 1994). Here in 1989 the population density was 778 persons per sq. km. If the population of Kisii Municipality is excluded, Bomorenda is one of the most densely populated areas in the district surpassed only by Bogiakumu (1068 persons per sq. km.) in Suneka Division and Mwamosioma (886 persons per sq. km.) in Marani Division (CBS 1994).

The census reports from 1989 do not give a breakdown of distribution of population by age and sex for administrative units smaller than the district. There are only summary statistics for the whole district and these data indicate that about 48% of the 1.14 million people residing in the district were male (the same proportion as for Bomorenda). Over one half (53%) of the people living in Kisii district in 1989 were less than 15 years old (CBS 1994) indicating a high dependency ratio reflecting similar trends as data from national statistics. I suspect that the same trends hold true in Bomorenda. Since 1989, the larger Kisii district has been split into three districts: Nyamira, Kisii and, most recently, Gucha.

Altitude. Altitude in Suneka Division ranges from 1,420 meters to 1,755 meters above sea level. This altitude is generally on the lower end of the general altitude range for Kisii district. The predominant food crops grown by the people in the area include bananas and maize. These crops provide windshield and shade for mosquitoes. Together with a warm climate these crops provide an environment that favors the breeding and survival of the malaria vector, the mosquitoes. In addition, people also grow: tea, sugarcane, and some coffee and groundnuts.

<u>Health Care Facilities in Suneka Division</u>

The division is characterized by general lack of government health care facilities. Most of the health care facilities are concentrated within Kisii Municipality which has four hospitals (1 government–the Kisii District Hospital, and 3 private hospitals–Christa Mariane, Hema, and Getembe).

Within the division there are four government dispensaries–Riotanchi, Iyabe, Nyamagundo, and Riana–one private health center (Itierio Health Center) managed by a Christian organization–the Evangelical Lutheran Church–and eight private clinics. Four of the private clinics–Amani, Royal, Nyambunwa, and Makori's clinic–are in Suneka township.

A questionnaire survey (N=55) revealed that these facilities on average are located about 2.6 km (sd = 2.3 km) from the homes of potential users. However, respondents stated that they traveled on average 3.2 km (sd = 3.9 km) indicating that patients do not necessarily go to the nearest health care facility. The reasons why this is the case will become clear in Chapter seven. The larger hospitals such as the Kisii District Hospital (15 km away) and Tabaka Mission Hospital (10 km away) are located further off from the study site. Although Tabaka Mission Hospital is outside Kisii district (it is in South Mugirango, Gucha district), patients routinely go there for treatment but only for serious malaria episodes or major ailments. The hospital is run by the Evangelical Lutheran Church.

The health care facilities are connected by a poor communication network, which makes it difficult for seriously ill patients to access the government facilities located ostensibly closer to the people. There are no telephone services to any of the government maintained health centers and dispensaries nor are there ambulances that could take patients to the hospital in an emergency situation. The roads are never maintained which puts an extra burden on patients during the rainy season because they become impassable. The result is that many would-be users would rather go to Suneka township, where the private health care clinics and Itierio Health Center are located. From there they can access Kisii District hospital without difficulty should the need arise. The road between Kisii Town and Suneka is paved; it takes about 15 minutes to travel on public transport.

Characteristics of the Study Population

During the fieldwork I worked with a team of research assistants who helped me to administer a survey to determine the general characteristics of the population residing in Bomorenda. To obtain the sample interviewed, I divided the study site into roughly ten equal blocks going by the landscape and the roads running through the area. From each block five homesteads were selected for the interview. We defined a homestead as an economically autonomous home with its own agricultural land and at least one parent. We made sure to skip several homesteads to minimize chances of interviewing people who might otherwise be closely related. (In Gusii, it is typical to have brothers living in contiguous homesteads.) This was to ensure inclusion in the sample of as much variation

as possible. One adult was interviewed from each homestead. The eleventh block consists of the area around and including Suneka Township. Five people were interviewed from each block for a total of 55 respondents.

Respondents (N=55, 49% or 27 were female) were asked to respond to a questionnaire which sought information on: (i) demographic and socio-economic characteristics, (ii) number of children, (iii) religious affiliation, (iv) land size, (v) educational status, (vi) cost of health care, and (vii) distance from home to the nearest health care facility.

The inhabitants of Bomorenda reside in a rural area with the majority of them relying on farming. About 85% of those surveyed reported farming as their main occupation. Other occupations reported by respondents were business (5%), and clerk, forester, teacher, veterinarian, and student (2% or 1 person for each category). Thus farming is the main source of income for people living here. It accounts for 78% of reported sources of income. The other sources of income are business (9.3%), regular wage employment (7.4%), and performing paid contract work (3.7%). The student (1.8%) in the sample did not report any source of income.

Eighty-nine percent (or 49 people) reported that they were married, one was widowed and the rest were single. I asked those who were married to tell me how many children they had. The average family size in the sample is 4.4 (sd = 2.8) children. There are more girls per family (mean = 2.24, sd = 2) than boys (mean = 2.13, sd = 1.76) (i.e. 48.7% are boys, cf. data for the whole district). However, given that 50% of the respondents were aged 35 years or lower, it is possible that these figures do not reflect the

actual family size, which is higher than five children, in Bomorenda at the end of a married

woman's reproductive period. In fact, the average family size for those aged over 35 years

is 6.09 children (sd = 2.25). The number of children per family ranges from zero (for those

recently married) to ten.

The age of the respondents varies from 20 years to 63 years (mean age = 35.76

years, sd = 10.02) with education varying from zero years of schooling to 12 years of

schooling (mean is about 6.4 years of schooling, sd = 3.7 years). The majority of those

who have 12 years of schooling are younger in age. The correlation (r) for age in years

(AGE) and years of schooling (EDUC) is -0.57 (Figure 6.1). This reflects that there is a

gradual shift into investment in formal education by the older people on the young. Out of

the 55 respondents three did not provide their years of schooling. These three have been

excluded in the computation to determine the correlation of age and years of schooling.

Over the years the size of the landholdings that one can own has reduced

considerably due to land subdivision. In the early 1980s, farms owned by young families

comprised of two to four acres (Hakansson and LeVine 1997: 255, Kenya uses the metric

system but land size is usually reported in acres). Today the average landholding in

Bomorenda is 1.6 acres (sd = 1.52), but 50% of the people own one acre or less. The main

cause of higher educational status among the younger generation is the reduction in size of

landholdings. With reduced landholdings people have to get off-farm wage employment to

supplement income from farm work. The type of job one gets, and the amount you earn,

depends on the level of education of the person. Thus as the land becomes scarce a great

number of young people are spending more years in school to ensure that they get better as well as better-paying jobs.

Sixty-seven percent of the respondents identify themselves as Catholic, 18% as Seventh Day Adventist, 12% identified themselves as belonging to Pentecostal Assemblies of God, and one person reported belonging to the Living Water church. The Living Water Church is a fairly recent entrant into Gusii. Catholic and Seventh Day Adventist missionaries came to Gusii between 1911 and 1913 but did not gain their first converts until around the end of World War I, in 1918 (Orvis 1997). Despite this early entry of missionaries into Gusii, missionary work did not get into Bonchari (Suneka) until 1948 when the Evangelical Lutheran Church set camp in Suneka. They chose to settle in Bonchari because this area did not have missionaries working there (ELCK 1988). The first clinic by the missionaries was build in 1950, two years after gaining initial permission from the local people to start missionary work, and in 1951 the missionaries opened a secondary school block (ELCK 1988). Despite the entry of other denominations into Gusii the Catholic and the Seventh Day Adventist churches have continued to maintain a strong presence.

I used a 5-point scale to assess the socio-economic status (SES) of the respondents. According to this scale a score of 1 is given to a person who lives in a grass-thatched house while 5 is for a person who lives in a permanent (stone) house. If a person lives in an iron-sheet roofed house with mud walls they were given a score of 2, 3 if they had an iron-sheet roofed house with mud walls and cemented floor, and 4 if they were living in a semi-permanent house. A semi-permanent house has a floor cement and cement

plastered mud walls. These categories were modified from those developed by Hakansson

(1990). These modifications are based on my experience growing up in Gusii and from

watching people advance from one SES level to the next. According to this 5-point scale

the majority of the people (N=32 or 59%) are classified as having iron-sheet roofed house

with mud walls while a sizable (22%) are classified as being of level one SES. Eleven

percent have a score of four on the SES 5-point scale, and the remaining 8% had a score

of five.

<div align="center">Data Collection</div>

Data focusing on lay people's knowledge regarding malaria and its management

was collected over a period of ten months, from February to November 1997. Between

June 1996 and February 1997 I spent time renewing my research permit at the Office of

the President in Nairobi, re-establishing my contacts in the field, and reviewing any

additional information available in Nairobi.

We administered a general survey questionnaire to 55 respondents. This

questionnaire enabled us to determine the general characteristics of the study population.

The findings from this survey are presented above in section three of this Chapter.

In order to understand lay people's knowledge of malaria and its management, we

used a combination of systematic data collection techniques including freelists, pilesorts,

and triad tests and ethnographic interviews with informants. A detailed discussion of these

techniques is provided in Weller and Romney (1988) and Bernard (1994: 239–252).

A 'systematic' approach is said to be systematic because data gathering follows well-defined procedures. For example, to investigate how informants judge similarity among a list of items, one relies on prior information collected from informants or people with whom they share a similar cultural background. I use the term "similar cultural background" to imply people who have some common characteristics that may be defined in terms of socio-economic background, ethnic affiliation or common local residence.

The boundary of the 'cultural' group investigated is determined precisely by the study domain. The study domain in turn determines the kind of freelists the researcher gets from informants. Thus an investigation of the domain of illnesses of the upper respiratory tract infections will produce a list markedly different from one focusing on diseases of the reproductive system. Similarly we expect a freelist of illnesses in rural Kenya to be different from one obtained from rural Florida. Suffice to say that a vast difference exists in environmental and socio-economic conditions between these two regions. These differences would influence the type of illnesses and length of the freelists obtained for each region.

Freelist of Illnesses in Bomorenda

We asked 21 informants resident in Bomorenda to provide a freelist of all illnesses that they know which are common in the area. These data were analyzed using the ANTHROPAC program (Borgatti 1993). For each informant the free list was typed in the ANTHROPAC data entry module. The data were then cleaned to make sure an illness was not spelled in two or more different ways and that an illness with two or more different

names was appropriately edited. For example, *esosera* and *omokunguru* both imply vomiting. Any informant's list which indicated the name *omokunguru* was changed to *esosera*. After this cleaning was done ANTHROPAC generated a frequency and salience output for each of the unique illness on the list.

The 21 informants produced a list of 33 unique illnesses (Table 6.1). The number of illnesses mentioned by informants ranged from one to as many as ten. Later I translated these illnesses into English. I asked a Clinical Officer, a native speaker of Gusii language, who has 45 years of experience treating people in Gusii to translate the terminologies for me. Since I am also a native speaker of Gusii language we discussed the translation of the terminologies elicited from the informants to come up with what we considered to be the correct English translation of the illnesses. Later, I would use the illness list to select items for triad tests.

Freelist of Malaria Symptoms

I generated a second list of malaria symptoms by extracting terms from ethnographic interviews on malaria symptoms and its treatment (Table 6.2). This was done prior to starting the malaria focused narratives interviews. I wanted to understand the range of symptoms that lay people associate with malaria before embarking on the extended malaria interviews. The malaria symptoms lists were cleaned following the same procedure as for the freelist of illnesses. The ethnography-derived list gave me a total of 27 different symptoms from 53 informants. Looking at both the frequency and salience[1]

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[1] Salience is a measure of how prominent a particular item in a cultural domain is to a group of informants (cultural group). In a free list, informants will tend to mention those

scores enabled me to pick out symptoms which were mentioned by most people and which

had the highest salience. I used the selected list to determine symptoms to which I had to

pay particular attention during the extended malaria-focused narratives.

Triad Tests for 16 Illnesses[2]

The triad test is a convenient way to collect similarity data when the cultural

domain you are studying is small, but they are difficult to administer if respondents are not

literate. In that case, it is necessary to use actual items or photographs of the items in the

cultural domain. However, with a list of concepts one cannot have photographs or the

actual items. Under such conditions the researcher has few alternatives. One is to read out

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items of greatest significance (concern) in their lives first and then, those that are of less
significance (concern) later. Typically each informant gives a variable list–some will give a
short one while others tend to mention long idiosyncratic lists. Of course, some informants
will give names of items that they can not recognize (identify) but the items are likely to
come later in their lists, unless the informants try to consciously alter the spontaneous
order of the list. The salience of an item is determined by taking into account the relative
position of the item and the length of the free list given by each informant and then
averaging it out to obtain a rank order list.

[2] Initially I selected 25 illnesses mentioned by informants for the triads test. Twenty-five
illnesses taken three at a time produce 2300 different triadic comparisons. For a triads test,
a triadic combination of four illnesses: malaria, stomachache, backache, and diarrhea
produces six pairs with each pair of items appearing twice in four triads. With 25 items the
pair of items appear 23 times (or N-2, where N is the number of items in a domain). This
gives rise to a number of redundant triadic combinations. I used a Balanced Incomplete
Block (BIB, Burton and Nerlove 1976) design to reduce the number of triadic
comparisons removing in the process those combinations that are redundant. A lambda 1
BIB design produces just 100 triadic combinations. Seventy people responded to this
questionnaire. Now, a lambda 1 design allows the respondent only one opportunity to
compare any two items. This is because it would not have been possible to economically
administer the longer questionnaire. This design, therefore, is less reliable than either
lambda two or lambda three designs (Borgatti 1994). Thus, it was not possible for me to
carry out an informant agreement test with the 25 illnesses. Therefore, I have excluded the
data for the 25 illnesses from the analysis.

all the questions on the questionnaire to the respondents. After each triadic combination

the respondent is given a chance to select the item that does not fit. This exercise is

continued until all the questions on the questionnaire are completed.

From Table 6.1, I selected 16 illnesses mentioned by informants for the triads test.

I selected these illnesses taking into account the frequency of their mention, their salience

and based on my knowledge of Gusii illnesses. The overriding factor was the relation of

the illnesses to malaria. With 16 illnesses, I generated a lambda 2 design questionnaire

with 80 triadic comparisons which was then administered to 50 respondents (Appendix

A).

Since a number of my respondents were not literate, I elected to have my research

assistants read to the respondents the triads questionnaire. From the triads test

questionnaire, my research assistants read out for each respondent the list of illnesses in a

triad and then asked them to select the illness that did not fit in the triad. We instructed

respondents that they were free to decide their own criteria to use. Each questionnaire was

randomized using ANTHROPAC to eliminate order effects. Order effects can affect the

outcome of choices that informants make by biasing the choice in a particular direction

because all the questions appear in exactly the same order. By randomizing we ensured

that no two questionnaires had questions appearing in the same order.

Before starting to respond to the questionnaire we gave respondents examples of

triadic combinations, asking them to identify the odd items. As soon as they appeared

comfortable we made the transition into the questionnaire. Although the majority of the

respondents liked the exercise, a few, particularly the elderly complained that the

questionnaire was confusing. Often they accused us of asking repeated questions but after

explaining that each of the questions was different they continued to respond to the

questionnaire.

I entered the data into the computer and cleaned it using ANTHROPAC. We had

the opportunity to return to the respondents if any one of the triads was left unmarked.

The data from this exercise yielded diseases similarity measures which I used for

multidimensional scaling and cluster analysis. The results are presented in Chapter seven.

To test for differences between women and men, I performed a quadratic

assignment procedure (QAP, Hubert and Schultz 1976) on the proximity matrices

obtained from the informants' judgment of similarity among illnesses. I separated the

triads data for male and female informants' judged similarity of the 16 illnesses. I

converted their triads data into two aggregate proximity matrices (one for males, the other

females) and then determined the Pearson's correlation coefficient between the

corresponding cells of the two matrices. The correlation, using a permutation test, is 0.94,

$p < .0001$, and r-square is 0.88. This result is not unexpected because the respondents

come from the same area and views about common diseases are not greatly influenced by

one's gender.

Pile Sorts Using Drugs for Malaria Management

Pilesorts are handy when you have a large cultural domain. After the initial

interviews with informants we were able to generate a list of drugs that are used for the

management of the 'malaria cognate' illnesses and which are available in the local shops

and the two pharmacy stores. In this category of drugs, therefore, we included those that

are used for the treatment of fever and body pains and aches. Fever and aches (head and

joint) are an integral part of malaria and people quite often take analgesics to control the

effects of malaria.

We bought from the local shops and pharmacy stores drugs that were mentioned

by respondents. Each of the drugs was carefully labeled with an identifying number. There

were a total of 29 different drugs used for the management of malaria. The list of the

drugs and their codes is given in Table 6.3. All the drugs are easily available over the

counter.

Fifty-two informants were asked to pile sort the actual drugs into groups

according to how they think the drugs go together. The informants were selected

following the same procedure used in the survey questionnaire. The free pile sorting

technique is prone to the lumper/splitter problem. Lumpers tend to put lots of items

together, forming in the process fewer categories. Splitters see finer details in the items

and end up having more categories (Bernard 1994: 250; Weller and Romney 1988). This

can be a source of great variation on the number of piles created by informants.

In an attempt to tackle this problem, we instructed informants that they could

create from two to eight piles (constrained pile sorting) and that they were to determine

their own criteria for the pile sorting exercise. After the pile sorting exercise was

completed informants were asked to explain what the drugs in each group represented. On

average informants created 5.2 piles (s.d. = 1.4 piles). The pile sorting data information

yielded proximity matrices that were analyzed by multidimensional scaling and clustering

(Figure 7.8 and Figure 7.9). A QAP analysis (Hubert and Schultz 1976) reveals no significant differences in how men and women view the drugs. The correlation is 0.878, p < .0001 and r-square is 0.772.

In order to determine the frequency of the various reasons given by informants I treated the reasons as another list. I did not take into account the salience output results because this is not a true free list in the sense that the free list technique is used in systematic data collection. In order for the salience to be taken into account the ordering of the freelist must come from the informants. In this case ordering simply followed the groupings (the piles created by respondents), starting from group one for each respondent. I have created a measure to rank order the reasons by group. To get the group rank I derived a ratio of the total frequency in the group with the aggregate frequency for the entire list. The frequency of the reasons and group rankings are presented in Table 6.4. Reasons that have an average rank of at least 0.10% are grouped into four categories. These categories are drugs used for the treatment of malaria (0.276), drugs used for the management of aches (e.g. headaches) (0.215), drugs used for the management of fever (0.175), and drugs used for pains (0.110). Over 60% (group rank = 0.126) of the respondents reported that they did not know what some of the drugs are used for.

Malaria Focused Narratives

Next I embarked on a grand tour survey of what lay people know about malaria. Here I was interested in knowing lay people's own lived experience with malaria or with that of those they know. The information used for analysis is from interviews with 35

informants resident in Bomorenda. I personally conducted all the 35 interviews. In each

case, permission to tape record the interviews was sought and granted by the informants.

The interviews were tape recorded, transcribed and coded for analysis. The exercise

yielded 511 pages of single spaced typed text.

Prior to the interview I prepared an interview schedule (see Appendix B) with

talking points which I would cover in each case. I also prepared a form on which I wrote

handwritten notes as the interview progressed (see Appendix C). The handwritten

information was as a safe-guard against loss of the tapes or in the event that a tape was

defective or the recorder failed. Later these handwritten notes became invaluable during

the coding text process. Most of the information for which I had defined the codes was

also in my notes–only in short form. Immediately after the interview, and then later in the

evening for an extended period, I played back the tapes just to make sure that the day's

taping went well.

Twenty-seven of the taped interviews were transcribed by two native speakers of

Gusii language whom I paid to do the work. The transcribers were students of

anthropology studying for an undergraduate degree at the University of Nairobi's Institute

of African Studies. I personally transcribed the first eight interviews to get a feel for what

the information looked liked and what was involved in the transcription process. I

carefully recorded each time I started and stopped to transcribe each of the C90 cassettes

that I transcribed. I needed this information to be able to determine how much time to give

the transcribers to do the job. Even with my excellent skills of Ekegusii, on average it took

me 7 hours and 15 minutes to transcribe one C90 cassette. I then typed in all the

transcribed interviews into a word processor. This text forms the core of my data which I have used for coding, searching, and retrieval.

Before starting to code the narratives data, I created a preliminary code-book with 49 different codes. There were three types of variables: interval (e.g. age and amount of money spent for treatment), ordinal (e.g. socio-economic status), and nominal (e.g. gender, and other yes/no variables). New variables were then added during the actual coding process if the need arose. Each time I created a new code I went back to check the transcribed interviews already coded to see whether the new variable applied to those interviews. The final code-book had 94 different variables. The definition for each is given in Appendix D.

For coding I used a computer package known as EZ-Text produced by Carey and his colleagues at the Centers for Disease Control and Prevention (CDC), Atlanta (Carey et al. 1997). Although the program is geared towards collection and analysis of semi-structured data, I easily adopted it for the narratives I had. I simply imported the entire corpus of text into the program to create a database. This program enabled me to generate and export data to a statistical package for quantitative analysis. The data generated for statistical analysis are dummy scores in form of 1s and 0s. Table 6.5 presents part of the comma-delimited output generated by EZ-Text for the first nine informants and 18 variables. I performed logistic regression, chi-square and other analyses on the data to test various issues in the variables of interest.

Field Work Dynamics

Before the start of field work I trained two research assistants, Ms. Judith Moraa Onsomu, who acted as the in-charge whenever I was away from the field site, and Mr. Vincent Onditi Ombasa. Both are native speakers of Ekegusii and Moraa has a Bachelor of Arts degree in Anthropology from the University of Nairobi. I employed these two research assistants for the 10-month period when data collection took place. In addition, I also trained two other research assistants who were always available for short surveys I needed to carry out or for administering questionnaires.

During the fieldwork period I had my field assistants staying on site. I commuted from Kisii town each morning while I was in the field. This provided me with access to telephone, power to operate my Laptop computer and printer, and secure office space. The rest of the time when I was away from the field I was in Nairobi carrying out library reviews.

During my stay in Kenya I was asked to teach a Medical Anthropology course to Master of Arts students at the Institute of African Studies, University of Nairobi where I am employed. This proved problematic for me as I had to travel to Kisii every week to keep track of what was taking place in the field. When I was away from the field I kept in touch with the in-charge field assistant via telephone. I also gave her my telephone number in Nairobi where she could reach me if there was need to do so. In Nairobi, I had my classes scheduled for Mondays and Tuesdays to give me the rest of the week to spend in the field. This lasted through the first half of fieldwork. During the second half of the

research period, after finishing my teaching responsibilities, I was able to spend more time in the field.

Towards the end of the fieldwork I changed one of the field assistants Ms. Onsomu (the anthropologist) because she had to go to college for a post-graduate diploma at the Kisii campus of Egerton University. In her place I hired another female assistant, Ms. Risper Abuya, for the remaining period. Since the college was in Kisii town Ms. Onsomu agreed to visit the remaining research team in the field on Thursdays and Fridays and also to monitor Ms. Abuya, the latest addition to the research team. Ms. Onsomu accompanied them to the field during these visits. It was necessary to have her continue on the team since she was the leader of the team of research assistants. She assisted with the data collection while I carried out the malaria-focused interviews. Her presence also ensured continuity in data collection.

Kenya holds general elections every five years. December 1997 was an election year in Kenya. Carrying out fieldwork during the electioneering period would have jeopardized data collection. The study was timed to end just before election campaigns for presidential, parliamentary and civic elections started in order to avoid disturbances due to political factors–such as informants asking for money in exchange for information. During the campaigning period politicians are known to give potential voters money to induce them into voting in their favor. People use this money to purchase beer and other alcoholic beverages. Drunkenness is often likely to lead to violence, which is rampant during the electioneering period.
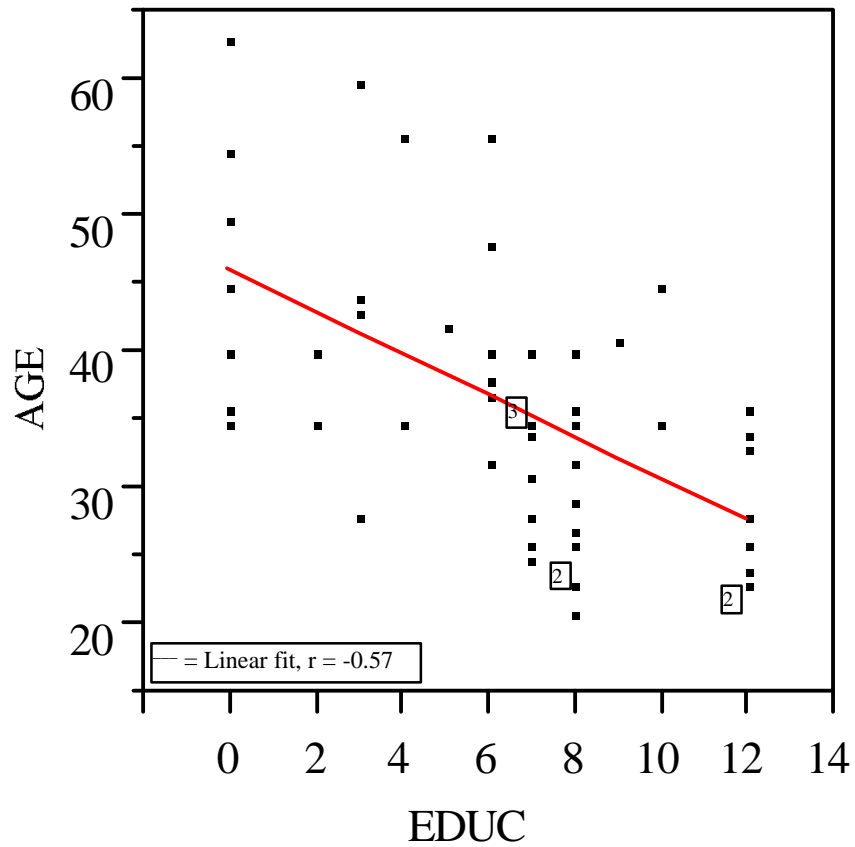
Figure 6.1: Scatter plot and regression analysis of age and education[*]

[*] Three cases not included due to missing data; the boxed figures indicate the number of people represented by the dot.

Table 6.1: Freelist of 'illnesses' that affect people in Gusii (N=21)

	Item	Freq.	Resp%	Salience
1	Malaria	21	100	0.816
2	Stomachache	11	52	0.271
3	Fever	10	48	0.273
4	Flu	9	43	0.305
5	Scabies	6	29	0.120
6	Measles	5	24	0.129
7	Paining eyes	4	19	0.131
8	Diarrhea	4	19	0.086
9	Pneumonia	4	19	0.129
10	Headache	4	19	0.103
11	Toothache	3	14	0.041
12	Endwari ya inda (enlarged spleen)	3	14	0.073
13	Body pains	3	14	0.028
14	Tuberculosis	3	14	0.058
15	Chest pains	3	14	0.076
16	Joint pains	3	14	0.081
17	Coughing	3	14	0.122
18	Backache	2	10	0.090
19	Trash	2	10	0.068
20	Typhoid	2	10	0.034
21	HIV/AIDS	2	10	0.016
22	Vomiting	2	10	0.058
23	Severe malnutrition	1	5	0.044
24	Gonorrhea	1	5	0.003
25	Whooping cough	1	5	0.014
26	Inflammation of the eye	1	5	0.024
27	Kwashiorkor	1	5	0.024
28	Menengitis	1	5	0.043
29	Feeling cold	1	5	0.004
30	Allergy	1	5	0.012
31	Asthma	1	5	0.036
32	Dizziness	1	5	0.038
33	Cirrhosis	1	5	0.005

Table 6.2: Freelist of Malaria symptoms (N=53)

	Item	Freq.	Resp%	Salience
1	Headache	34	64	0.447
2	Shivering	29	55	0.393
3	Vomiting	18	34	0.188
4	Joint pains	17	32	0.158
5	Fever	16	30	0.226
6	Diarrhea	14	26	0.137
7	Feeling weak	10	19	0.110
8	Stomach pain	9	17	0.102
9	Dizziness	7	13	0.094
10	Loss of appetite	6	11	0.070
11	Feeling cold	6	11	0.077
12	Aching body	4	8	0.052
13	Being dull	3	6	0.022
14	Backache	3	6	0.025
15	Chest pains	3	6	0.027
16	Itching	2	4	0.026
17	Stiff neck	2	4	0.033
18	Coughing	2	4	0.038
19	Being withdrawn	1	2	0.019
20	Feeling tired	1	2	0.019
21	Bad chest	1	2	0.015
22	Being restless	1	2	0.013
23	Unusual cries	1	2	0.011
24	Nausea	1	2	0.015
25	Blisters in the mouth	1	2	0.003
26	High Blood Pressure	1	2	0.016
27	Mouth has a bitter taste	1	2	0.005

Table 6.3: List of 29 drugs and thecodes used for the Pilesorts

Drug	CODE	Drug	CODE
1. Dawanol	DWOL	16. Cafenol Extra	CAFX
2. Panadol Extra	PANX	17. Hedapan	HEDAP
3. Junior Aspirin	JASP	18. Suprin	SUPR
4. Meriquin	MERQN	19. Cafenol	CAF
5. Dawaquin	DWQN	20. Panadol	PAN
6. Dawaquin Junior	DWQNJ	21. Malaratab	MLTAB
7. Benaquin	BENA	22. Maladrin	MLDRN
8. Panadol Junior	PANJ	23. Nopen	NOPEN
9. Aspirin	ASPI	24. Aspro	ASPRO
10. Viprin	VIPR	25. Homaquin	HOMQN
11. Algon	ALGN	26. Chloroquin	CHLQN
12. Splentir	SPLT	27. Mepacrine Hcl.	MEPA
13. Hedex	HEDEX	28. Malakelfin	MLKFN
14. Action	ACT	29. Fansidar	FANSD
15. Malaraquin	MLQN		

Table 6.4: Frequency of reasons (by group) for drug pile sort (N=49)

Item	Group Frequency (f)	Group Rank[*]
Malaria Malaria and Cold Malaria and Fever in Children Malaria and Pains Malaria and Pains in Adults Malaria and Stomachache Malaria and Whooping Cough Malaria in Adults Malaria in Children	68	0.276
Headache Headache and Backache Headache and Pains Headache Cold and Fever in Adults Headache in Adults	53	0.215
Fever Fever and Headache Fever and Malaria Fever and Pains in Adults Fever and Pains in Children Fever in Adults Fever in Adults and Children Fever in Children	43	0.175
Pains Pains and Fever Pains and Whooping Cough Pains in Adults Pains in Children Pains in Children and Adults	27	0.110
Joints and Body Pain Joints and Headache	10	0.041
Stomach Malaria	4	0.016
Whooping Cough Whooping Cough and Fever	3	0.012
Diarrhea	2	0.008
Cold Colds and Fever in Children	2	0.008
Chest Pains	1	0.004
Family Planning	1	0.004
Nose and Joints	1	0.004
Don't Know	31	0.126
Total Frequency (F)	246	1.00

[*]Group Rank = Group Frequency (f)/Total Frequency (F)

Table 6.5: A comma-delimited output from the coding for the first 9 informants

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
"1",	"48",	"male",	"retired worker",	"0",	"0",	"1",	"1",	"0",	"0",	"0",	"0",	"0",	"0",	"0",	"0",	"1",	"0",	"0"
"2",	"58",	"male",	"farmer",	"1",	"0",	"1",	"1",	"0",	"0",	"1",	"1",	"1",	"0",	"0",	"0",	"0",	"0",	"1"
"3",	"68",	"male",	"clan elder",	"0",	"0",	"1",	"1",	"0",	"1",	"0",	"0",	"0",	"0",	"0",	"0",	"1",	"1",	"1"
"4",	"80",	"female",	"n.a",	"0",	"0",	"1",	"0",	"0",	"1",	"0",	"0",	"0",	"0",	"0",	"0",	"0",	"0",	"0"
"5",	"45",	"male",	"security guard",	"0",	"0",	"0",	"1",	"0",	"1",	"0",	"1",	"1",	"0",	"0",	"1",	"1",	"0",	"0"
"6",	"39",	"male",	"security guard",	"0",	"1",	"1",	"1",	"0",	"0",	"1",	"0",	"0",	"1",	"0",	"0",	"1",	"1",	"0"
"7",	"49",	"male",	"farmer",	"0",	"0",	"1",	"1",	"0",	"1",	"1",	"1",	"1",	"1",	"0",	"0",	"1",	"1",	"1"
"8",	"59",	"male",	"farmer",	"0",	"1",	"1",	"1",	"1",	"1",	"0",	"1",	"1",	"1",	"1",	"1",	"1",	"1",	"1"
"9",	"60",	"female",	"housewife",	"0",	"0",	"0",	"1",	"0",	"1",	"1",	"0",	"1",	"0",	"0",	"0",	"1",	"0",	"0"

Key:
1="RESP_ID",2="AGE",3="GENDER",4="OCC",5="AAITCH1",6="ABELIEF1",7="ACAUSE1",8="AHELP1",9="AINDASL",10="AINDASR",11="AITCH",
12="ASYM1",13="ASYM5",14="ASYM6",15="ASYM7",16="ATIME2",17="ATREAT11",18="ATREAT22",19="AWITCH"

CHAPTER 7
FINDINGS AND DISCUSSION

Introduction

This Chapter presents findings on lay people's recognition of malaria and their actions to manage it. The bulk of the data comes from malaria-focused narratives collected from informants in Bomorenda, Kisii district. Each informant was asked to "tell all you know about malaria." Specifically the study focused on how malaria is recognized, beliefs about malaria, actions the lay people adopt to counter it, and its effect on them. Informants provided explanations regarding their experience with malaria and their interpretations. These emic explanations are illustrated by quotations from actual interviews. Determinants of health behavior such as distance to health care facilities, cost, and availability of drugs are also considered. I use the biocultural model to present and discuss my findings.

In the next section I deal with lay people's knowledge regarding disease in Bomorenda. The data, obtained through freelisting procedures and triad tests, provide information on lay people's judgement of similarity among illnesses. I have used this information to situate malaria among illnesses in general. The third section focuses on lay people's knowledge of malaria. This section deals with recognition and causes of malaria. I also present and discuss data on the management (treatment) of malaria in Bomorenda in

this section. In section four I discuss factors that affect health care behavior of patients

who have malaria. Specific factors that affect utilization of health care facilities, decisions

that patients and their caretakers make, and information exchange/flow are considered.

Section five focuses on how information exchange influences lay people's treatment-

seeking behavior. In section six I deal with factors that help explain the increase of malaria

in Bomorenda. These findings along with the quantitative results presented in the next

Chapter are placed in a biocultural context in the conclusion in Chapter eight.

Knowledge of Illnesses Common in Bomorenda

I asked respondents to tell me illnesses that are common in Bomorenda. I wanted

to discover how people relate these illnesses to malaria. The freelist of illnesses was

processed using ANTHROPAC. The resulting frequency and salience output is in Figure

7.1 (and in Table 6.1). To obtain Figure 7.1 I converted the percentage frequency to a

ratio, thus stomachache (52%) is 0.52, and fever (48%) is 0.48 on a 0 to 1.0 scale. This

standardized the scale so that I could plot frequency and salience outputs on the same

scale.

Malaria, the most common illness in Bomorenda, was mentioned by all of those

interviewed. It also has the highest salience (salience = 0.816). It is followed by

stomachache (52% or 0.52 on a scale of 0 to 1, salience = 0.271), fever (48% or 0.48,

salience = 0.273), and flu (43% or 0.43, salience = 0.305). Although the informants' list of

illnesses does not tell us how severe or incurable a disease can be, it, nevertheless, reflects

the significance of malaria in Bomorenda (and the rest of Gusii). It is the single largest

killer in Gusii accounting for the most reported deaths. Of the top five killers in Kisii

district, malaria accounted for 54% of the deaths between 1991 and 1995 (Kenya, Rep. of

n.d.: 54). Along with malaria are other illnesses mentioned by informants but which may

be as a result of malaria. For example fever, stomachache, vomiting, enlarged spleen

(*endwari ya inda*), and dizziness which were identified as illnesses are often indicators of

malaria.

These illnesses were analyzed further to determine the extent of their similarity

based on lay people's judgment. We administered a lambda two design triad test for the 16

illnesses selected from the original list of 33 illnesses. The illnesses were selected on the

basis of a combination of three factors: their frequency of mention, their salience and my

knowledge of illnesses in Gusii. The resulting aggregate similarity data were then used to

generate a non-metric multi-dimensional scale (MDS) (Figure 7.2) and cluster analysis

diagrams (Figure 7.3). The MDS shows the cognitive map of lay people's judgment of

malaria together with 15 other illnesses that are most common in the area while the cluster

diagram shows the clustering of the illnesses.

When asked to name illnesses, informants often included symptoms in their lists,

thus the list of "illnesses" is a mixture of both illnesses and symptoms. The distinction

between illnesses/disease and symptoms is sometimes fuzzy because a symptom can also

take the form of an illness/disease. In fact, a single symptom can represent different

illnesses altogether. For example, fever and headache are often used as symptoms for

malaria, but one can have a fever or a headache without malaria.

Malaria occupies a central position on the 2-dimensional non-metric MDS in

Figure 7.2 (stress[1] = 0.182). Close by are illnesses such as enlarged spleen (*endwari ya*

inda), fever, vomiting, dizziness, stomach ache, general body pain, and headache.

Together these illnesses cluster around malaria. This cluster, the malaria cluster, indicates

that lay people judge a number of illnesses common in Bomorenda as being close to

malaria. The cluster analysis for the 16 illnesses (Figure 7.3) reveals two distinct clusters:

one of malaria and its symptoms, and the other groups conditions related to pains. The

underlying reasoning among the Gusii informants seems to be: take a disease like malaria

and add to it all others that go with it, or take a theme such as pain and put all illnesses in

which patients experience pain.

The non-metric MDS reveals that certain illnesses are less similar to malaria than

others. Those that are judged by informants to have less similarity e.g. HIV/AIDS,

measles, pneumonia, and flu, are placed further off on the MDS (Figure 7.2). There are

two criteria used by lay people to group illnesses. The first appears to be a distinction

between general ailments vs. more specific illnesses. Thus, on the right side of the MDS

informants have paining chest, paining body, paining joints, and headache. These are also

more general ailments because they can occur as symptoms of more serious conditions.

Going across to the left side of the MDS plot, informants appear to be more specific in

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[1] Stress is the amount of strain left when the items in a cultural domain have been fitted into an MDS. Its value ranges from 0 (perfect fit) to 1 (worst possible fit). A lower stress is indicative of a better fit. Theoretically N items can be arranged in N-1 dimensions to obtain a perfect fit with no stress. It is not possible to say what a good or bad stress value is (Bernard 1994: 504). The value is a function of many things in addition to the amount of error in the data. In particular, the stress goes up when the number of items in a domain increases as well as when differences among informants are large.

their responses. To the left side of the MDS plot are illnesses like malaria, pneumonia,

HIV/AIDS and measles. This dimension seems to be based on the gravity of the illness,

with the more general ailments on the right side of the MDS plot being less serious than

those to the left side. AIDS has no known cure, malaria kills many people, an enlarged

spleen is a sign of chronic malaria and a person with malaria and high fever can rapidly go

into a coma. Measles is a leading cause of infant mortality in Kenya. These illnesses are a

concern to residents in Bomorenda.

The second criterion puts the illnesses along a dimension of the alimentary system

vs. air-borne illnesses. On the lower end of the MDS are illnesses associated with the

digestive system. They include diarrhea, stomachache and vomiting. Diseases that are air-

borne (or being the result of contact with the physical environment include flu, pneumonia,

and measles. These are put under diseases brought about by environmental agents in the

more encompassing scheme of indigenous contagion theory (ICT). Measles requires

special mention here. Measles is a disease that is transmitted through contact, it is not air-

borne, but is included in the same cluster as pneumonia. In order to conclusively say that

Gusii people indeed consider it an air-borne illness I would need to get more data on these

so as to perform a PROFIT analysis. What I know of Gusii classification is that the illness

is known as *oborwaire bw'embeo* (disease brought by air) implying that measles may be

transmitted with the air acting as a medium. Imperato (1974: 15) reports that the Bambara

of Mali classify measles among other illnesses as "wind illnesses." The question still

remains: Do Gusii classify measles as a wind illness? This can only be answered with more

data.

Malaria Recognition

Recognition of symptoms is often the start of actions to counter an illness. Patients and lay people learn to recognize and categorize illnesses on the basis of observable symptoms. The interpretation of symptoms may vary from one person to another and from one group of people to the next. Lay people use a number of symptoms to recognize malaria. These symptoms act as a trigger for them to start treatment. Ogora is a 45 years old security guard living in Bomorenda. According to him malaria is recognized thus:

> [7-1]: …. You will have fever, followed by feeling cold but when another person touches you, you are really hot, then you have headache, joint pains, and stomach ache. When I experience these symptoms I suspect malaria, so I buy drugs for malaria. (Ogora–005)

And, Mogaka, a farmer in Bomorenda, gave these malaria symptoms.

> [7-2]: You become weak and all your joints start aching. Then you feel cold, start shivering and vomiting. You vomit *esosera*, which is indicative of the presence of malaria in your body. Sometimes it (malaria) gives you diarrhea. If it exceeds you will feel dizzy, have headache and your eyes will pain too. (Mogaka–025)

Patients/caretakers do not necessarily recognize the same symptoms, but as is the two cases above, the symptoms that have the highest salience are usually mentioned (see Figure 7.4). The symptoms given by the two informants generally indicate malaria in adults. Adults and children who can talk may be asked how they are feeling. However, the situation in quite different for children who can not talk. Parents/caretakers have to rely on some other criteria. At home, in the absence of other ways to reliably detect malaria, they can only tell from the behavior of the child and by feeling whether the child has fever.

According to Mogaka the following are the symptoms that parents or caretakers notice to diagnose malaria, "the child will start to cry, next the child develops fever, vomits, and starts to diarrhea. When you (the caretaker) see these signs you will know the child has malaria." ([7-3]: Mogaka–025)

A plot of the list of symptoms[2] compiled from informant's (N=53) narratives of malaria symptoms is presented in Figure 7.4. Headache is mentioned by most people (64%) with a salience[3] of 0.447, shivering by 55% (salience = 0.393), vomiting by 34% (salience = 0.188), paining joints 32% (salience = 0.158), and fever by 30% (salience = 0.226). Other symptoms mentioned include diarrhea, feeling weak, stomach pain, dizziness, loss of appetite, feeling cold and aching body. The frequency and salience output of the symptoms reflects the importance of headache, shivering, vomiting, joint pains, and fever in the diagnosis of malaria among lay people in Bomorenda. In fact headache, vomiting, joint pains and fever are cluster with malaria among 16 illnesses (Figure 7.2).

Clinically, malaria is diagnosed when some or all of the symptoms given by informants are present. The symptoms mentioned by informants in Bomorenda, indicate that lay people know malaria symptoms. These findings are not unique to people of Bomorenda. Studies from other areas (e.g. Uganda–Kengeya-Kayondo et al. 1994;

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[2] These symptoms are derived form a set of 53 informants interviewed. The aim of the interviews was to understand the range of symptoms used by lay people to identify malaria in Bomorenda. This information was also useful in the coding exercise. I used it as a general guide to symptoms I had to look for in the malaria-focused narratives. The ANTHROPAC output of the symptoms is given in Table 6.2.

[3] Salience measures the relative importance of items in a cultural domain.

Tanzania–Fivawo 1993; Sri Lanka–Jayawardene 1993; Ghana–Agyepong 1992; Liberia–

Jackson 1985) reveal similar findings. Only when they have determined that the symptoms

indicate malaria do they start treatment for malaria. Thus their treatment-seeking behavior

would be based on their ability to correctly diagnose malaria. For conclusive diagnosis,

however, a blood sample is taken to determine whether the malaria parasites are present.

Given that in most of rural Kenya presumptive treatment is the order of the day rather than

the exception it implies that patients can indeed, if they correctly diagnose the illness,

avoid going to the health care facilities and, instead, settle on self-treatment. This is the

case in Bomorenda where the majority of the people (> 80%) resort to self-treatment first.

However, there are misconceptions held by lay people regarding malaria

symptoms. For example, some patients mention that itching is a symptom for malaria.

Itching usually results when some patients take certain drugs. Chloroquine based drugs

such as Malaraquin and Dawaquin do cause itching in some individuals, a problem taken

care of by swallowing Piritons. Some informants interpret itching as a sign that the

medicine is working.

Vomiting: Expelling Malaria

Vomiting (*esosera*, also known as *omokunguru*) is the third most commonly

mentioned symptom (see Figure 7.4) and it is particularly a good sign for a malaria

patient; it is an indication that malaria is coming out, that the patient is on the road to

recovery. Among the Abagusii malaria is perceived as an object that enters the patient, so

that vomiting is an act meant to expel the offending object from the victim. It is not

uncommon to inquire of a patient and be told that "malaria came out yesterday," implying

that the patient had vomited the previous day. Thus malaria is personified and its locus is

in the patient. Here is what one informant said regarding vomiting *esosera*:

> [7-4]: What makes us say malaria is leaving the patient is this, before you vomit malaria accumulates in the body. You get treatment but the fever does not come down, so you start vomiting. The vomit resembles the yellow part of an egg or it may be greenish like algae [hence the name *esosera*]. You vomit until it is clear. That is a sign that the disease (malaria) is clearing from the body. Sometimes if you still have some strength left in you bathing with cold water followed by a good meal speeds up the healing process. Take some pills and you are completely healed. (Mogaka–025)

In order to aid in the healing process the patient is given medicine for malaria. The

people belief that you heal faster if you vomit *esosera*. The same belief goes for a person

who has diarrhea resulting from malaria. Vomiting is thought to cause the actual removal

of malaria. This implies that taking of anti-malaria medicine after a person vomits or has

had diarrhea is not in itself a defining moment in the healing process. It is the act of

expelling the offending agent in you that has the greater effect. Thus without vomiting or

having diarrhea, the suffering is prolonged.

Out of the 35 people I interviewed, 27 (77%) reported that vomiting can result in

faster healing (Table 7.1). The chi-square results indicate no difference between men and

women ($\chi^2 = 0.811$, $p = 0.37$). The mechanism through which this is achieved is shown in

the folk model of malaria presented in the next section (Figure 7.5).

Herbalists are aware of this folk (emic) link between healing and expelling the

offending agent through vomiting or diarrhea. They give their patients herbal preparations,

which cause them to vomit. They know (all of the herbalists are Gusii) that patients

associate vomiting with better things to come. By giving patients emetics herbalists

reassure the psychological and emotional side of the patient. They know that patients try

self-treatment with pills after vomiting (see for example what Mogaka–025 says in excerpt

[7-4]). So the herbalist's actions assure them a constant supply of customers (patients) and

money while at the same time assuaging the patient's psychological and emotional

components. One informant, a primary school teacher, told me that herbalists "give their

clients herbal preparations to make them vomit. After a person has vomited then the

individual will not suffer from malaria. Usually they give medicine to a person who has had

malaria repeatedly; some get well after consultation with a herbalist." ([7-5]: Nyanchera–

018)

The herbalists are consulted by clients who have had repeated malaria attacks,

those who might have tried western medicine before with little success. These patients

seek refuge in traditional medicine. They are likely to have tried self-treatment with drugs

bought from the shop or in conjunction with herbal preparations.

In the next section, which deals with causes of malaria, I show that a number of

people consider certain foods to cause malaria. Subsequently, I argue that the act of

vomiting or diarrhea is an action to expel the foods that cause malaria (or to expel their

harmful effects). I then present a folk model of malaria for people in Bomorenda.

Causes of Malaria

The majority (86% or 30 informants) of those interviewed recognize the mosquito

as the leading cause of malaria. However, there are other causes of malaria which were

reported. These causes center on the types of foods one consumes. For example eating

sugary foods (57.1%)–sugarcane and ripe bananas, and eating roasted green corn can lead

to malaria. Other actions that are thought to cause malaria are eating too many groundnuts

and dried molasses (*sukari nguru*).

The folk theory of causation can be described thus: a person eats sugary foods–

sugar cane, ripe bananas, dried molasses, and other types of foods–groundnuts. The sugar

in these foods accumulates in the body to form *esosera*. When *esosera* accumulates the

individual suffers malaria (or it makes an existing malaria condition worse). The body

reacts by expelling the offending agents. Sometimes the patients use emetics in belief that

it will lead to faster healing. The causal explanation is made vivid by the informants' own

narratives given below:

> [7-6]: Okong'o: You know with malaria you can vomit and have diarrhea as well.
> Isaac: That is what we call *esosera*.
> O: If you have malaria, vomiting makes you feel better. Particularly if you have, in addition, some slight diarrhea. Diarrhea will make you feel weak but that is all right because you are healed. You will not need to go to hospital if you take pills. (Okong'o–024)

> [7-7]: Isaac: …. You said vomiting *esosera* helps bring out malaria.
> Bonareri: Yes, when the patient gets *esosera*, you let them vomit until it is all finished and then give the patient malaria pills. …. (Bonareri–019)

From the accounts collected, it is clear that people in Bomorenda have notions of

multiple causation with regard to malaria. I present these notions in the folk causal model

in Figure 7.5. Malaria is thought to be the result of bites from mosquitoes. But, it can also

result from actions of the individuals such as eating too much sugar, corn, and groundnuts.

The third manner through which malaria may be caused according to some informants

(e.g. [7-8]) through witchcraft.

Green corn is of interest here. Corn matures beginning around May to late July

which is also a period of long rains. The association between eating green maize and

malaria by Abagusii is a spurious one. The same is true for groundnuts. Because of the

rains this is also a time when mosquito density is high and there is a high chance of having

more cases of malaria. To achieve maximum yield, groundnuts are planted in March just as

the long rains set in. During the rainy season the nuts are formed, usually within 3 months.

Farmers harvest these nuts to boil which are then consumed at home or sold for extra

income. As for the case of sugar, children chew sugarcane (and sometimes corn stalks)

and suck the sweet sap. All these activities take place during the rainy season. Lay people

associate their actions (behavior) with malaria. The culprit here is not the eating of maize

(or groundnuts or sugarcane). The real culprit is the increase in the mosquito population

which then transmit malaria causing parasites.

The association between sugary foods and malaria plays directly into people's

beliefs about sugar and malaria. Eleven informants (31%) said that sugary foods should be

avoided when a person has malaria, while 19 informants (57%) reported that sugary foods

can cause malaria. The distribution of the responses, controlling for gender, is given in

Table 7.2.

I tested whether people who report that certain kinds of foods can lead to malaria

(CAUSE2), are also likely to report that those foods should be avoided (AVOID2),

especially when they are sick. A nominal logistic regression between the variable

CAUSE2–whether informants reported that sugary foods can cause malaria, and their

reported behavior (AVOID2–avoid the foods that can cause malaria) yields a significant

relationship between belief that eating sugary foods can cause malaria and avoidance of those foods when the individual is sick ($p < 0.05$, odds ratio = 14) and differences between men and women are statistically independent ($\chi^2 = 1.11168$, df=1, $p > 0.05$). This implies that there are no differences in knowledge regarding beliefs held by male and female informants.

Some informants (12 of 35 or 34%) mentioned that *oborogi* (witchcraft) may be implicated in causing malaria although it is not something proven. In the case of Gusii many people believe that witchcraft causes harm. In fact, some chronic illnesses, even when they are positively identified in hospital, are considered by some to be the result of witchcraft. However, lay people are careful to disclose such information to family or trusted friends only. They fear that the accused person may cause further harm. As a result reports witchcraft are only partially made by lay people and often when the illness is fatal or chronic.

One or more witches usually direct witchcraft to an individual or group of individuals. Allegations about witchcraft are more likely to be made if there is a death in the family as will become evident from the excerpt of one of the interviews [7-8]. From this excerpt it is apparent that some informants, while not being open about it, believe that death can be caused by witchcraft. Here is an excerpt from what one of the informants said when asked whether witchcraft is a factor to be considered in the cause of malaria:

> [7-8]: Recently we had a similar case. A child died apparently due to malaria. One evening after the child's funeral service someone said that soon there would be another service. A few days later a second child passed away. The victim's relatives started suspecting that witchcraft has caused the child's death. That is quite common. People here do not think a person can die of malaria, they usually transfer the blame to a human cause. Even though these days death is caused by

witchcraft and then blamed on malaria…. That is what is going on, especially for people residing in reserve (not in towns), particularly among women who quarrel all the time. Quarreling about chicken and cattle. (Mogoi–013)

However, the informants could not tell me who is likely to be the victim of such allegations. My experience is that people are very secretive about it often talking only among affected family and very close friends. Calling someone *Omorogi* (Witch) has far reaching social repercussions. There are several cases in which people accused of *oborogi* have had their houses burnt and property destroyed in other parts of Gusii. These incidents are reported widely in the media, as far as Los Angeles. For example, in September 1993, The Los Angeles Times reported that 44 people had been burnt to death in Kenya inside their grass thatched houses over a period of two months in what they called "a phenomenon reminiscent of the Salem witch trials in 17th-Century Massachusetts." All of them were accused of practicing witchcraft (The Los Angeles Times, Sept. 2nd, 1993). Practicing witchcraft (or black magic) is against the law, but rarely are people brought to court for practicing it.

Lynching of suspects and the reaction of authorities make people very secretive because there is no telling when a group of people, usually young men, will gang up to administer 'justice.' In September, ten people accused of practicing witchcraft were killed, including a 80-year-old woman, in Bomorenda. According to a Kenyan Daily (Sunday Nation, Sept. 6th, 1998) the ten suspects were taken from their homes in the wee hours of the morning by a mob of youths. In almost all instances those who administer 'justice' are youths. The witch-hunts result from the negative effect economic changes have had on

health care which in turn has reactivated Gusii beliefs about evil and misfortune (Ogembo 1997).

Explanations regarding the cause and effect of cerebral malaria are quite different from those about malaria. Lay people report that cerebral malaria affects the brain of the victim. This happens in two ways. One, a connection is believed to exist between the head and the rest of the body. The local explanation is that when a person has high fever and does not diarrhea, it causes the fever to rise through the spinal cord and gets into the brain. (This has the concept of the way mercury rises in a thermometer–the higher the temperature the greater and faster the mercury rises.) Kerandi–034 [7-9] provides a folk mechanism of how this results:

> [7-9]: Isaac: What causes cerebral malaria?
>
> Kerandi: Abagusii say that when malaria becomes chronic it gets into the brain to cause cerebral malaria.
> …
> K: It starts like the usual malaria except that its progression is fast. The patient may not be transfused because they do not have a fever. And, sometimes the patient may have a fever without diarrhea. It then gets into the brain and the patient becomes violent. Cerebral malaria is like the other malaria, but when it has reached a certain stage it causes convulsions. It can progress very fast causing convulsions and, also, cause you to become violent.

Diarrhea seems to achieve two things: it reduces the level of the 'rising fluid' by removing it, which in the process also removes the excess heat to lower the body temperature. If the patient does not get diarrhea, the rising 'fluid' affects the brain resulting in convulsions that are common in cerebral malaria cases.

The other explanation given is that the patient is a victim of social problems within the homestead. This is captured in the next three statements from informants Bochaberi– 011, Bisieri–027 and Kemunto–032.

> [7-10]: Bochaberi: …. In a polygynous homestead the husband is more affectionate to the younger wife. The other is left alone and often starts thinking of their earlier life together; she remembers how her husband used to provide for her children and how they used to plan together. Now, with a co-wife, that is all gone. Cerebral malaria then affects her and causes her to become violent.

> [7-11]: Isaac: Why do patients become violent when they have cerebral malaria?

> Bisieri: It might be because of a lot of problems that leave you with mental instability. Sometimes cerebral malaria may result because the fever affects your brain.

> [7-12]: Isaac: What causes cerebral malaria?

> Kemunto: It is due to too much noise and because of thinking too much about your social problems. [Afterwards the informant explains too much noise as quarreling at home.]

As a result of these problems the victims are under a lot of stress which is thought to cause them to have cerebral malaria. The social problems may include quarreling among family members (see Kemunto–032, [7-12]) or lack of funds to carry out activities at home or send children to school (see Bisieri–027, [7-11]).

The first explanation gets closer to the etic explanation. Fever beyond what the body can regulate can cause damage to brain cells, convulsions leading to coma and eventual death if no actions are taken to reverse the situation. Association of cerebral malaria with witchcraft or spirits has been reported in Malawi (Helitzer-Allen 1989) and Tanzania (Fivawo 1993). Makemba et al. (1996) report of a locally recognized febrile illness in Bagamoyo district, Tanzania in which children who have fever and convulsions

are treated by traditional healers. This illness is believed, by the local community to be

caused by *degedege*, a bird that enters the victim. These has also been reported by

Mwenesi et al. (1995b) among the Mijikenda of Kilifi, Kenya. However my findings differ

from these studies in that Abagusii also associate cerebral malaria with unstable social

relations within the family which lead to mental instability. Indicators of this social

instability include quarreling and, in polygynous homesteads, unequal distribution of

resources by the head of the homestead, the husband. I did not come across reports of

invasion by foreign objects, such as birds, that cause malaria in Gusii although, as noted

earlier, this is implied in the case of malaria and vomiting. Some informants (5 of 35)

reported that cerebral malaria may be caused through witchcraft.

In Figure 7.6 I present an a biomedical/folk model of cerebral malaria. The folk

explanation for cerebral malaria is that foreign agents (spirits, animals) or such other agent

that may be caused by witchcraft, and social problems affect the normal functioning of the

brain. Fever also can cause convulsions and coma, both of which are indicators of cerebral

malaria. Though the biomedical and folk accounts are in agreement that the brain is

affected the mechanism through which that occurs differs. The biomedical account is that

the temperature exceeds a critical point. When that point is exceeded the normal

functioning of the brain is affected. The folk account, however, links the rise in body

temperature to absence of diarrhea. If the patient does not have diarrhea, the fever rises

and eventually affects the brain.

The biomedical explanation provides a second mechanism through which the

condition of a person who has malaria can develop into cerebral malaria. Cerebral malaria

can also occur as a result of invasion, by the *Plasmodium* parasites, of the brain. These parasites block blood vessels in the brain causing patients to go into coma.

There are many explanations given by lay people to account for disease causation. Despite the variations in explanations given, in the case of cerebral malaria, it is clear from the folk accounts that the locus of activities that lead to cerebral malaria is in the brain. The problem may start elsewhere in the body or even outside the body, but eventually affect the brain. Indigenous theories of illness causation are often overlooked in favor of western health care model that focuses on the germ theory (Green, in press). In the case of Gusii, lay people see malaria as a result of mosquito bites. This is in agreement with the western health care model. Among the Gusii, malaria may also be caused through contagion–eating of sugary foods, or through other agents that enter the victim and which may be expelled using emetics. The three Gusii accounts of malaria causation exemplify the indigenous contagion theory (ICT) (Green, in press).

According to Green, ICT contains three related types of etiologic beliefs. These are naturalistic infection or the folk germ theory, mystical contagion (often referred to as pollution), and environmental dangers. In the analysis of Gusii beliefs of malaria causation, both the naturalistic infection aspects and environmental dangers are evident.

<u>Treatment of Malaria</u>

Informants demonstrated knowledge of many different types of drugs used in the management of malaria. The most commonly mentioned drugs were *Chloroquine*[4] and Malaraquin tablets and Malakelfin and Fansidar to a lesser extent. The later two are more recent additions into the range of drugs used to treat malaria and they are more expensive than *Chloroquine* and Malaraquin.

Where there is multiple choice of drugs, patients will continue using a particular treatment if it is regarded as effective. Otherwise they will opt for alternatives. Failure to change would indicate a maladaptive response and more people are likely to suffer, sometimes fatally, from malaria. If self-treatment drugs fail to work patients will change the treatment in favor of a more responsive one. In other words if it works then one can improve (or change) it only if a cost-benefit analysis is in favor of the patient/caretaker. As will become clear later the total cost for going to seek consultation from the experts is higher than the cost for using self-treatment and patients take this calculus into account when making decisions. Accordingly, then more people would rely on self-treatment because it is deemed to be cost-effective.

Twenty-nine of 35 informants reported buying medicines from the shop to use as a first treatment resort while only four and none reported using pills as a second and third

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[4] Chloroquine phophate is the active ingredient in several malaria drugs that are sold under various trade names in Kenya. Lay people in Gusii refer to the unpackaged chloroquine tablets as "*Chloroquine*" and other chloroquine based drugs by their trade names. In this section, I use italics when referring to "Chloroquine" the name by which it is recognized by lay people in Bomorenda.

resort respectively. Their responses are summarized in Table 7.3 while the transitions made over the three stages are given in Figure 7.7.

As a first line of treatment, self-treatment with pills bought from shops account for 82.9%, the combined public (8.6%) and private (5.7%) facilities account for 14.4% while use of herbs accounts for 2.9% of the patients' actions. These results underscore the importance of self-treatment as a first line of treatment. They echo findings by Snow et al. (1992). Snow and colleagues found that among the Giriama of Kenya coast 72% used over-the-counter drugs to self-treat, 51% mentioned use of health care facilities and 8% reported use of home remedies–prayers, tepid sponge and herbs.

The transition from one stage to the next usually occurs after a period of observation. As a result the three stages can take several days to complete. The transitions end once the patient is well. In Figure 7.7 I have shown the transitions for 29 informants who opted for self-treatment as a first option. Since those who opted for the other alternatives are too few, I have terminated their transitions at the first level. Over the next two stages, patients move from self-treatment to use of either public or private facility. Those who opt for public facility make a transition to private facility or use of herbs if they do not get well. None of those who reported use of private facility made transition to self-treatment, public facility or use of herbs. However, there is an exception. For those who opted for private facility first, one informant reported getting well while the other turned to self-treatment before getting well.

The implications of the foregoing are clear. As the malaria condition last a longer period, individuals want to maximize their chances or getting well. This is demonstrated

by their transitions over the three different stages. The public and private facilities have health care providers who are trained to provide specialized care. Patients are more likely to go these people after their initial actions prove unsuccessful. There is also a tendency toward use of private facility. Since the accounts are based on narratives of the informants' experiences it is not possible to determine the seriousness of their condition prior to seeking treatment. It is quite likely that those who opted for private care had a more serious condition and the patients did not want to take chances with the government health care centers because they often lack drugs.

Management of malaria: self-treatment with over-the-counter drugs. Patients have several alternative sources of health care available to them. The first alternative is self-treatment using over-the-counter drugs such as Malaraquin or *Chloroquine* from local shops. These drugs, particularly Malaraquin, are widely advertised and used for the management of malaria in Kenya. Several shops in Suneka township have entire wall blocks painted with Malaraquin advertisements, with a drawing of a mosquito prominently displayed. This creates a powerful image that lay people use to associate the mosquito, Malaraquin and malaria. *Malar*aquin, of course, has the same root name as *malar*ia, as do other remedies like *Malar*atab and *Mala*drin.

The patients' response is to buy other drugs, like Fansidar and Malakelfin, available in the market when these fail to work. But potential buyers consider Fansidar and Malakelfin expensive and Malakelfin is regarded to be strong by some patients. Malakelfin and Fansidar are virtually the same drugs, they both are sulphur based, except that Malakelfin uses sulphalene instead of sulphadoxine as the active ingredient. Malakelfin has

a shorter half life than Fansidar. The differences in their chemical composition also mean

that Malakelfin acts fast for it to have the same effect as Fansidar but, according to some

informants "it makes one feel weak" (see for example Bisieri–027 7-19) The difference in

the action of these two drugs in captured by informant Bochaberi [7-13].

Patients change the drugs they use as first line of treatment when the drugs fail to

work. Here is what one informant said regarding resistance to drugs and changing

preferences among patients:

> [7-13]: I used to take *Chloroquine* when I have malaria. The tablets were effective
> then. I used to take *Chloroquine* together with Aspirin or Panadol and I get well.
> Nowadays use of *Chloroquine* has become a problem. Each time I take them the
> whole body itches and yet I do not get well. I have started using Metakelfin. When
> I take them, I feel better. I also tried Fansidar, but it takes several days before you
> get well. But Metakelfin works fast; it takes only a few hours and you feel well.
> (Bochaberi–011)

Bochaberi [7-13] continued to explain why the medicines have become less

effective in the treatment of malaria. According to her it is because the medicine "do not

agree with the patient's blood." She said this of her child:

> [7-14]: .... Even when my child takes them (referring to Metakelfin) he gets well
> that day. He will always get well that day, but does not stay for a month before he
> gets sick again. I will give him the same medicine when it attacks him again. I do
> not know whether his body will reject these tablets like my body has rejected
> *Chloroquine*. (Bochaberi–011)

Cost is another guiding factor in the treatment of malaria. The government charges

user fees at its health care facilities in line with health care reforms recommended by the

World Bank. Patients are required to pay, at the health centers, Ksh. 20.00 for the services

they receive. This is a relatively small fee to pay. Patients, are however, often disappointed

because they make the payments only to be told that there are no drugs. They are given

prescriptions and asked to go and buy drugs from the Pharmacists. According to some

people this wastes their time. When asked why they do not like using the government

health care facilities one informant told me:

> [7-15]: We go to these health care facilities (Iyabe and Riotanchi) but they tell us they have no drugs. You queue for a long time and when you finally get to consult, at the pharmacy they will ask you to go and buy the medicine elsewhere. This is after you have paid Ksh. 20.00 for the consultation card. Sometimes they give you painkillers (Panadol or Aspirin) to take along with those you are asked to buy. It is better for us to sell chicken or some bananas to get money and take the child to a private clinic in order not to waste time. You will get help at the private clinic before it gets worse. Due to inconveniences we experience at the public health care facilities we do not like going there often. (Bochaberi–011)

At the pharmacy shops patients buy the drugs at the retail price. They end up paying more

than they would have paid at the private health care clinics, which get the drugs in bulk.

Buying the drugs in bulk brings down the cost of the drugs and these benefits are passed

on to patients by a number of clinics.

In addition to Malaraquin, *Chloroquine*, Fansidar, and Malakelfin there are many

other drugs that are used for management of malaria and fever. I asked 52 people to pile-

sort the actual 29 different drugs I obtained from the local shops. These are drugs used for

management of malaria and fever. Information on drugs used to treat malaria and other

illnesses in the malaria cognate category was compiled from discussions on recognition

and treatment of malaria. Informants mentioned a number of different medicines for

malaria and fever. I then decided to get all the drugs for malaria available in the local

shops and pharmacies. The names of the drugs are given in Table 6.3. Using these drugs I

asked the people to pile sort them based on criteria of their choice. This exercise also

produced similarity data which has generated the MDS (Figure 7.8) and cluster analysis

(Figure 7.9).

Three outlying informants, two male and one female, with a correlation of less than

0.09 with the rest of the group were excluded from the final analysis. Exclusion of the

three informants caused a reduction in stress from 0.215 to 0.118, a 45% improvement.

The excluded female informant who is 83 years old, recognized only one drug,

Malaraquin; one male informant, aged 60 years had six groups five of which has single

items in them; and the second male informant, aged 28 years, had three piles but

apparently just split the drugs into three groups. Two of this informant's piles had drugs

for malaria and fever but he did not make distinction between adults and children as most

other informants and the third pile which according to the informants has drugs for

treating joints and pains actually has drugs which are used for treatment of malaria–

Maladrin, Fansidar, Malaratab, Dawaquin, Meriquin, Mepacrine, Homaquin, and for

fever–Dawanol and Aspro and, again, makes no distinction between drugs for adults and

those for children.

The MDS of drugs used for the management of malaria by lay people has two

dimensions (Figure 7.8, stress = 0.118). The drugs are arranged along an age dimension,

with drugs used by adults on one end and those used by children on the opposite end. The

second dimension is a dichotomous distinction between malaria drugs and fever and pain

relieving drugs.

The drugs are grouped in three main clusters (Figure 7.9) which correspond to (1)

drugs that are used for the management of malaria in adults and children, (2) drugs that

are used for the management of fever and pains in children, and (3) drugs that are used for the management of fever and pains in adults.

Drugs in group one (see Figure 7.9) include those that have chloroquine phosphate as the active ingredient (Meriquin, Dawaquin, Dawaquin Junior, Benaquin, Malaraquin, Maladrin, Homaquin, *Chloroquine*), Amodiaquine hydrochloride (Malaratab), Mepacrine, and sulphur based drugs (Malakelfin, Fansidar). Those in group two include Junior Aspirin, Panadol Junior, Aspirin, Viprin, Cafenol Extra, Suprin, Cafenol, Aspro and Nopen; and the drugs in the last group include Dawanol, Panadol Extra, Algon, Splentir, Hedex, Action, Hedapan, and Panadol.

The MDS and cluster results tell us that lay people clearly distinguish medication for children from that for adults and between malaria and non-malaria drugs (Figures 7.8 and 7.9). This is likely the result of high cases of malaria in Gusii, which has forced lay people to know the drugs. Knowledge of these drugs implies that lay people are more likely to try them out and then go to seek specialized care next if there is need to do so.

Informants gave several reasons why they put certain drugs together more often. The reasons were treated as a freelist and analyzed using ANTHROPAC. These results are presented in Table 6.4. The number of piles (groups) that the informant created limited the length of the list. Most drugs were put together either because they are used for the treatment of malaria in adults and children, management of fever in adults and children, and treatment of pains and aches. These reasons agree with the non-metric MDS and cluster analysis results (Figures 7.8 and 7.9).

Some of the drugs such as Cafenol, Cafenol Extra, Aspro, Algon, Hedapan, and Junior Aspirin were erroneously thought to be for treating whooping cough. These drugs are often used to treat children with fever. Use of them may be linked to presence of fever in children with whooping cough. Mepacrine is used for management of enlarged spleen (*endwari ya inda*) and liver problems. In the past Mepacrine was used to treat malaria. Its use for treatment of enlarged spleen might be due to the relationship between malaria and enlarged spleen. One informant indicated that Mepacrine is also used for family planning. Most informants (63.3%, N=49) did not know what some of the drugs were used for. Drugs put in this category by some informants include Malakelfin (used for treatment of malaria), and pain killers (Viprin and Splentir). Splentir was being introduced into the market when I was conducting field research.

From the foregoing it is evident that lay people do not have full knowledge of drugs used in the management of malaria. The lack of knowledge may lead to improper administration of drugs. Patients/caretakers often give the children malaria medicines together with those meant to control fever. As a result they have come to associate use of fever drugs alongside those for malaria. One of the widely used medicines to control fever in children is Junior Aspirin. Studies in Kenya have shown that children are sometimes overdosed which may lead to metabolic acidosis, hyperglycemia, lethargy, and coma and fits (English et al. 1996). Aspirin and similar drugs, which are classified as salicylates, are widely sold in Kenya and other developing countries. In the developed countries they are no longer used in children because of safety concerns (English et al. 1996).

None of the informants interviewed reported self-treatment for cerebral malaria.

Those interviewed reported that they know someone who has had cerebral malaria.

According to Nyang'ate–026 cerebral malaria is managed in two ways: going to the

hospital and/or going to a traditional healer. Here is what she reports:

> [7-16]: Yes, I know about cerebral malaria but I have not had it. I just hear that it makes people violent and it difficult to treat. You can go to a traditional healer if you fail to get well at the hospital. The traditional healer will give herbal medicine, and if you are lucky, you will get well. Getting well is a matter of luck. (Nyang'ate–026)

Management of malaria: knowledge of correct dosage. Informants reported the correct

dose required for the treatment of malaria. They are particularly clear about the dosage in

pre-packaged drugs such as Malaraquin. Pre-packaged drugs have the required dosage for

adults and children indicated on the packages. The dosage varies depending on the type of

drug one is taking and the age of the patient. Children are given a lower dose compared to

adults. An adult suffering from malaria takes a full dose of chloroquine tablets. Here is

how two informants explained it:

> [7-17]: Makori: … You take four tablets first followed by two more tablets after six hours. The following day and for the next two days you take two each day to complete a dose. A complete dose is 12 tablets (4+2+2+2+2).

> [7-18]: Ogora: Now, if it is malaria, an adult swallows a full dose of *Chloroquine* tablets. I give the adult four tablets to begin with and after six hours I add the patient two tablets after that the patient takes two tablets per day until they have taken a total of 12 tablets. During this period I also give the patient two Panadol tablets each time they take the *Chloroquine*. When they take a full dose malaria goes away.

Fear of using certain drugs, either because they cause itching (e.g. Malaraquin and

Chloroquine) or because the medicine has other side effects, was reported by some

informants. I was told by one informant that Metakelfin can cause problems for the users if their blood is not strong enough ([7-19]: Bisieri–027) which indicates that some patients have misgivings about use of these drugs. These may cause them to avoid using the drugs they associate with specific side effects. On the other hand, some patients regard the side effects of itching as a sign that the drugs are working. They take them for this very reason.

Despite most informants being knowledgeable about the correct dosage, self-treatment may cause problems for some patients if they rely on incorrect information about dosage (or about the appropriate drugs to use). The possibility of using the wrong type of drugs is real and often lurking. This is made apparent by one of the male informants, Asati, an artisan aged 37 years. His daughter-in-law had been sick, down with malaria, for a couple of days. His son, the patient's husband, went and bought drugs after consulting friends. But, as it turned out friends had either given him the wrong information or he did not follow their advice. Here is Asati's account:

> [7-20]: Friends will always tell you which medicine to buy. Take for instance my son who was told to buy for his wife Panadol and Hedex to treat malaria. I know both drugs treat the same problem–pains. My daughter-in-law had used these tablets without experiencing any improvement, instead she was getting worse. So I asked my son to go and buy a dose of *Chloroquine* and Panadol. I also asked him to inquire from the shopkeeper how to administer the medicine. He did not realize that Panadol and Hedex treat the same problem. So there are some people who give you wrong information, you end up buying medicine that make your condition worse. (Asati–012)

Management of Enlarged Spleen (*Endwari ya Inda*)

Lay people recognize *endwari ya inda* (enlarged spleen) as a different illness but which is closely related to malaria. It has symptoms similar to those experienced by people who have malaria. Despite some similarities in the symptoms (e.g. stomach pain and

fever), patients follow a different strategy to manage *endwari ya inda*. To diagnose it

there is one defining symptom–the presence of a palpable lump just below the rib cage.

One of my informants informed me that:

> [7-21]: …. When you have *endwari ya inda*, you start spitting, then you feel dizzy, sometimes you have a sharp pain around the spleen area. If you touch, there is a palpable lump in that place. This is what signals that you have *endwari ya inda* and so you ask yourself, 'what should I do?' If you feel really bad, you make the decision to consult a physician. If it is not serious you prepare herbs to take until it gets better. When you are economizing you drink herbal preparations instead of taking money to a physician. (Onchieku–007)

The lumps can be felt either on the left or the right hand side which gives rise to

two distinguishable forms of *endwari ya inda*. The more dangerous one affects the right

side of the stomach–the liver, and the less serious affects the left side of the stomach–the

spleen. The latter is especially common among children an indication of high malaria rates

among children. People in Bomorenda see it as hopeless to attempt treating the one that

affects the liver. However, an enlarged spleen can be treated.

To treat *endwari ya inda* patients use boiled herbs and take the juice extract by

mouth. Some herbs may be burnt and ground into powder to make *obosaro*. This is also

either licked or if the patient is scarified *obosaro* is applied into the wound. *Omoarubaine*

(the Neem plant, *Azadirachta indica*) although relatively recent in the area has overtaken

most of the indigenous herbs in usage. This tree is grown in many homes. Originally from

India, Indian immigrants brought it first to the Kenya coast. It is thought to treat as many

as 40 different illnesses hence its name *Omoarubaine* (arubaine is Swahili for forty).

Patients drink one to two glasses of the extract per day. This plant is quite popular; people

drink extracts from it even when they are healthy.

Informants reported that they use *omoarubaine* to treat both malaria and *endwari ya inda*. For example one informant informed me that:

> [7-22]: When you have *endwari ya inda* then you use *omoarubaine*. There is change after using it. If you continue using *omoarubaine* as per instructions (one glass per day) you feel better and go back to do your daily activities. Even the pain in the joints ceases after using *omoarubaine*. *Endwari ya inda* closely resembles malaria in its symptoms. It gives you fever and stomachache. (Asati–012)

For *endwari ya inda,* patients are more likely to use traditional treatment than going to hospital or a private clinic. Other than the oral administration of herbs, *obosaro* can also be applied through scarifications made on the skin. These two treatments are the most commonly used. Out of 35 informants interviewed, 68% (or 24 informants) said they use herbal treatment to treat *endwari ya inda*. However some patients take their children to the private health care facilities where they are given Mepacrine. But this group also mentioned that herbs are used to manage *endwari ya inda*. For a long time Mepacrine was used in the treatment of malaria before the drug of choice, chloroquine, replaced it.

Management of Malaria: Treatment Choices

When malaria lasts over a period of time, lay people go through different treatment transitions (Figure 7.10). The proportion of people using self-treatment (82.9%) drops with second (12.5%) and third (zero) choices but increases for those using public facilities. About 38% reported use of private health facilities as second treatment choice up from 5.7% and then drops to 18%. Consulting a herbalist or using herbs remains relatively constant through the three stages. What does this tell us? These results tell us that those who rely on herbalists or herbs for treatment are likely to stick with their choices through

the three stages. In fact, over the three treatment stages only one person who had earlier opted for self-treatment changed to a herbalist.

The results also indicate that people are more likely to seek treatment outside the home when malaria lasts a longer period. The results concur with Kroeger (1983), Ryan (1995) and Weller et al. (1997). In his study Ryan (1995: 166) found that in a Kom village of Cameroon, 83% of the illnesses are treated at home with 22.5% (cf. 14.3% in Bomorenda) of the 454 illness episodes seeking treatment outside the home. Kroeger's (1983) reports that 80% of the illnesses are managed within the household. In Guatemala, Weller and her colleagues (1997) report a higher figure (90%) for the initial treatment actions. These involve use of either home remedies or remedies obtained from a pharmacy. Eight percent of the initial actions involved seeing a physician or a nurse while about 2% of the people visited a folk healer.

The data from Gusii indicate that more lay people (>80%) seek treatment outside the home for second and third treatment choices (see Table 7.3 and Figure 7.7). Patients resort to second and third treatment choices when the first action seems to have failed, usually after a period of waiting. The second and third treatment choices are usually located outside the home. Based on data of behavioral sequences, Ryan (1995: 222) concludes that "the longer an illness lasts, the more likely people are to go outside the compound for treatment."

Patients change from self-treatment to other forms of treatment as costs mount and the duration of incapacitation increases. The patient changes from self-treatment to treatment at a private health clinic and eventually to government clinic. Patients change

source of health care accordingly to even out the costs incurred. They start with a cost

saving strategy–self-treatment, as they evaluate what happens to them. The next stage is

when the patient or caretaker choose a more expensive, but also deemed as more likely to

succeed, treatment alternative, usually the government clinic if drugs are available there,

but it can also be from the private clinics. The patients expect to get better because these

health care providers are trained and the private clinics have "stronger drugs." Although

the cost of taking a patient to a private health care facility is high, they are likely to get

better sooner because of better treatment. This is reflected in statements made by

informants. For example consider the following statements made by four different

informants:

> [7-23]: Private clinics provide better treatment so that patients may continue to visit. But it is different in government dispensaries. A lot of drugs are sent there (referring to government clinics) from the District hospital but those drugs find way into shops where they are sold. (Kembero–003)

> [7-24]: At the private clinic you pay according to what treatment you receive. Patients used to avoid private clinics but nowadays everyone goes there because there are no drugs at Iyabe (government dispensary). Instead of wasting time the patient goes to a private clinic where treatment is more certain. (Nyanchera–018)

> [7-25]: They treat well at the private clinics and their price is negotiable. In case there is no improvement the health care provider will change the medicine for you at the same rate as the earlier one. They give you a mixture of drugs. We like it, if your sickness is due to malaria you will get well. (Kemunto–032)

> [7-26]: Isaac: Why do you not go to Riotanchi (government dispensary) more often since they charge less than the private clinics?
> Nyang'ate: They are cheap but you might not get well which will force you to go to Nyariki's clinic[5]. So it is better to go to Nyariki's clinic. (Nyang'ate–026)

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[5] Throughout this Chapter I have used Nyariki's clinic and Amani clinic interchangeably. I have done this in order to preserve informants' quotes. Amani clinic is owned and operated by Nyariki.

Because private facilities offer better quality services patients are more likely to get

well sooner so that they get back to their normal daily economic activities. From the

statements of informants given above, their strategy seems to be–minimize prolonged loss

due to sickness. However, if this also fails the patient and caretaker move on to another

cost saving strategy–they go to Kisii General Hospital, the only government hospital in

district, if they think that the disease will take some time to heal. Mogaka–025 [7-27] and

Nyang'ate–026 [7-28] make this clear in the next two statements. Going to public health

care facilities lets patients spread out whatever little money left over a relatively longer

period than would last if the money were used to pay private health care providers.

Thus, there are three stages that patients go through when they have malaria. This

is aptly stated by Mogaka and Nyang'ate.

> [7-27]: Mogaka: First, when you get malaria you take pills and wait to see whether
> you will get well. If you don't get better next you go to a health care facility where
> you will be treated.
> Isaac: Do you go to a private clinic or public facility first?
> M: Private clinics help a great deal except that they are expensive. You go there if
> you can not get help at the dispensaries. When you fail to get better then you
> proceed to (Kisii) General hospital. At the General hospital they will assess your
> condition and provide you treatment with different drugs. (Mogaka–025)

> [7-28]: You might go to Nyariki's clinic without getting well, but you get well
> when you go to Kisii General. First, you use self-treatment, if there is no
> improvement you go to Nyariki's clinic and then to Kisii General if you still don't
> feel well. (Nyang'ate–026)

These three stages represent strategies that over one-third (34.3%) of lay people in

Bomorenda employ in order to overcome malaria. The first, a cost reduction strategy, is to

get medicine for self-treatment from the shops. They are cheap and most patients from

experience know the required dosage. During this time the patient's activities may be

curtailed resulting in loss of farm work days. They cannot tend their crops on the farm or carry out their other activities. Together with the need to constantly get new (sometimes more expensive) drugs the patient's anxiety increases. They want to get over malaria so as to continue with their work. They may, at this stage, opt for more specialized care from the private health care providers, from dispensaries, or they may also continue with self-treatment by changing the drugs. In the long run comes the acceptance stage; the patients come to accept their malaria condition and look for long term strategies to counter its effects on the person and household resources.

The three stages are: wait/observe stage; anxiety stage; and the acceptance stage (Table 7.4). Depending on how the patient's condition is classified, each of the stages has three categories–not serious; sudden and serious and money is available for treatment; and sudden and serious but money is not available for treatment.

The stage at which a particular action will begin depends on how serious malaria is and whether the patient can afford to pay for the services. Thus for more serious cases (and if finances allow) a patient will go to a private clinic or public hospital for immediate treatment. For example Onchieku–007 [7-29] says "I go to Nyariki's clinic when the malaria attack is sudden, serious and I can not get to Riotanchi in good time. So I go to Nyariki's clinic, even though it is more expensive, because it is near." If patients have no money, they are more likely to go to public hospital for treatment unless they can get credit. In all cases the patients go to public hospitals for treatment at the acceptance stage. The role played by cost on the patient's choices is made vivid by Nyanga'u, aged 44 years. He says:

[7-30]: Isaac: When do you go to Nyariki's (private) or Iyabe (public)?
Nyanga'u: I go to private clinics when I have money.
I: To private clinics?
N: Yes, they offer faster service. (Nyanga'u–031)

Over a period of time, patients suffering from malaria may change the health care sources. The source selected next depends on whether the earlier was successful or not (Figure 7.11). There are other factors that are involved in the decision making process which must be taken into account by both the patient and the caretakers. These include networks of patients, the person's own financial base or financial support from extended family, presence of the head of the homestead (sometimes they are out for wage employment away from near home). For example, women in Gusii particularly rely on these social networks when their husbands are away for long periods working (Orvis 1997). They will get money from friends and relatives to make payments for health care services and refund it later when their husbands send them money. Notions about an illness may change over time and gradually to make the patient assign a new cause to an illness. In the case of malaria such new causes may be assigned if the malaria episode takes time to heal (e.g. because the treatment is not responding due to drug resistance, or if malaria progresses to the cerebral type.

There is another issue–the use of herbs, which I wish to deal with first. Those who seek herbal treatment are also likely to have tried western medicine, with over-the-counter medicines, prior to seeking help from the herbalists. Thus, getting well may be a function of their initial actions, self-treatment. The relationship between using herbal treatment, vomiting, and getting better after a bout of malaria is, in my opinion, a spurious one. Healing takes place due to initial actions (self-treatment with over-the-counter malaria

drugs or with drugs given from other sources of health care such as government and

private health care facilities). During the entire ten months of field research in Gusii, I

never met anybody who said they got healed from using herbal preparation or consulting a

herbalist alone. They mixed self-treatment with drugs from the shop and the other

treatments. There are no reports of people sharing pills across homesteads. This might be

due to people wanting to keep the medicines for themselves for future use. This reduces

costs incurred to treat subsequent malaria episodes.

Factors Affecting Utilization of Health Care Services in Bomorenda

The malaria-focused ethnographic interviews reveal a number of factors affecting

utilization of health care facilities in Bomorenda. The factors include: cost (amount of

money spent on treatment and to transport the patient), motivation of the health care

providers, intensity (or severity) of the illness (Table 7.5). For each of the I assign a

positive (+) score against a factor if it causes an increase in use of health care facility and a

negative (-) score if it causes a decrease. All of them, except knowing the provider, have a

positive-negative relationship. That is, if it causes a positive effect on use of private health

care facilities, it has a negative effect on use of public health care facilities. In the

remainder of this section I discuss the effect of cost, availability of drugs, friendly and

motivated staff, disease intensity and knowing the person providing health care service on

utilization of health care facilities.

<u>Cost of Treatment</u>

Patients go to public health care facilities because those facilities provide cheaper services. At the government clinics they pay a flat fee of Ksh. 20.00 for the services and that single payment covers several visits for the same medical problem. Despite the low cost, drugs are for the most part lacking. A full dose of Malaraquin tablets costs Ksh. 14.00 in the shops (i.e. Ksh. 6.00 less than they would pay at the dispensary and still be told to go and 'buy your own drugs').

In private facilities the cost may range from about Ksh. 180.00 to excess of Ksh. 1000.00 (average Ksh. 400.00). These costs can be prohibitive for poor households and can strain family resources. Patients and caretakers make decisions regarding whether they should incur the costs on the basis of perceived intensity (seriousness) of malaria. Twenty-nine percent report that intensity is a factor in their decision to use self-treatment or go to hospital while 20% reported cost to be a factor. Only 2 of 35 informants reported both cost and intensity to be a factor in their decision to use self-treatment. One informant reported cost and duration to be a factor. In the presence of a severe malaria condition consideration about cost is relegated into second place. In serious malaria cases patients or caretakers opt for private health care facilities where chances for getting the necessary medicines are much higher. Unless they are sure of getting medicine at the government health care facility they will opt to go to the private clinics. Information concerning availability of drugs comes from their friends who may have earlier utilized the facility being considered.

Availability of Drugs

Lack of drugs in government health care facilities is another major concern for most patients. The patients and caretakers detest incurring expenses only to be told that the prescribed drugs are not available so that they have to buy them at the retail stores. Lack of drugs in the government facilities acts as a disincentive in the patients' decision process. To decide on whether to go to the government health care facility or to a private facility, potential users rely on the amount of information they have regarding likelihood of getting drugs at the government facility at the time they want to visit the facility. If they have established through talking to other people that drugs are available, they will go to the government facility, but if they are told that the health care facility does not have drugs then they will go to a private health care provider (see for example comment by Bochaberi–011, [7-32]). Thus knowledge about availability of drugs influences choices about the source of health care that patients and caretakers decide to use.

Friendly and Motivated Staff

Workers at government health care facilities are paid low salaries, lack the necessary facilities to make their working environment comfortable, and often work in crowded places. These working conditions affect their motivation and are sometimes a rallying call for a better working environment. Since 1990 health care providers have threatened many times that they will go on strike because of low pay and a poor work environment. Twice they have carried out those threats, most recently in December 1997. At the end of 1997 nurses went on strike countrywide to demand better pay and working

conditions. The standoff lasted several weeks. Health care providers at government facilities have become lethargic as a result. They report to work late, are rarely at their work stations, and leave work early. As a result very little is accomplished. Some people complained that health care providers are never interested in providing services to patients. The workers are accused of quickly seeing those whom they know while the rest are left to wait in long queues.

Informants' decisions involve a careful evaluation of all factors that will influence accessibility to affordable health care while minimizing the costs to be incurred. For example, knowing a provider at the government facility is linked to the cost. Since the cost at a government facility is only Ksh. 20.00, it pays to go there first if you know a person who can ensure that you get medicine. If you do not know someone at the government facility but you know a private health care provider you go there since you can get treated on credit if you do not have money. In terms of cost, it is more cost-effective if you know a person at the government facility.

The work ethic is quite different at the private clinics. Health care providers here compete to gain customers who turn away from the government facilities. They have to devise strategies to get more customers. Providing a friendly working environment is one such strategy, it attracts more customers to their facilities. Informants reported that they go to the various clinics because the service providers are friendly and do not turn away patients, often treating them on credit when they do not have money. Some informants reported that they liked visiting certain clinics because the health care provider gave

treatment first before asking for the charges. Informants interpreted that to mean that the

service provider's main concern was on providing treatment rather than on making money.

Intensity of the Disease

Many people (83%) report self-treatment when they have malaria with about 29%

reporting that intensity of the disease was a factor in their decision of whether to use home

based management or go to hospital. If they consider the situation not to be serious,

patients may take a chance at the local government facility for treatment because the risks

are low and they can afford to wait longer if they do not get treatment there. They will go

back another day or look for money to buy medicine from the local shops. This allows

them to wait longer and, sometimes, to channel funds to other immediate family needs.

However, if the malaria condition is serious, the patients are more likely to opt for a

private health care facility for treatment (see for example Onchieku–007 7-29) or go to

Kisii General Hospital–the district referral hospital. If cost becomes an issue because of

lack of finances, they will sell chicken and bananas to get money to pay at the private

clinics or travel to Kisii General Hospital (see [7-15]).

Knowing the Health Care Provider

Informants reported that they go to specific clinics or government health care

centers because they know people there. They go to these places even when they are

farther off than the nearest clinic. According to the households survey, the average

distance traveled by patients to the place where they received health care services is 3.2

km. which is 0.6 km. more than the reported distance to the nearest health care facility. They will often pass those clinics closer to them if they know someone who can help at another health care facility. The same behavior is observed in the utilization of private health clinics. If they know a provider at the private clinic they will go to that clinic first passing other clinics. If those are closed only then will they go to other clinics that are open. If they know a health care provider at the government health care facility they will go there first since that provider will try to get them medicine.

As has been demonstrated, a major reason for choosing a clinic is personal knowledge of the staff. In fact, it is an important factor in lay people's health care choices. They go to specific clinics because they know the health care providers there. In the case of government facilities, knowledge of the health care provider appears to be of greater importance than the other factors that produce a negative effect. If a patient knows someone as a government health facility, availability of drugs, motivation, and friendly staff become secondary. Knowledge of a person at a government health care facility implies a substantial reduction in costs incurred because the patients' contact person will most likely try to locate the drugs for the patient.

Overall (from Table 7.5) it appears people would tend to use private care facilities–but the high cost can discourage them from going there unless they have a severe condition (i.e. the risks are high). If the patient is seriously sick then they are more likely to go to a private facility because chances that they will get someone to attend to them and get drugs are high (motivation in private health care providers is high). The cost at private health care centers in Suneka ranges between Ksh. 182.00–Ksh. 1000.00 (average

about Ksh. 400.00). This cost can be prohibitive for a person who has no regular income

and a lot of other financial obligations such as paying for sending children to school.

Primary school education is free in Kenya but parents have to incur expenses such as

paying for their children's school textbooks, school uniforms, activity fees, school

development fund, and for sundries that the schoolboard may impose. By the time students

get to secondary school financial obligations more than double which strains finances in

many households.

Lay people respond to the cost constraint by adopting a strategy to ensure them

treatment on credit should they become sick when they are low on money. They report

that when they are treated on credit they try to clear the debt as soon as possible before

they become sick again. The private health care providers are more dependable because

they usually have a stock of drugs for their patients. If patients do not have any credit

facilities with the private health care providers they might leave at the clinic, after

receiving treatment, their national identification cards as surety that they will come back to

settle the bills when they get the money. Those who are known to the providers need not

provide such sureties. They are given treatment based on mutual trust. Once they have

been offered treatment on credit most try to settle their debts quickly so as to maintain or

enhance their creditworthiness and to prevent accumulation of debts.

> [7-31]: It has been a while since the last time I had malaria. When I have malaria I
> use tablets which I buy from the shop. I don't go to hospital. …. I have had
> medicine but it has been a while. Usually I buy tablets. I buy tablets for Ksh. 14.00
> but if I go to Riotanchi[6] (the government dispensary) it costs me Ksh. 40.00. I can

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[6] At the time of this study, Riotanchi dispensary was charging a levy of KSh. 20.00. This
money was for the construction of a maternity unit. This is a project initiated by the local

use tablets for Ksh. 14.00 for a while instead of paying Ksh. 40.00 at the dispensary. I get well because God is good to me, so I return my thanks. (Onchieku–007)

Therefore patients/caretakers weigh the advantages of buying the medicine over the counter vs. getting it from the dispensary. They consider the expenses involved and rationalize in economic terms their choice of treatment. Because the cost of drugs is lower when taken directly from the shops, as is evident from the quote above, one is likely to opt for drugs from the shop rather than to go to a government health care facility or to a private health care provider. Since they report that they get well after using the medicine there is really no reason why they should go to the health care providers for treatment unless they consider their condition as serious. They end up spending less money that way.

It can be a frustrating exercise, sometimes futile, to try and get treatment at a public health care facility. For example, the Kisii General Hospital is usually crowded with patients and their caretakers. Built before 1930, it is the oldest hospital in the area. Patients come from several surrounding districts to Kisii General Hospital for medical care. During the rainy season it is common to have as many as three patients to a bed in the wards while the outpatient unit may look like an open market place. Sometimes patients avoid going there for treatment because the hospital is congested and they have no one to guide them around:

> [7-32]: We do not go to General Hospital because there are so many patients. If you do not have someone to guide you, you will go in circles the whole day without getting any treatment. So we go to the nearby private clinics, such as Amani Clinic, for treatment …. (Bochaberi–011)

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people. Therefore patients who visited this dispensary were paying KSh. 40.00 instead of the usual KSh. 20.00.

Thus, overcrowding at the public health care facilities can act as a disincentive to use the facilities.

<center>Information Exchange and Treatment of Malaria</center>

Patients/caretakers use information exchange networks for several purposes. They use them to inquire whether the government health care facilities have drugs before they make the trip there. Potential users will ask about the availability of drugs at a particular government health care facility. If they determine that the facilities have a supply of drugs, then they make a trip there to seek medical care before the supply is exhausted. Availability of drugs is never a concern when patients use private health care facilities. Their concern is cost rather than whether the drugs will be available. Social networks are important in conveying information about drug availability. One relies on the information supplied by friends to make a decision as to whether to go to the government health care facility for treatment.

> [7-33]: We rely on information from friends. Before you set out to go you make inquiries whether drugs are available at the dispensary (Riotanchi). The person you make inquiries from might tell you 'I went there yesterday and did not have any drugs. Are you sure you will get them today?' Once you know that there are no drugs you will go to the private clinic, like Nyariki's. You will tell them your financial position before they attend you, 'my child is sick but I have no money. I will pay when I get the money.' Because they are understanding they will normally give you treatment on credit. They are quite good, so we do not want to jeopardize the trust they have towards us. That is why we pay up our debts. However, if you are informed that Riotanchi has drugs, we hurry there before the drugs are finished. (Bochaberi–011)

The networks are also used to provide patients with information regarding which drugs they need to buy to treat malaria. Here is what one informant told me concerning

consultations they have with friends. Friends normally give them advice on what medicines they should try next if their first choice fails. "Very often they will ask you 'did you give the patient Chloroquine? Go try Fansidar. You do not need injection if you swallow Fansidar. They are strong." ([7-34]: Mogoi–013)

Informants reported using information exchange to advise one another about drugs that work and those that do not work. Thus, a person will tell a friend or neighbor to try a certain drug because it worked the last time the informer tried it. Sometimes such advice may not be the correct information (see for example [7-20]: Asati–012). Thus, patients may be led to think that they are dealing with a problem that they are not able to treat when in actual fact they are not using the correct medicine.

Accounting for Malaria Increase in Bomorenda

Seventy-one percent (or 25, N=35) of informants reported an increase of malaria cases in Bomorenda compared to the past. There are three etic reasons for this perceived increase. These are: an increase in population size, the architecture of houses, and the emergence of parasites resistant to malaria drugs. These reasons and how they influence the incidence of malaria in Bomorenda are discussed below.

First, increase in population size has caused many people to live closer to one another than they were 20 to 30 years ago as a result of increased land subdivision. Abagusii have a system in which every son in the homestead inherits a piece of land that his father inherited. This is a birthright. Any father who refuses to give his son land can be

taken before a council of elders by the aggrieved for remedial action. Now, land is a fixed asset. With families having on average 2.13 sons, subdivisions have led to a reduction in plot sizes (see for example Hakansson and LeVine 1997: 255). The direct result of these subdivisions is that now more people live closer to each other than in the past.

As a result of reduced plot sizes, crop area is also shrinking. Farmers now have their crops–especially maize and bananas–planted up very close to the houses. The bananas provide a secure breeding place, away from disturbing winds, for the mosquitoes. Banana leaves and petals from the banana flower can hold pools of water for as long as two weeks especially if they are away from direct sunlight. This is longer than the period needed for eggs to hatch and develop into adult mosquitoes. Thus over the years the ecology of the mosquitoes has changed bringing them closer to their victims.

The outcome of land subdivision is twofold. First, as a result of sub-division there are more homesteads across the countryside and the distance between them, as more and more homesteads are built, is reducing. Studies (e.g. Symes 1930) on the behavior of Anopheline mosquito have shown that they can travel over a distance of 4.8 km radius. The total life-span of the female Anopheline mosquito ranges from eight to thirty-four days (Russell and Rao 1942) with blood meals ranging from four to seventeen at room temperature. Thus it is possible for a single vector to get to several homesteads over a couple of days. If this vector is infected and has a blood meal at the homesteads visited, it is possible for it to infect new individuals.

The second consequence is on agricultural practices. Although there has been a decline over the years in family size, there is scarcity of food due to greater demand. The

concept of leaving the land fallow in order for it to recover the lost nutrients has disappeared with the increased demand for agricultural land. The result of this is a reduction in crop yield. Thus farmers plant two maize crops each year, and land close to the homesteads is under cultivation usually with maize and bananas. These crops provide a conducive environment (shade, shelter from winds), and breeding ground for mosquitoes.

The second reason is related to the <u>type of houses</u> common in the area. The traditional architecture common in the area is grass thatched mud-walled houses with open eaves. These architectural designs make the houses comfortably cool during the day and warm at night. However, they are poorly ventilated and lit. Anopheline mosquitoes like areas away from the light where they can rest, undisturbed until night time. Due to poor lighting conditions in the houses mosquitoes may continue feeding on the victims inside the house during the day and at night.

The third reason is related to the <u>emergence of parasites resistant to chloroquine</u>, the drug most widely used in the management of malaria. In many areas of Kenya this is one of the factors influencing malaria endemicity due to ineffectiveness of the drugs used. Thus a combination of population increase, an optimal house environment and a changing ecology have made it more conducive for the mosquito to breed and carry out its vector activities. Because of an increase in population density more people are likely to be bitten by mosquitoes.
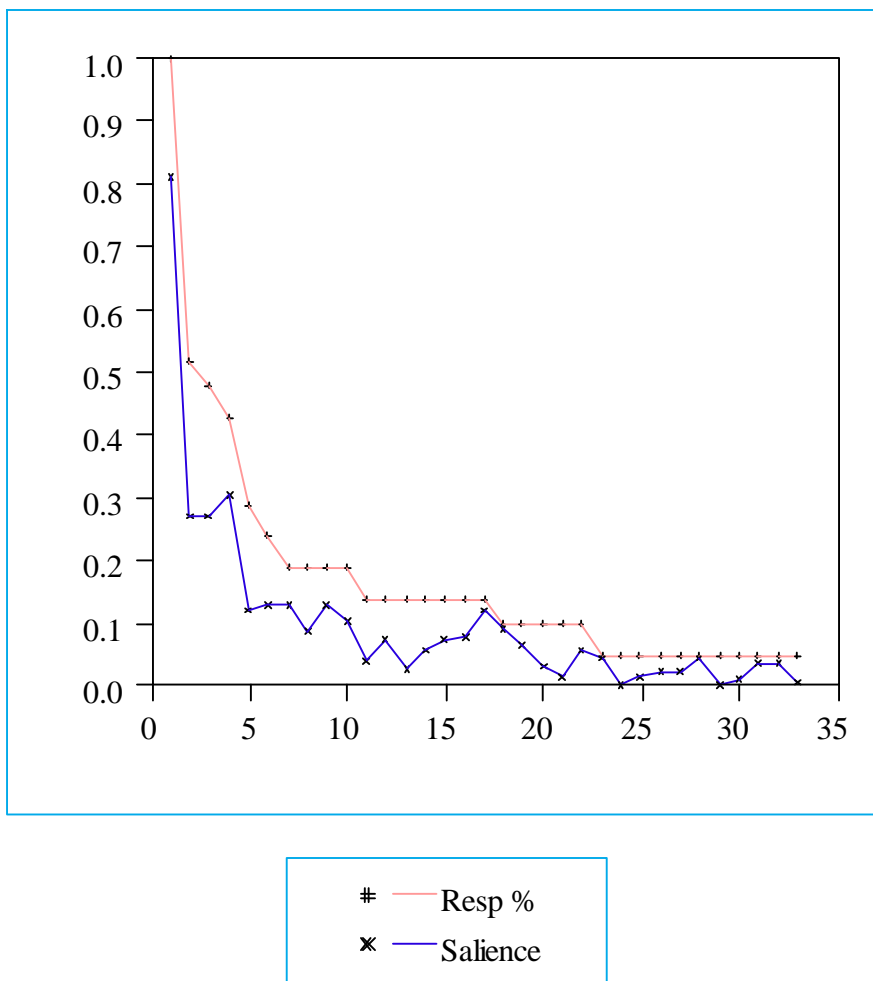
Figure 7.1: Plot of illnesses and their salience in Gusii (N=21)

Key: Illnesses (on X axis)

1 = Malaria	2 = Stomachache	3 = Fever
4 = Flu	5 = Scabies	6 = Measles
7 = Paining eyes	8 = Diarrhea	9 = Pneumonia
10 = Headache	11 = Toothache	12 = *Endwari ya inda* (enlarged spleen)
13 = Body pains	14 = Tuberculosis	15 = Chest pains
16 = Joint pains	17 = Coughing	18 = Backache
19 = Trash	20 = Typhoid	21 = HIV/AIDS
22 = Vomiting	23 = Severe malnutrition	24 = Gonorrhea
25 = Whooping cough	26 = Inflammation of the eye	27 = Kwashiorkor
28 = Meningitis	29 = Feeling cold	30 = Allergy
31 = Asthma	32 = Dizziness	33 = Cirrhosis
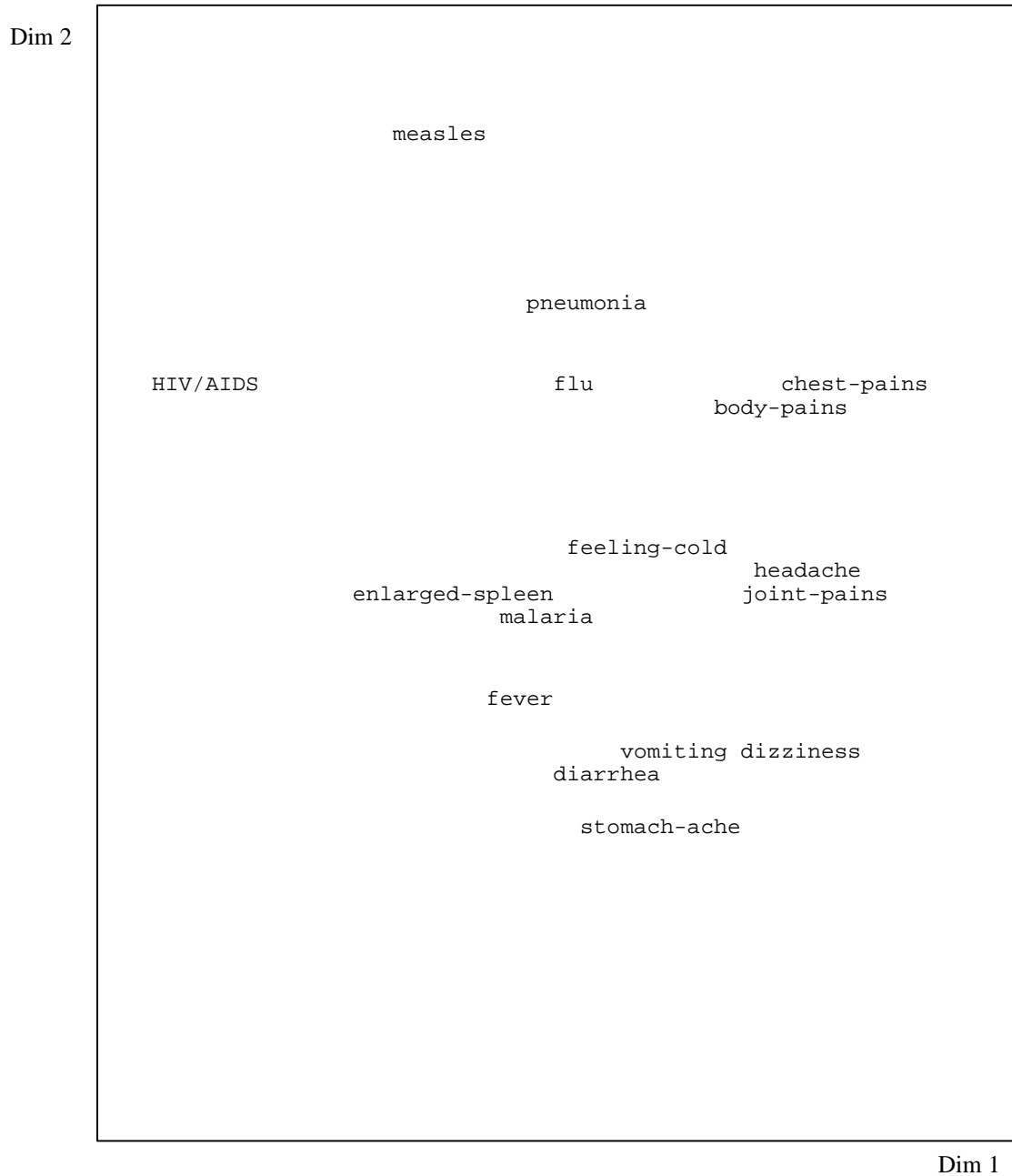
Figure 7.2: Cognitive map of 16 common illnesses in Gusii (N=50, stress = 0.182)–from a λ 2 triad test

```
          F           E   S
          e           n   t           J           C
          e D         l   o       P   o       B   h
        H l i     V D g       m   n   i H o   e
        I i z M o i d       a M e     n e d   s
        V n z a m a s       c e u     t a y   t
        / g i l i r p F h a m       p d p   p
        A c n a t r l e a s o       a a a   a
        I o e r i h e v c l n F i   c i i
        D l s i n e e e h e i l n h n   n
        S d s a g a n r e s a u s e s   s

          1   1   1     1 1 1 1
 Level    9 2 4 1 6 7 3 5 4 8 5 3 2 0 1 6
        _____
 0.8700   . . . . . . . . . . . . . XXX . .
 0.8200   . . . . . XXX . . . . . . XXX . .
 0.7800   . . . . XXX . . . . . . XXX XXX
 0.7400   . . . . XXX . XXX . . . XXX XXX
 0.6933   . . . XXXXX . XXX . . . XXX XXX
 0.6367   . . . XXXXX XXXXX . . . XXX XXX
 0.5800   . XXX XXXXX XXXXX . . . XXX XXX
 0.5222   . XXX XXXXX XXXXX . . . XXXXXXX
 0.5025   . XXX XXXXXXXXXXX . . . XXXXXXX
 0.4600   . XXX XXXXXXXXXXX XXX . XXXXXXX
 0.4278   . XXXXXXXXXXXXXXX XXX . XXXXXXX
 0.3989   . XXXXXXXXXXXXXXX XXX XXXXXXXXX
 0.3005   . XXXXXXXXXXXXXXX XXXXXXXXXXXXX
 0.2511   . XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 0.0994   XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

Figure 7.3: A cluster analysis of 16 illnesses common in Gusii
(using the average method) (N=50)–from a λ 2 triad test[*]

[*]The single-link and complete-link, and average methods all have outputs that have a similar distribution for the 16 illnesses. However, the average method appears closest to our knowledge about malaria and to the distribution of illnesses in Figure 7.2. For these reasons, I have selected the average method over the other two clustering methods.

Figure 7.4: Scree plot of respondent % and salience for 27 symptoms (N=53)

Key: Symptoms (on X axis)
1 = Headache	2 = Shivering	3 = Vomiting
4 = Joint pains	5 = Fever	6 = Diarrhea
7 = Feeling weak	8 = Stomach ache	9 = Dizziness
10 = Loss of appetite	11 = Feeling cold	12 = Aching body
13 = Being dull	14 = Backache	15 = Chest pains
16 = Itching	17 = Stiff neck	18 = Coughing
19 = Being withdrawn	20 = Feeling tired	21 = Bad chest
22 = Being restless	23 = Unusual cries	24 = Nausea
25 = Blisters in the mouth	26 = High Blood Pressure	27 = Mouth has a bitter taste
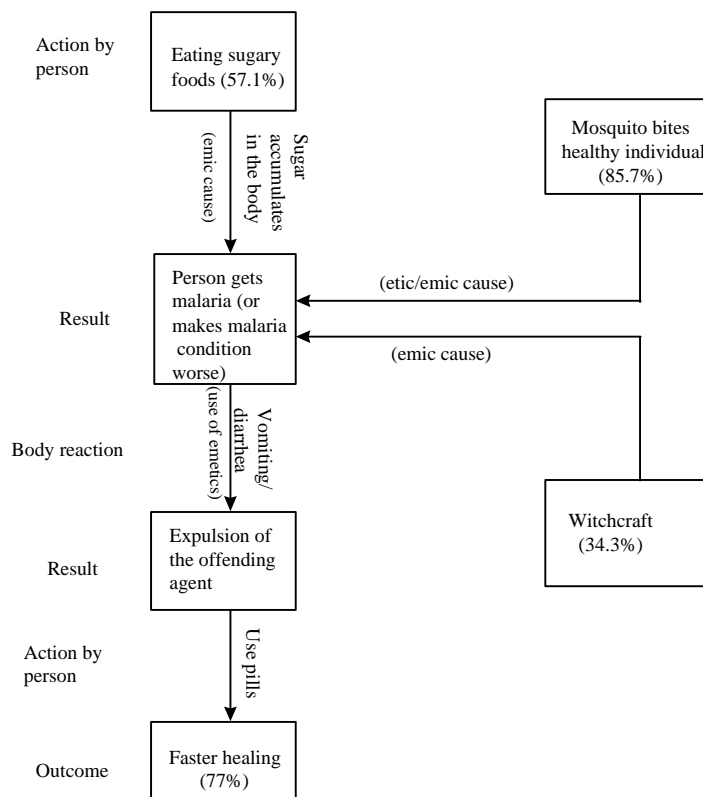
Figure 7.5: A folk model of malaria causation and treatment in Bomorenda
(% is proportion of people responding, N=35)
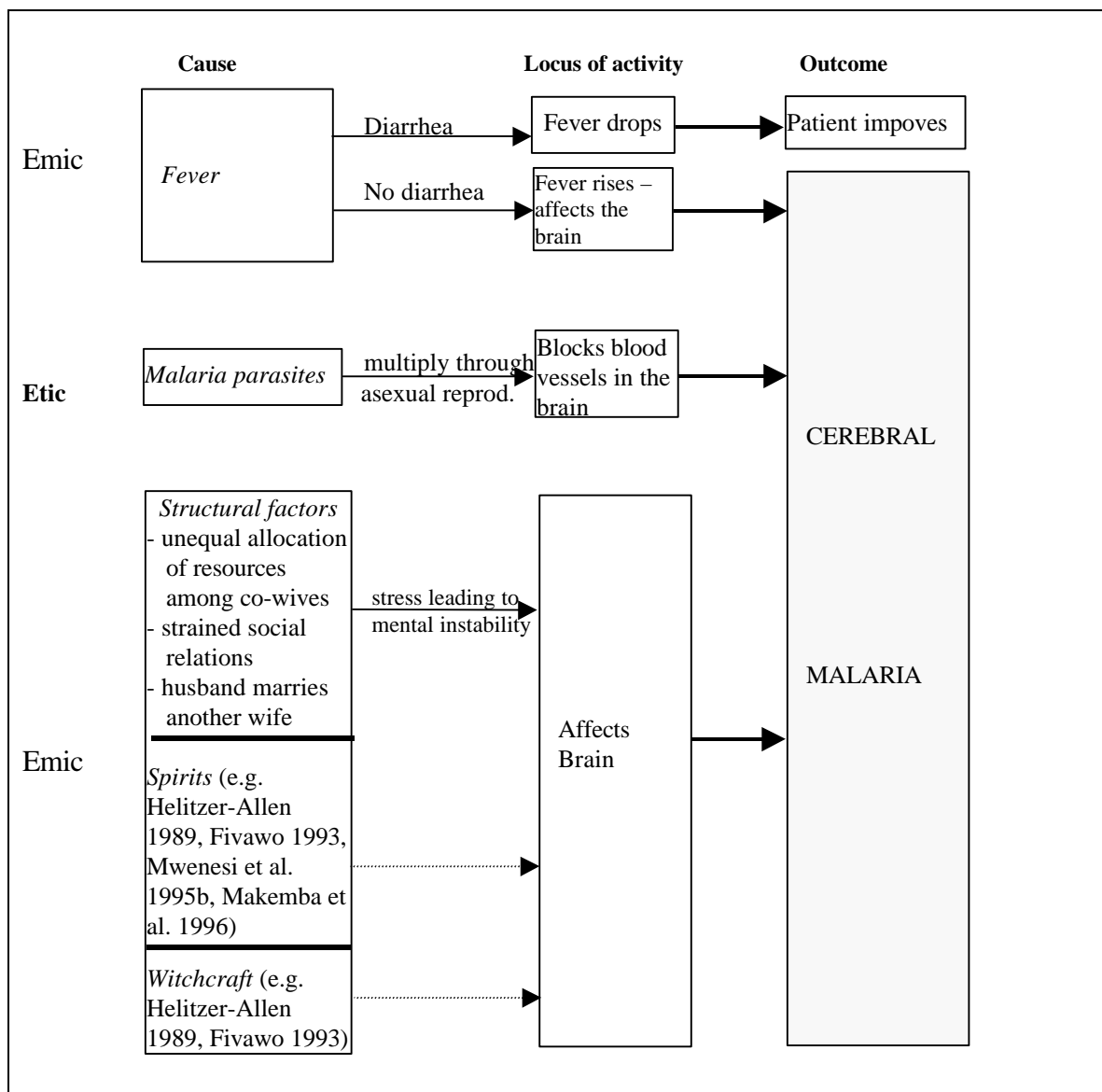
Figure 7.6: Etic/emic model of cerebral malaria (based on Gusii data)

Figure 7.7: Transitions with probabilities (in brackets) made over 3 treatment stages by 35 lay people in Bomorenda.

Dim 2

Children

                    JASP

          PANJ

                CAF   SUPR

                        VIPR

             ASPRO
                   CAFX ASPI   DWQNJ

Fever/pain ── Malaria

          PAN   BENA
                                    MLKFN   MLDRN/DWQN
               DWOL   NOPE   MERQN/FANSD/CHLQN
                                              MLTAB/HOMQN
          PANX   MLQN
                                            MEPA
             ALGN   SPLT
                        HEDAP
          HEDEX
            ACT

                        Adult

Dim 1

Figure 7.8: Cognitive map of 29 drugs used for management of malaria in Gusii (N=49, two dimensional stress = 0.118) from the pilesort exercise[*]

[*]For interpretation of the codes used for drugs see Table 6.3.

```
         H         H                            A D   M   M     H M M C F
     A E     S E D P     N A J P V S C     S W M L B E D M O L L H A
     L D A P D W A P O S A A I U A C P Q E K E R W L M D T L N
     G E C L A O N A P P S N P P F A R N P F N Q Q Q R A Q S
     N X T T P L X N E I P J R R X F O J A N A N N N N N B N D

     1 1 1 1 1       2 2       1 1 1 1 2     2 2       1 2 2 2 2 2
Level 1 3 4 2 7 1 2 0 3 9 3 8 0 8 6 9 4 6 7 8 7 4 5 5 5 2 1 6 9
_____
0.8980  . . .  . . . . . . . . . . . . . . . . . . . . . . XXX . .
0.8776  . XXX .  . . . . . . . . . . . . . . . . . . . . XXXXX .
0.8367  . XXX .  . . . . . . . . . . . . . . . . . . XXXXXXXXXXXXX
0.8163  . XXX .  . . . . . . . . . . . . . . . . . XXXXXXXXXXXXXXX
0.7959  . XXX .  . . . . . . . . . . . . . . . . XXXXXXXXXXXXXXXXX
0.7755  . XXX .  . . . . . . . . . . . . . . . XXXXXXXXXXXXXXXXXXX
0.6531  . XXX .  . . . . . . . . XXX . . . . . XXXXXXXXXXXXXXXXXXX
0.6327  . XXX .  . . . . . XXX XXX . . . . . XXXXXXXXXXXXXXXXXXX
0.6122  . XXX . . . XXX . . XXX XXX . . . . XXXXXXXXXXXXXXXXXXXXX
0.5918  . XXX XXX . XXX . . XXX XXX . . . . XXXXXXXXXXXXXXXXXXXXX
0.5714  . XXX XXX . XXX . . XXX XXX XXXXX . XXXXXXXXXXXXXXXXXXXXX
0.5510  . XXX XXX . XXX . . XXXXXXX XXXXX . XXXXXXXXXXXXXXXXXXXXX
0.5306  . XXXXXXX . XXX . XXXXXXXXX XXXXX . XXXXXXXXXXXXXXXXXXXXX
0.5102  . XXXXXXX XXXXX . XXXXXXXXXXXXXX . XXXXXXXXXXXXXXXXXXXXX
0.4694  . XXXXXXXXXXXXX . XXXXXXXXXXXXXX . XXXXXXXXXXXXXXXXXXXXX
0.4490  XXXXXXXXXXXXXXX . XXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXX
0.4286  XXXXXXXXXXXXXXX XXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXX
0.4082  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXX
        analgesics for adults     analgesics for children      drugs for malaria
0.3878  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

Figure 7.9: A cluster analysis of 29 drugs used to manage malaria in Gusii (using the single-link method) (N=49)[*]

[*]For interpretation of the codes used for the drugs see Table 6.3. I have used the single-link method because it provides distinct clusters that also closely reflect the MDS output in Figure 7.8.

Figure 7.10: Treatment choices made by patients in Bomorenda

Malaria

(2.9%)   (82.9%)   (14.3%)

Self-treatment → success → STOP

fail

(factors e.g. duration, knowledge of health
care provider, cost)

Public/Private facility → success → STOP

fail

(factors e.g. changing notions of causality,
duration)

or

Indigenous medicine → success → STOP

fail
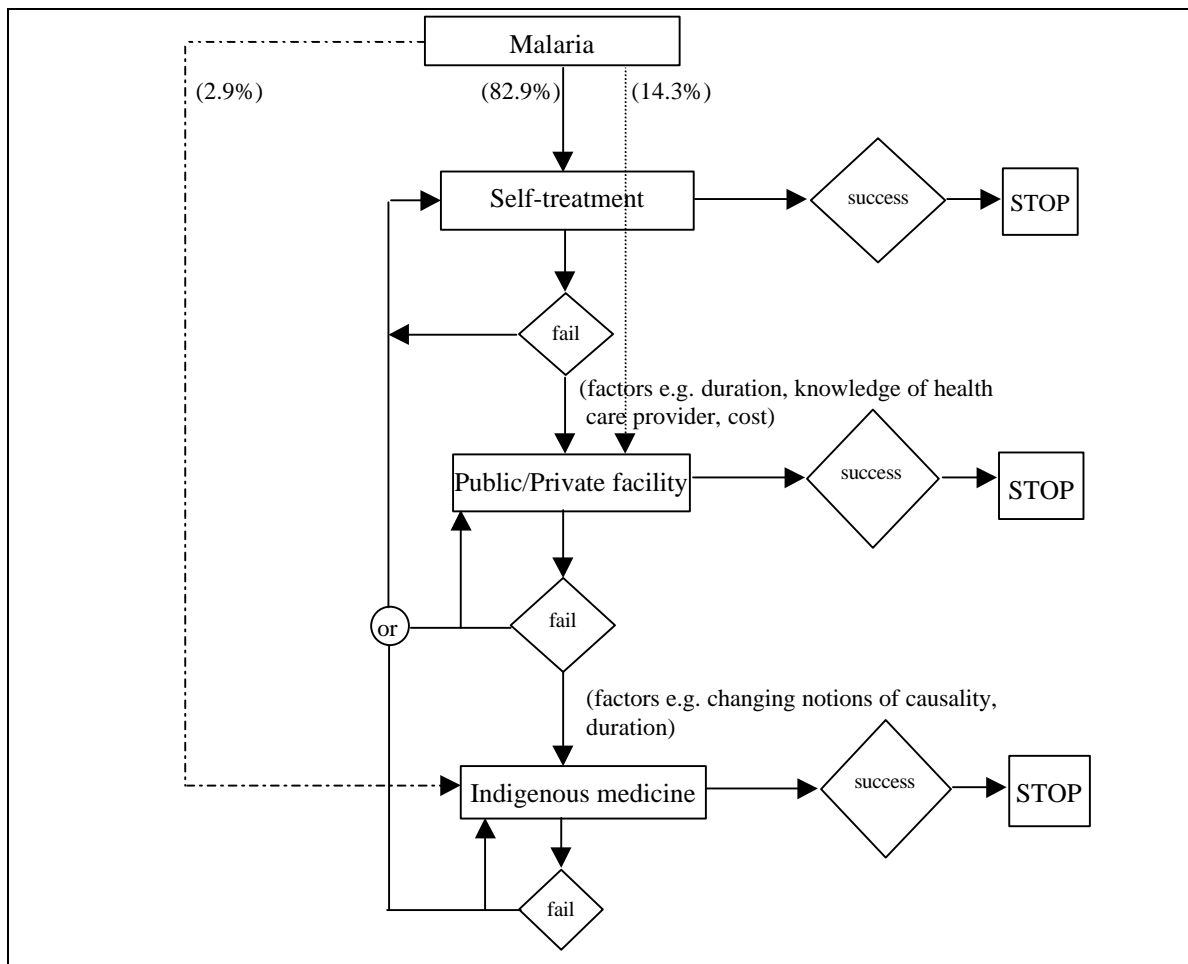
Figure 7.11: Treatment seeking of lay people in Bomorenda.

Table 7.1: What people say about malaria and vomiting

	GENDER		
	Female	Male	
0	3	5	8
1	15	12	27
	18	17	35

Response level 1 = if one reports that vomiting or diarrhea leads to faster healing, 0 = if one reports otherwise

Table 7.2: Lay people's malaria cause-effect beliefs

	CAUSE2 or AVOID2		
	Male	Female	Total
Yes	17	14	31
No	17	22	39
Total	34	36	70

Table 7.3: First, second, and third treatment choices reported by people in Bomorenda

	1st choice	2nd choice	3rd choice
self-treatment (pills)	29 (82.9%[*])	4 (12.5%)	0 (0%)
public facility (govt.)	3 (8.6%)	15 (46.9%)	7 (63.6)
private facility	2 (5.7%)	12 (37.7%)	2 (18.2%)
Herbalist or use of herbs	1 (2.9%)	1 (3.1%)	1 (9.1%)
no treatment sort	0 (0%)	0 (0%)	1 (9.1%)

[*]percentages are give as proportion of people reporting either 1st, 2nd or 3rd choice. Four people reported using more than one treatment option as a 1st choice.

Table 7.4: Decisions patients/care takers make on treatment strategy to adopted

	NOT SERIOUS	SERIOUS (sudden, have money)	SERIOUS (sudden, no money)
WAIT/OBSERVE	- self - dispensary	-	-
ANXIETY	- self - private - dispensary	- private clinic - public hospital	- public hospital
ACCEPTANCE	- self - private - dispensary	- private hospital - public hospital	- public hospital

Table 7.5: Factors affecting utilization of health care facilities

Factors	Private care use	Public care use
Cost	- (expensive)	+ (cheap)
Availability of drugs	+	-
Friendly staff	+	-
Motivated workers (dedicated workers)	+	-
Intensity (serious)	+	-
Intensity (not serious)	-	+
Personal knowledge of provider	+	+

CHAPTER 8
QUANTITATIVE ANALYSIS OF THE ETHNOGRAPHIC DATA FROM
BOMORENDA

In Chapter seven I present findings of data obtained from ethnographic interviews

as well as from triad tests and pile sorts. It is evident from the content analysis of the

malaria-focused narratives that relationships exist regarding lay people's knowledge of

and behavior toward malaria. In this Chapter I look for similarities among informants as

well as test the strength of the relationships of variables relevant to findings reported in

Chapter seven.

I rely chiefly on data from coded malaria-focused narratives (Table 6.1). Each of

the 35 ethnographic texts was coded to produce a total of 86 1–0 codes. The 86 1–0 codes

have been used to generate an aggregate similarity matrix. I also use similarity data from

responses given during the triads tests and pile sorts data collection. Similarity data are

used to test for differences among men and women informants. Since the data from the

malaria-focused narratives are mainly dummy variables, consisting of ones and zeros, I

rely on bivariate statistical analysis and chi-square statistics to test for significant

differences and relationships. I have used cluster and consensus analyses and QAP to

investigate differences among informants.

In the conclusion I draw on findings from this Chapter and from Chapter seven

and assess the utility of the biocultural model. Based on these results I make suggestions

on possible areas for policy intervention so as to improve delivery of health care services.

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Testing for Differences Among Informants

Before looking into the various bivariate statistics, I would like to answer the

question: Are there differences in responses between men and women informants? In

order to answer this question, I have used all of the 86 dichotomous variables for this

exercise. I separated the data into two groups, one for the male informants (N=17) and

the other for the female informants (N=18), and then generated a similarity matrix for

each group by matching the responses within each group. ANTHROPAC (Borgatti 1993)

has a procedure for doing this exercise.

After creating two proximity matrices of informant's responses, I performed a

quadratic assignment procedure (QAP, Hubert and Schultz 1976) using ANTHROPAC

by correlating the two proximity matrices. The correlation, using a permutation test, is

.847, $p < .0001$, and r-square is .72. These results reinforce further those from pile sorts

and triads test, in Chapter six, that there are no significant differences between men and

women with regard to knowledge of malaria. In Chapter six, a QAP analysis for the triads

tests of 16 illnesses common in Bomorenda yields a correlation of .94 ($p < .0001$, r-

square is .88) while that for pile sorts of 29 drugs used to manage malaria yields a

correlation of .878 ($p < .0001$, r-square is .772).

A cluster analysis of the 35 informants interviewed for the malaria-focused

narratives produces a pyramid-like block (Figure 8.1). The distribution of informants

across the cluster diagram is not based on the informant's gender. However, there are

variations which are based on informant's age. For example informant 4F is a female

aged 80 years. This informant's responses were at variance with the most of the group.

For example she reported that malaria can not be prevented because it is brought by bad air and that when she has malaria she just waits for it to go away or uses herbs to treat it. Consensus analysis results indicate that she agrees less with other group members. In general informants cluster into three groups with age as the distinguishing factor. The average age of the first group (A) is 50 years, in the second group (B), the average age of informants is 40 years, while in the third group (C) the average age is 46 years. Older individuals join the clusters later than the younger informants. Logistic regression results, which I present later, indicate that age influences what informants said. That influence is significant in two variables: belief that an enlarged liver is a more serious condition than an enlarged spleen and that mosquito bites cause malaria. The logistic regression results reveal that older informants are more likely to say that sugary foods can also cause malaria.

Consensus analysis results (Table 8.1) show that the first factor is more than three times the second factor. In other words the group does not have sub-cultures within it. These results taken together with those of QAP for triads tests and pile sorts indicate that what we have is a single group. Therefore analyzing it as a unit should have little or no influence on the outcome. I am still left with the task of explaining why there are no differences among informants.

Although I did all the coding myself, over a two-month period, it is unlikely that I would have created this similarity through a systematic bias. The only way for me to test whether I introduced my own biases, is to give the entire text to another Gusii speaking person to do the coding and then test for inter-rater agreement. This I have not been able to do due to non-availability of another Gusii speaker to perform the coding. I think the

reason for lack of differences is that malaria is an everyday concern for many people

in Gusii. At any given time a person resident in Gusii is likely to know someone–a

member of the immediate or extended family or a friend–with malaria. Due to its high

occurrence, the knowledge of malaria is fairly constant and the manner in which they

respond to malaria is uniform. For example, in Chapter seven it is evident that lay people

in Bomorenda recognize specific symptoms to diagnose malaria. In general informants in

Bomorenda mentioned on average 6 symptoms (sd. = 2). These symptoms are also

reported in studies from other sites (e.g. Jackson 1985–Liberia; Agyepong 1992–Ghana;

Jayawardene 1993–Sri Lanka; Kengeya-Kayongo et al. 1994–Uganda, among others).

Anthropologists (e.g. Garro 1986; Mathews 1982) have argued that "in recurrent

choice situations, like that of illness, … the members of a given group often come to have

a common set of cultural standards" (Garro 1986: 177). The strategies or heuristics that

people adopt involves the use of fixed sequences although the strategies may not always

be successful (Mathews 1982: 181). Lay people are more likely to change their health-

seeking strategy so as to maximize chances of success. They make transitions from one

health care alternative to another in an effort to get responsive treatment.

Treatment Transitions–How Does Duration of Illness Influence Use of Health Care Alternatives?

In Chapter seven I have shown that the patients' tendency is to seek treatment

outside the home when the illness takes long to heal. In the transition state probabilities I

give in Figure 8.2, this tendency is very clear. I have only followed the 29 cases of people

reporting self-treatment at time t, where t is the initial treatment choice. Other cases are

too few to follow over the three transition periods. At time *t* the probability of using

self-treatment is .83. The probability of seeking other treatments at time *t* is .09 for

government clinic, .06 for private clinic, .03 for herbal treatment, and no one reported not

seeking treatment at *t* (see Figure 7.7, probabilities rounded off to two decimal places).

However, given that their initial choice was self-treatment, at time *t*+1, the probability of

an individual using self-treatment drops to .07 and then to zero at *t*+2 (Figure 7.7).

The transition states probabilities provide important information on lay people's

shifting behavior in the utilization of the various health care alternatives over the entire

period, from time *t* to time *t*+2. Of the people who reported using self-treatment at time *t*,

some moved to a public health care facility (prob. = .43) while others went to a facility

operated by a private health care provider (prob. = .34) during state two, *t*+1 (Figure 8.2).

All of those who chose to continue with self-treatment at time *t*+1 opted for a public

health care facility during state three, *t*+2 (prob. = 1.0). Those who used a public facility

at time *t*+1 shifted, during state three, *t*+2, to a private health care facility (prob. = .13) or

shifted to use of herbs (prob. = .07) if the illness did not improve. In contrast, those who

reported use of private health care facilities at time *t*+2 reported either that they got well

(prob. = .58) or that they continued with treatment at the private health care clinics (prob.

= .42) at time *t*+2.

It is clear from these cases that the patients' tendency is to progressively move

from self-treatment, with pharmaceuticals bought from the shops, to the use of private

health care facilities if the illness lasts long. Is this the case? The chi-square results reveal

a significant association between using self-treatment at time *t* and using treatment

outside the home (public or private) at time, *t*+1 (χ^2 = 18.103, df=1, p < .0001 2-tailed,

Table 8.2). The degree of association as indicated by Cramer's V is high (Cramer's V

= .719). First, patients are more likely to use, as their next resort, public health care

facilities and then move on to private health care facilities. These results are consistent

with the ethnographic findings. Though I do not have data for time $t+3$, I suspect that

patients will go to a hospital if the illness does not improve. This is because patients and

caretakers become more concerned of an illness that does not go away quickly. Such an

illness affects the productivity by taking away important labor resources. The illness

might involve admission into hospital and the local facilities do not have the capacity to

care for in-patients.

Figure 8.3 shows the patient's likely movements and the likelihood estimates

between the various transition points. From the transition states, the probability of getting

to END (where END is getting well) at time $t+2$ for those opting for public facilities is

.343 while for those opting for private health care facilities the probability is .202. All the

three states taken together have a success rate of 71.7% (Figure 8.3, all the arrows

pointing to END).

When the success rate for public facilities and that for private facilities are

compared, that for public facilities is higher. Why is there a higher success rate at public

health care facilities despite pointing out in Chapter seven that patients generally are not

satisfied with the services provided at public health care facilities? Without actual

behavioral data, it is difficult to answer this question conclusively at the moment. I leave

that for the next phase of my focus on malaria. However, the most plausible explanation I

can provide has to do with the intensity of the illness. In Chapter seven I have pointed out

that patients are more likely to go to a private health care facility if the illness is regarded

as severe. They prefer the private health care facilities because those facilities are considered as having stronger, albeit more expensive, drugs than the government facilities. If the illness is severe, the patient is likely to take longer to get well and they are also likely to continue with treatment at the private health care facilities until they are well.

Maintaining Good Credit Record with Private Health Care Providers

Except for one female informant who is a primary school teacher, none of the people I interviewed have any regular wage employment. Those who do not have regular employment have no health care insurance cover. The teacher is covered under the National Hospital Insurance Fund (NHIF). Thus the majority of the informants rely on income from the sale of small-scale farm produce or on the sale of chicken (see for example quote from Bochaberi–011 [7-15]). This income is spent on the family needs–meeting the costs of sending children to school, purchase of clothing and items for the household. This income does not last them long and usually the frequency of sales is far between. Operating under these conditions can limit access to the private health care clinics.

If health care is expensive are people who have access to care on credit from private clinics likely to report making an effort to maintain a good record of repayment? This gives them good credit rating which, in turn, acts as a form of health insurance cover. It guarantees the people access to quality health care. This should be the case. In deed informants reported that they make an effort to build a good credit record with the

private health care clinics so that in times of need they can be treated and then pay

their debts later.

The chi-square statistic between getting treatment on credit (ACREDIT) and

informant's attempt to build a good credit record by settling the outstanding amount due

at the earliest opportunity (ACREDITR) reveals a significant association (Fisher's exact

test p < .001, 2-tailed) (Table 8.3). That association is high, Cramer's V = .753.

Malaria, Sugary Foods and Use of Pills

Data from the 35 informants reveal that 57.1% reported sugary foods can cause

malaria. I have tested whether what they report about sugary foods is supported by

whether they also reported trying to avoid those types of foods when they have malaria.

The distribution of their responses is given in Table 8.4. The Fisher's exact test p-value is

less than .001 (2-tailed) and the association between belief that sugary foods can cause

malaria and informants' reports that the foods should be avoided is moderate (Cramer's

V = .462). In other words, there is consistency in what they report. I would, however, in

the future, like to get actual behavioral data to test out what informants report.

Use of some malaria drugs, especially the chloroquine-based, may have side

effects. For example, Malaraquin makes some patients itch. This side effect causes some

patients to avoid use of malaria drugs (see for example quote from Bochaberi–011 [7-13]

or it may make them non-compliant fearing that a complete dose may cause them to itch.

On the other hand, some patients regard the presence of itching as a sign that the

medicine is working. Patients reported two ways they respond to itching caused by the

medicines for malaria. Some informants (14.3%) reported that they use Piritons and while 5.7% of informants reported using Aspirin to counter this side effect of malaria tablets.

A chi-square statistic yields a significant association (at p < .05) between AITCH (whether informant reported that use of malaria pills causes itching) and the action AAITCH1 (use of Piritons to prevent or stop the itching) (Table 8.5). This association is moderate (Cramer's V = .445). About 46% of informants reported itching when they use malaraquin pills and 31% of them reported that they use Piritons to relieve the itch. None of the informants reported using both the Piritons and Aspirins to stop the itching. If they used a Piriton they were less likely to use Aspirin to relieve itching as well.

<u>Malaria Symptoms, Illness Recognition and Treatment Seeking</u>

In order to understand how lay people recognize malaria, I coded for the symptoms they mentioned during the malaria-focused narratives. The signs mentioned include headache, loss of appetite, feeling cold, aching body, child being dull, crying child, shivering, fever, vomiting, paining joints, diarrhea, feeling weak, stomach ache and feeling dizzy (head, l-appetite, f.cold, a.body, child.d, child.c, shiver, fever, vomit, j.pains, diarrhea, f.weak, stomach, and dizzy). These were coded as one if mentioned by an informant otherwise they were coded as zero.

A number of these symptoms are significantly correlated at p = 0.05 or less (Table 8.6). Apart from two symptoms–child being dull and aching body, the rest are the same symptoms with the highest salience (Table 6.1 and Figure 7.4). This indicates their

relative importance in the diagnosis of malaria in Gusii. The same symptoms have

been found to be important predictors of health care behavior (see Ryan 1995). For

example in Kom, Cameroon, Ryan (1995: 216) reports that "signs of headache or fever

and diagnosis of headache and fever both predict the use of home remedies and pills."

Patients or their caretakers choose from among several health care alternatives.

These alternatives are discussed in relation to transitions made over the three states. Self

treatment (ATREAT11) using pharmaceutical from the shops is significantly correlated

(p < .05) with use of a public health care facility (ATREAT22) at time two (t+1) (Table

8.7). Use of public facility at time two (ATREAT22) is significantly correlated (p < .01)

with use of public facility at time three (ATREAT32). However, this relationship is

negative. This indicates that if an informant mentioned using public health care facility

during t+1, they were less likely to have mentioned using the same source at t+2. Thus

patients will tend to avoid use of public facility at time three t+2 if they have used it at

time two t+1. These results taken together with those of the transition state probabilities

suggest a general tendency to shift from public facilities to other sources of health care,

notably private facilities.

<u>Predicting Outcomes from Informants' Characteristics</u>

In order to predict what informants say, I use logistic regression to model their

personal characteristics–age, gender, and socio-economic status, and what they reported

during the interviews. I performed the regression on several outcome variables. The

variables used include the following: whether informants reported using a public or

private health care facility for treatment, informants' views about the gravity of an enlarged spleen vs. an enlarged liver, their beliefs about malaria and knowledge about the cause of malaria.

Out of the three independent variables used in the regression model, only age significantly predicts two outcome variables–belief that an enlarged liver is a more serious condition than an enlarged spleen and that mosquito bites cause malaria. In both cases the probability is less than .05. A person's gender and socio-economic status do not predict what they will say about malaria. Given that there are no differences between men and women in their responses in the pile sorts, triads tests, and in the coded information, it is unlikely that gender is a factor influencing their responses, at least in the case of malaria. Also socio-economic status shows little variation among the 35 cases.

Over 65% of the responses on whether an enlarged liver is the more serious condition compared to an enlarged spleen are correctly predicted by age alone ($p < .05$) using the stepwise logistic regression (forward method) (Table 8.8). However, when other predictors (gender and socio-economic status) are added prediction drops to 57%.

In the second model, knowledge that malaria is caused by mosquito bites is correctly predicted 88% of the time taking all the predictor variables together (Table 8.9). The significant effect of age, however, disappears when the predictors are modeled using stepwise logistic regression. The Hosmer-Lemeshow[1] goodness-of-fit indicates that the

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[1] The Hosmer-Lemeshow procedure tests the null hypothesis that the logit model estimates can not be distinguished from the observed data, i.e. that the model generated predictions are significantly different from the observed probabilities. High probabilities mean that the model generates accurate predictions. The p-value of the Hosmer-Lemeshow statistic is .745 for Table 8.8 while for Table 8.9 the statistic is .356. These probabilities show that the simulations accurately model the observed data.

two models correctly model the data. The p-value for Table 8.8 is .745 and that for

Table 8.9 is .356.

The results of the logistic regression tell us that knowledge is a function of age, at

least in their knowledge of the extent of seriousness of an enlarged liver. This does not

seem to be the case with knowledge regarding role of mosquitoes in causing malaria.

That could explain why the effect of age disappears when considered on its own using

stepwise logistic regression modeling. With a very high prediction of 96.7% (Table 8.9)

for those reporting correctly that mosquito bites can cause malaria, age should have no

effect.

<p style="text-align:center">Conclusion</p>

<u>Summary of Findings</u>

This study presents findings of lay people's health care seeking behavior in

Bomorenda, Kisii District. It provides a baseline on which I will build future research. I

set out to investigate how lay people in Gusii recognize and respond to malaria. I chose

Bomorenda because of three main reasons. First, the area has a plural health care system.

When patients are faced with an illness, they make health care choices from among the

various alternatives. Thus, I ask–What factors influence people's health care choices in

Bomorenda? The second reason is related to communication. Because of poor

infrastructure–poorly maintained roads and lack of telephone facilities, patients find it

expensive to access health care when they need it. The facilities are far between. Thus,

distance raises the cost of accessing them. Cost, in turn, can (and does) affect the

utilization of the health care facilities. Ethnographic data clearly indicate that cost is a factor considered when lay people make treatment choices. Lastly, due to inadequate sources of income–the only significant source of income for most families is petty trade, residents have low purchasing power. The situation in Bomorenda makes it ideal to apply the biocultural model.

I used a combination of systematic data collection methods and malaria-focused ethnographic interviews to collect data over a ten-month period from February 1997 to November 1997. I personally interviewed and collected all the malaria-focused ethnographic interviews while my research assistants collected triads and pile sorts data. Informants granted permission to tape record the malaria-focused ethnographic interviews. Later these interviews were transcribed in Ekegusii, the original language of the interviews. Only those sections quoted in the dissertation have been translated into English. The original texts of the translated parts, however, are given in Appendix E. I created ninety-two codes for the coding of transcribed data. Coding was done in EZ-Text (Carey et al. 1997) and the comma-delimited data were then imported into SPSS for further analysis.

The study yields a number of findings. The first relates to people's notions about malaria causation. People in Gusii have multiple notions of malaria causation. They ascribe the cause of malaria to mosquito bites (85.7%), eating of sugary foods (57.1%) and witchcraft (34.3%). This study indicates that people use both the emic and the known biomedical causes of malaria. The treatment-seeking behavior reflects the multiple notions of causality held by the Gusii. A majority of the people (82.9%) opts for self-treatment with over-the-counter drugs as a first line of treatment.

Secondly, the treatment-seeking behavior reflect means used by lay people to limit the impact of malaria on the family's resources. They, first, start with a cost saving strategy–self-treatment as they evaluate the progression of the disease. If this fails they will use private clinics or government facilities. They prefer the latter, due to its lower cost, and will use them over the private clinics if they establish that the public facilities have drugs. An exception is when malaria is serious. Then, they by-pass self-treatment to go straight to professionals (private and government health care facilities) for treatment. Statistical analysis of informants' reported behavior show significant association (Fisher's exact test p < .0001) between self-treatment at time t and treatment outside the home at time $t+1$.

Informants are disappointed because of poor services they get at public health care facilities. These facilities often lack drugs even though users pay for drugs following the cost-sharing policy adopted by the government. When cost-sharing was introduced the government's aim was to reduce its own expenditure on health care while ensuring that health care facilities had the necessary drugs. However, this policy has not been successful due to inadequate drug supply. Whenever there are no drugs, patients are asked to go and buy drugs from the local pharmacy stores. This is expensive and time consuming. In order to save time, patients go directly to private facilities where they can get a prescription and medicine. The latter facilities stock their own drugs that they buy at wholesale price. Lay people make an effort to maintain a good credit rating (p < .001). This acts like insurance for them.

The third finding relates to ecological factors. The ecology of Gusii provides a favorable environment for the mosquito. This in turn contributes to an increase in the

incidence of malaria. The ecology has changed as a result of increased farming

activity. Due to an increase in land sub-division and population pressure more people live

closer than was the case in the past. They also farm very close to their homes or the

neighboring homes. Bananas, a major source of income for families, are planted close to

the homes. The bananas provide an optimal environment for the mosquitoes to breed and

they can shelter there during the day before they come out at night. The traditional grass

thatched houses compound the mosquito problem. These houses also provide optimal

environment for the mosquitoes. The interior is dark and warm thus making it possible

for the mosquitoes to continue with their biting activity even during the day when people

are in the house. Patients are likely to be visited by family and friends. The visits add an

opportunity for the infected mosquitoes to bite and transmit parasites to those who are

visiting.

Cultural factors also influence the ecology of the mosquito in Gusii. These factors

include land inheritance practices and the type of houses constructed. Land inheritance in

Gusii is governed by a principle through which male children inherit their father's land.

Each married woman strives to get a male child. In fact her status in the family is

characterized by instability until she bears a son. Men will often get a second wife in an

effort to get a son if the first wife does not. Each son builds a home on a section of the

land he inherits and carries farming activity on the remaining portion. The houses

common in the area are either grass thatched or have mud walls with open eaves. These

type of houses have been linked to higher malaria attacks (e.g. Adiamah et al. 1993). In

The Gambia, Adiamah et al. found that mud-walled buildings and bed rooms without

ceilings were found more frequently in the households of children who had experienced

malaria. Growing bananas close to homesteads and construction of grass-thatched houses increases the mosquito population, biting frequency, and an increase in the likelihood of transmission of *Plasmodium*.

In order to counter malaria a majority of lay people (82.9%) start with self-treatment. They use over-the-counter medicines or those remaining from prior malaria episodes. This has a number of consequences. First, patients/care-takers must be able to recognize and know the appropriate medicines. This knowledge is demonstrated in their responses. Informants mentioned a variety of medicines used for the management of malaria. An MDS of drugs used for the management of malaria indicates that they consider certain drugs as appropriate for treating children and those appropriate for treating adults. Informants also differentiate between analgesics and malaria drugs. However, they must constantly guard against getting incorrect information regarding the use of various medicines. Obtaining incorrect information is a possibility, as indicated by some informants (see for example what Asati–012 says in quote [7-20]), and can affect the health outcome.

Lay people have devised means to combat the problem of malaria. Information exchange, keeping of the remaining drugs as a reserve, waiting for a time while observing the patient's progress are all ways they use to minimize the cost due to malaria. However, people will respond appropriately when the illness is threatening, the major concern being the preservation of life. In the event of a serious malaria condition, patients by-pass self-treatment to go straight to a professional at the private or public health care facility where they can get more specialized attention.

This study finds that some patients explain cerebral malaria as a result of unstable social relations in the family. Accordingly, quarreling can cause social strain leading to cerebral malaria. Witchcraft is also implicated in some cases.

An enlarged spleen, *endwari ya inda*, is not readily associated with malaria. People in Bomorenda consider it as different from malaria and so is their treatment-seeking behavior. Repeated attacks of malaria can result in an enlarged spleen. Spleen palpation is used as a measure of malaria endemicity (Kenya, Republic of 1992; Roberts 1974). Almost all informants mentioned use of herbs as the first choice of treatment for an enlarged spleen. Thus it may take longer to treat an actual case of malaria than it would normally take if it is diagnosed as *endwari ya inda*. This has implications for patient's malaria prognosis. The parasites that cause malaria stay in the body for a long time and may influence drug resistance.

Utility of the Biocultural Model and Policy Implications

The biocultural model links infrastructural, structural and cultural factors and enables me to account for Abagusii's response to malaria. This model helps me demonstrate that ecological, macro-economic as well as cultural factors play a major role in people's responses to illness and in sustaining the malaria levels. The model also brings into the analysis historical and contemporary issues that are relevant to the current malaria situation in Bomorenda. It is possible to apply and demonstrate the utility of this model in other areas in order to assess its suitability in studies of lay people's response to malaria and on studies of malaria control as well as the control of other illnesses.

Particularly, the model reveals the importance of ecological and cultural factors in sustaining the mosquito density in Bomorenda. For example, due to changes in population density, farming practices have changed over the last 30 years. Population pressure on the land is demonstrated by an increase in demand for land to cultivate food and other crops. This results in cultivation of land very close to and surrounding the homestead. In some cases banana crop and corn are planted less than 15 meters from the houses. At the same time grass thatched houses common in Bomorenda provide optimal conditions for mosquitoes to shelter. These conditions taken together help to sustain the anophiline mosquito population which, in turn, influences the rates of parasite transmission and subsequently the level of malaria in the population.

Thus, this model makes it possible for me to link population issues to the study of people's response to malaria. I use population density as an indirect indicator of the distance mosquitoes have to go before they get to the next person and probability that someone will be bitten by an infected mosquito. However, we still need detailed studies of mosquito behavior under these conditions. Such studies will answer the following two questions: How far do mosquitoes travel under Gusii ecological conditions? How many people are they likely to bite over that distance? What is the probability of an individual in the area being bitten by an infected mosquito? Answers to these and similar questions will make it possible for us to determine more directly the potential impact of the anophiline mosquitoes on the population in Bomorenda and other areas of similar ecological conditions by calculating the relative risks that the population faces.

The model also enables me to bring into focus macro-economic factors such as costs incurred to access health care facilities and to get treatment. The cost incurred in

accessing the facilities are themselves influenced by the location from the patients'

homes of the health care facilities. Higher costs are likely to prevent patients from using

health care facilities unless the health condition of the patient is such that they must seek

professional help. It is typical for patients in Bomorenda to wait for a time as they assess

their condition.

These findings have potential policy implications. Towards the end of 1989 the

government of Kenya with the support of the World Bank introduced cost-sharing at

government health care facilities. Together with the Bamako Initiative, cost-sharing is

aimed at bringing services close to the majority of the users–the people in rural areas.

When cost-sharing was introduced utilization of government health care facilities

dropped while use of private facilities increased during the same period. The Bamako

Initiative was introduced to improve drug supply to health care facilities. However, as

this study reveals users at government facilities face problems related to drug supply.

There is frequent shortage of drugs especially during the rainy season when high demand

results from increased malaria cases. Patients pay for health care services but complain

that they are not given drugs because often the prescribed drugs are in short supply. This

makes patients to avoid government facilities or to prolong waiting period before

consulting a professional. They resort to self-treatment using drugs bought from the

shops or left-over drugs from previous malaria episodes and, when they consider an

ailment to be serious they go to private health care facilities. Use of drugs remaining from

earlier malaria episodes may be indicative of the fact that patients do not complete

swallowing their doses when they are sick, a contributing factor in the development of

parasites resistant to drugs used for the management of malaria.

The government must therefore address issues related to its drug supply program. Specifically, it must enhance and institute ways to improve monitoring of drug supply from the central drug stores. One area they could address is ensuring that early returns from public facilities are filed and to emphasize the importance of drawing up projections of drug requirements based on morbidity statistics collected from each of its outlying facilities. Statistical records are easily available from the health care institutions.

Putting in place educational programs that teach people low-cost mosquito control initiatives is a second area of possible intervention. Educational programs should encourage people to construct houses that do not have open eaves. Open eaves, which make rooms cool by allowing warm air to escape, could be replaced by ventilation screens. Use of physical barriers, like screens, lead to a reduction in the incidence of malaria by reducing the risk of mosquito bites. It is known that houses with no ceiling are associated with higher malaria rates (see Adiamah et al. 1993). Houses in Bomorenda usually have no ceilings. Lay people should be encouraged to use inexpensive materials like newspapers to install low-cost ceilings. A ceiling made from newspaper material will make rooms bright by reflecting light thus creating unfavorable conditions for the mosquito.

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            2 1   1   2 1 2 1 2 2 2   1 3 1 3 1       3 3 3 2 3 1 1   2 2 1 2
          4 1 7 2 8 1 6 9 2 4 3 4 7 3 6 1 1 4 3 6 7 2 0 3 8 5 5 0 8 0 5 2 9 5 9
          F F F M F M F F F M F M F M F M F M M M M F M M F M F F M F M M F M F
          8 3 6 5 5 4 3 5 5 4 2 5 2 6 3 4 3 3 6 3 4 2 6 1 2 2 4 3 5 4 3 3 5 4 6
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0.7111    . . . . . . . . . . . . . . . . . . . . . . . . XXX . . . . . . . . . .
0.6353    . . . . . . . . . . . . . . . . . . . . . . XXX . . . XXX . . . . . . . .
0.5936    . . . . . . . . . . . . . . . . . . . . . . XXX . . . XXX . XXX . . . . . .
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0.5770    . . . . . . . . . . . . . . . . . . . . . . XXX . . . XXX XXXXX . . XXX . .
0.5727    . . . . . . . . . . . . . . . . . . . . . . XXX . . XXXXX XXXXX . . XXX . .
0.5707    . . . . . . . . . . . . . . . . . . . . . . XXX . . XXXXX XXXXX . . XXX XXX
0.5574    . . . . . . . XXX . . . . . . . . . . . . . XXX . . XXXXX XXXXX . . XXX XXX
0.5433    . . . . . . . XXX . . . . . . . . . . . . XXX . XXXXXXX XXXXX . . XXX XXX
0.5423    . . . . . . . XXX . . . . . XXX . . . XXX . XXXXXXX XXXXX . . XXX XXX
0.5417    . . . . . . . XXX . XXX . . XXX . . . XXX . XXXXXXX XXXXX . . XXX XXX
0.5297    . . . . . . . XXX . XXX . . XXX . . XXXXX . XXXXXXX XXXXX . . XXX XXX
0.5091    . . . . . . . XXX . XXX . . XXX . . XXXXX XXXXXXXXX XXXXX . . XXX XXX
0.5090    . . . . . . . XXX . XXX . . XXX XXX XXXXX XXXXXXXXX XXXXX . . XXX XXX
0.5013    . . XXX . . . XXX . XXX . . XXX XXX XXXXX XXXXXXXXX XXXXX . . XXX XXX
0.4971    . . XXX . . . XXX . XXX . . XXX XXX XXXXX XXXXXXXXX XXXXX . . . XXXXXXX
0.4846    . . XXX . . . XXX . XXX . . XXX XXX XXXXX XXXXXXXXXXXXX . . . XXXXXXX
0.4824    . . XXX . . . XXX XXXXX . . XXX XXX XXXXX XXXXXXXXXXXXX . . . XXXXXXX
0.4776    . . XXX . . . XXX XXXXX . . XXX XXX XXXXX XXXXXXXXXXXXXXX XXX XXXXXXX
0.4683    . . XXX . . . XXX XXXXX XXX XXX XXX XXXXX XXXXXXXXXXXXXXX XXX XXXXXXX
0.4413    . . XXX . . . XXX XXXXX XXX XXX XXXXXXXXX XXXXXXXXXXXXXXX XXX XXXXXXX
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0.3713    . . XXX . XXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXX
0.3607    . . XXX . XXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXX
0.3225    . . XXX XXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXX
0.2891    . . XXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXX
0.2432    . . XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXX
0.1999    . XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXX
0.1826    XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
          X              A         X              B              X     C     X
          XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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M = Male, F = Female, Informant's age is given in bold figures. For example informant 4F is female aged 80 years.

Figure 8.1: Johnson's hierarchical clustering of informants using the average method (N=35)

t (n=29)	*t+1 (n=29)*	*prob.*
self	self	= (.829 x .069) = .0572
self	public	= (.829 x .517) = .4290
self	private	= (.829 x .414) = .3432
self	public/private	= (.829 x .93) = .772

t (n=29)	*t+1 (n=29)*	*t+2 (n=29)*	*prob.*
self	self	public = (.829 x .069x 1.0) = .058
self	public	private = (.829 x .517x .133) = .056
self	public	herbal = (.829 x .517x .067) = .030
self	public	END = (.829 x .517x .80) = .343
self	private	private = (.829 x .414 x .417) = .143
self	private	END = (.829 x .414 x .58) = .202

Combined public and private

self	pub/priv.	Pub/priv = (.057 + .143) = .200
self	pub/priv.	END = (.343 + .202) = .545

Figure 8.2: Transition state probabilities for 5 treatment choices from time *t* to time *t*+2 (N=29)
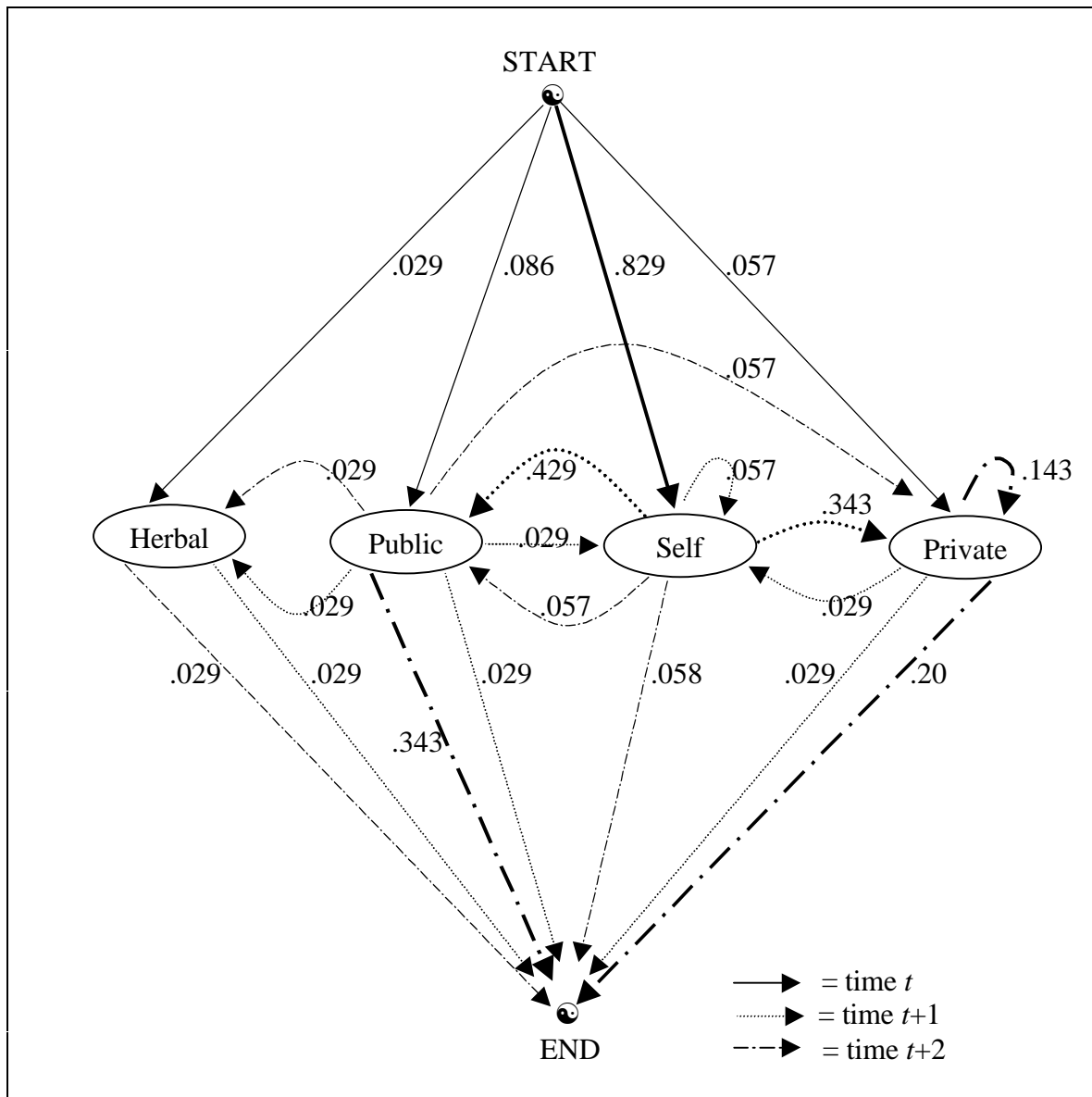
Figure 8.3: Likely movements between treatments with the likelihood estimates (N=35)

Table 8.1: Eigenvalues of consensus analysis of the 35 informants

Factor	Value	%age	Cum. %	Ratio
1	9.861	83.2	83.2	8.883
2	1.110	9.4	92.5	1.251
3	0.887	7.5	100.0	
Totals	11.859	100.0		

Table 8.2: Cross-tabulation of Self-treatment (ATREAT11)
 and going outside the home (TREATP) (N=35)

TREATP (Treatment outside home)	ATREAT11 (Self-treatment at time t)		
	No	Yes	Total
No	6		6
Yes	4	25	29
Total	10	25	35

Fisher's exact test p < .0001 (2-tailed), Cramer's V is .719[a].

[a] Cramer's V is a measure of association based on chi-square. The value ranges between zero and 1, with zero indicating no association between the row and column variables and values close to 1 indicating a high degree of association between the variables.

Table 8.3: Cross-tabulation of ACREDIT and
ACREDITR (N=35)

		ACREDITR (Good credit record?)		Total
		No	Yes	
ACREDIT				
(Get credit?)	No	21	1	22
	Yes	3	10	13
Total		24	11	35

Fisher's exact test p <.001 (2-tailed), Cramer's V is .753.

Table 8.4: Cross-tabulation of AAVOID2 and
ACAUSE2 (N=35)

		AAVOID2 (Avoid sugary foods?)		Total
ACAUSE2		No	Yes	
(Sugary foods?)				
	No	14	1	15
	Yes	10	10	20
Total		24	11	35

Fisher's exact test p < .001 (2-tailed), Cramer's V is .462.

Table 8.5: Cross-tabulation of AITCH and AAITCH1(N=35)

		AITCH (Do pills cause itching?)		Total
		No	Yes	
AAITCH1				
(Use Piritons?)	No	19	11	30
	Yes		5	5
Total		19	16	35

Fisher's exact test p < .05 (2-tailed), Cramer's V is .445.

Table 8.6: Pearson correlation between 15 symptoms for malaria (N=35)

	headache	l-appetite	f.cold	a.body	child.d	child.c	other[a]	shiver	fever	vomit	j.pains	diarrhea	f.weak	stomach	dizzy
headache	1.000														
l-appetite	.088	1.000													
f.cold	-.059	.067	1.000												
a.body	-.019	.079	.009	1.000											
child.d	.213	-.112	-.159	-.145	1.000										
child.c	.189	.248	.028	-.240	.251	1.000									
other[a]	-.079	-.067	.134	-.009	-.134	-.222	1.000								
shiver	.164	-.120	.043	-.083	.398*	-.077	.258	1.000							
fever	-.164	.288	.258	-.351*	.156	.077	.043	.120	1.000						
vomit	-.099	.113	-.226	.015	-.268	-.117	-.048	-.054	-.073	1.000					
j.pains	.417*	-.219	-.059	.113	-.036	-.306	.196	.292	-.292	.248	1.000				
diarrhea	.059	.113	-.190	-.165	-.134	.167	-.134	-.043	-.258	.090	-.079	1.000			
f.weak	.283	-.241	.196	.019	.284	.306	-.059	.091	-.091	-.132	.167	.079	1.000		
stomach	-.284	-.145	.075	.165	-.167	-.276	.071	-.019	.019	-.120	-.036	-.369*	-.089	1.000	
dizzy	.000	-.227	-.068	.196	-.123	-.204	-.102	.000	-.474**	.172	.289	.238	.144	-.031	1.000

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)
[a] Other includes reported malaria symptoms other than those given in the Table.

Table 8.7: Pearson correlation of 5 treatment alternatives over three transition periods (N=35)

	ATREAT11	ATREAT12	ATREAT13	ATREAT14	ATREAT21	ATREAT22	ATREAT23	ATREAT24	ATREAT32	ATREAT33	ATREAT34	ATREAT35
ATREAT11	1.000											
ATREAT12	-.551**	1.000										
ATREAT13	-.313	-.129	1.000									
ATREAT14	-.215	.298	-.088	1.000								
ATREAT21	-.313	.153	.153	-.088	1.000							
ATREAT22	.394*	-.311	-.130	-.213	-.311	1.000						
ATREAT23	.329	-.070	-.259	.082	-.259	-.382*	1.000					
ATREAT24	-.377*	.477**	-.062	-.042	-.062	-.149	-.124	1.000				
ATREAT32	.227	-.180	-.180	-.123	.269	-.433**	.391*	-.086	1.000			
ATREAT33	.112	-.088	-.088	-.061	-.088	.284	-.178	-.042	-.123	1.000		
ATREAT34	.078	-.062	-.062	-.042	-.062	.198	-.124	-.029	-.086	-.042	1.000	
ATREAT35	.078	-.062	-.062	-.042	-.062	.198	-.124	-.029	-.086	-.042	-.029	1.000

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)
TREAT11, 21 = Self; TREAT12, 22, 32 = Public; TREAT13, 23, 33 = Private; TREAT14, 24, 34 = Herbs; TREAT25, 35 = No action

Table 8.8: Classification table for–How serious is an enlarged liver? (N=35)

		Predicted		
		No	Yes	% predicted
Observed	No	15	5	75.0%
	Yes	7	8	53.3%
		Overall prediction		65.7%

Significance p < .05

Table 8.9: Classification table for–Is malaria caused by mosquito bites? (N=35)

		Predicted		
		No	Yes	% predicted
Observed	No	2	3	40.0%
	Yes	1	29	96.67%
		Overall prediction		88.57%

Significance p < .05

TRIADS QUESTIONNAIRE FOR 16 ILLNESSES IN BOMORENDA

ID #0 MALARIA STUDY - SUNEKA, 21.08.1997   1

Aiga inse intobwate amange ya amarwaire achandete abanto aiga Suneka. Koranche tokogosaba otoe chitageka inke igo erio tonyare gokoboria igoro y'amarwaire aya. Kera ase elaini intobwate amarwaire atato oka. Nigo tokogosaba ototebie ase aya atato mborwaire ki okagerete koba aboao kabisa. Koranche totiga nonya nelaini eyemo. Totebie onsi. Mbuya mono.

(Here we have most of the illnesses common in Suneka. We want to request you to give us time so that we interview you about these illnesses. In each line we have three illnesses only. Please tell us of the three in each triad that which does not fit. Do not leave any triad unanswered. Tell us all. Thank you.)

_____

Name:_____ Sex: _____

Age:_____ Date: _____

Location:_____ Interviewed by:_____

Comments by interviewer: _____

_____

Ogwatigwa Omobere	Ogwatigwa Omotwe	Malaria
Okoromwa Enda	Ogosaa	Obokendu
Esiororia	Measles	Endwari ya Inda
Ukimwi	Okoroka	Ogosaa
Malaria	Obokendu	Measles
Obokendu	Measles	Esiororia
Ogwatigwa Egekuba	Obokendu	Ekeuno
Ogwatigwa Omobere	Esiororia	Ekeuno
Measles	Ekeuno	Rikuba
Ogwatigwa Amagoro	Measles	Okoroka
Ogwatigwa Omotwe	Ogosaa	Ekeuno
Measles	Rikuba	Ogwatigwa Egekuba
Ogwatigwa Egekuba	Ogwatigwa Amagoro	Riberera
Ukimwi	Ogwatigwa Amagoro	Malaria
Rikuba	Okoromwa Enda	Ogwatigwa Omobere

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ID #0 MALARIA STUDY - SUNEKA, 21.08.1997   2

Ogwatigwa Egekuba	Measles	Ogwatigwa Omobere
Measles	Ukimwi	Ogwatigwa Omobere
Okoromwa Enda	Riberera	Ukimwi
Okoroka	Ogwatigwa Omobere	Rikuba
Ukimwi	Rikuba	Riberera
Obokendu	Riberera	Rikuba
Okoromwa Enda	Ekeuno	Riberera
Ogosaa	Ogwatigwa Omobere	Riberera
Endwari ya Inda	Ekeuno	Rikuba
Endwari ya Inda	Obokendu	Ukimwi
Ekeuno	Okoromwa Enda	Malaria
Ogwatigwa Omobere	Ogosaa	Ogwatigwa Egekuba
Ogwatigwa Omotwe	Rikuba	Esiororia
Ogwatigwa Omotwe	Ekeuno	Okoroka
Okoroka	Rikuba	Esiororia
Ogosaa	Ogwatigwa Egekuba	Malaria
Endwari ya Inda	Ogwatigwa Omobere	Ogwatigwa Omotwe
Riberera	Okoroka	Measles
Ogwatigwa Egekuba	Rikuba	Malaria
Ogosaa	Malaria	Rikuba
Ogosaa	Esiororia	Ogwatigwa Amagoro
Ogwatigwa Egekuba	Endwari ya Inda	Riberera
Esiororia	Riberera	Ogwatigwa Omobere
Ogwatigwa Omotwe	Esiororia	Okoroka
Malaria	Ekeuno	Riberera
Ogwatigwa Amagoro	Ekeuno	Endwari ya Inda
Ekeuno	Ogwatigwa Omobere	Ukimwi
Obokendu	Okoroka	Ogwatigwa Omobere
Endwari ya Inda	Ogosaa	Ukimwi
Ogwatigwa Omobere	Endwari ya Inda	Malaria
Ogwatigwa Omobere	Obokendu	Ogwatigwa Amagoro
Measles	Malaria	Ogwatigwa Amagoro
Esiororia	Ukimwi	Ogwatigwa Egekuba
Ogosaa	Ekeuno	Obokendu
Rikuba	Obokendu	Ukimwi

ID #0 MALARIA STUDY - SUNEKA, 21.08.1997   3

Ekeuno	Okoroka	Ogwatigwa Egekuba
Riberera	Obokendu	Ogwatigwa Omotwe
Okoroka	Ogosaa	Endwari ya Inda
Esiororia	Obokendu	Malaria
Endwari ya Inda	Okoromwa Enda	Esiororia
Malaria	Okoromwa Enda	Okoroka
Ogwatigwa Amagoro	Esiororia	Ekeuno
Rikuba	Ogwatigwa Amagoro	Ogosaa
Ogwatigwa Omobere	Okoromwa Enda	Ogwatigwa Amagoro
Endwari ya Inda	Riberera	Measles
Ogwatigwa Omotwe	Measles	Ogosaa
Endwari ya Inda	Rikuba	Ogwatigwa Amagoro
Ukimwi	Esiororia	Malaria
Ogwatigwa Egekuba	Ogwatigwa Amagoro	Ogwatigwa Omotwe
Ogwatigwa Omotwe	Endwari ya Inda	Obokendu
Riberera	Okoroka	Ogwatigwa Amagoro
Ogwatigwa Egekuba	Okoroka	Obokendu
Endwari ya Inda	Okoroka	Malaria
Okoroka	Okoromwa Enda	Ukimwi
Obokendu	Okoromwa Enda	Ogwatigwa Amagoro
Esiororia	Okoromwa Enda	Ogwatigwa Egekuba
Ukimwi	Measles	Ekeuno
Ogwatigwa Omotwe	Ogwatigwa Amagoro	Ukimwi
Malaria	Ogwatigwa Omotwe	Riberera
Esiororia	Riberera	Ogosaa
Okoromwa Enda	Ogosaa	Measles
Endwari ya Inda	Ogwatigwa Egekuba	Okoromwa Enda
Ukimwi	Ogwatigwa Egekuba	Ogwatigwa Omotwe
Measles	Ogwatigwa Omotwe	Okoromwa Enda
Okoromwa Enda	Rikuba	Ogwatigwa Omotwe

APPENDIX B
MALARIA HEALTH CARE DECISIONS--GRAND TOUR SURVEY GUIDE

The purpose of this interview is to enable me determine how patients manage malaria episodes and how they explain their suffering as a result of malaria. I am asking for your permission to tape record the interview so that I do not forget what we discuss. Your honest response will be greatly appreciated.

Thank you.

_____

Please tell me all about malaria.

1. How many times have you had malaria over the last one year/6 months/3 months? Please describe to me what you did in each of this malaria episodes (Treatment resort). What did you do first, second, third, etc.? These days people talk of malaria they can not self-treat (drug resistant), tell me all you know about it? Do you have any preferred drugs in the treatment of malaria? Which ones and why? How many other people has it attacked in the family? What did they do to treat it? Find out whether neighbors are a factor in dealing with malaria. Any specific clinics you prefer to visit? Why?

2. How did you know you had malaria? (Here I expect the informant to give the malaria symptoms) What causes malaria? Do not forget to probe about mosquitoes, eating sugary foods, any other "assigned" causes especially those related to family misunderstanding or with neighbors.

3. Please tell me about the problems you had treating the latest episode of malaria? How did you deal with them? What problems did you have with any of the earlier episodes

and how did you deal with them? Any that you specifically remember? (If there is ask Why this particular one?)

4. How does malaria affect your activities, that of the family? (What are the economic implications of malaria to you as an individual? on the family?) Are there any other loses due to malaria that we have not discussed? Which ones? (probe further on these, if any)

5. How best can we prevent malaria?

6. Are there foods which are best for malaria patients? Which ones? How is each one of these foods good for the patient? Quite often people say that one can get malaria from eating too much sugarcane, please tell me about sugary foods and malaria. What foods are proscribed? Which ones are prescribed?

7. Ask the informant whether malaria can be caused by agents other than those they have already mentioned. What about polygynous homesteads - accusations of witchcraft and the like?

8. When people say that "malaria yasokire/yautokire" after vomiting "esosera" what precisely do they mean? Is malaria in this sense viewed as something that enters one and leaves after a period?

9. Please tell me how the community used to manage malaria in the past.

10. If not already mentioned ask about traditional healing practices/doctors, etc.

FILL-IN FORM FOR RECORDING MALARIA INTERVIEWS

MALARIA HEALTH CARE DECISIONS: GRAND TOUR SURVEY GUIDE	
No:	
Time start:	Time end
Interviewer:	Date:
Name: Sex:	Marital status:
S. Location Occupation:	
How many times? What the respondent did: preferred drugs; treatment choices; TMG's input.	
Main signs/symptoms, cause (neighbors! Polygyny!)	
What problems if any related to treatment of last malaria episode:	
Effect of malaria on various activities of individuals and family:	
Prevention of malaria:	
Recommended foods, if any, for malaria patients:	
Any other causes? Probe further regarding polygynous homesteads	
"Malaria yasokire" tell me about this:	
Management of malaria by community in the past:	
What about traditional medicine/doctors, etc.:	

APPENDIX D
CODES FOR MALARIA NARRATIVES

COLUMN	VARIABLE CODE	VARIABLE DESCRIPTION AND VARIABLE VALUES
1 - 3	RESP_ID	Informant number, from 001 - 035
4 -11	NAME	Name of the informant
12-13	AGE	Age in years as reported by the informant.
14-18	GENDER	The gender of the informant. It is indicated as male or female
19-32	OCC	Occupation of the informant. This is a nominal variable. The possible scores are housewife, farmer, retired worker, security guard, teacher, student, artisan, village elder, and n.a. if the informant reported no occupation
33	SES	Socio-economic status is an ordinal variable measured by presence of the following in the homestead. 1= grass thatched house, 2 = Iron sheet roofed, dirt floor house, 3 = Iron-sheet roofed, cemented floor house, 4 = Semi-permanent house, 5 = Permanent house, 9 = information not available
34	AITCH1	Action taken to relieve itching. Did the informant report using Piriton pills? 1 = yes, 0 = no
35	AITCH2	Action taken to relieve itching. Did the informant report using Aspirin pills? 1 = yes, 0 = no
36	AITCH3	Action taken to relieve itching. Did the informant report waiting for itching to stop? 1 = yes, 0 = no
37	AVOID2	If informant reports that foods in CAUSE2 should be avoided. 1 = yes, 0 = no
38	BELIEF1	If informant reports that vomiting or diarrhea when suffering from malaria leads to faster healing. 1 = yes, 0 = no
39	BELIEF2	What informants think about effectiveness of drugs/treatments. 1 if the informant believes that there is an intrinsic connection between patient and health care provider for the patient to heal (okoigwana), otherwise score is 0
40	CAUSE1	If mosquito is mentioned by informant as the cause of malaria. 1 = yes, 0 = no
41	CAUSE2	If eating sugarcane, ripe bananas, and roast green maize are mentioned by informant as the cause of malaria. 1 = yes, 0 = no
42	CUASE3	If causes other than CAUSE1 and CAUSE2 are given. 1 = yes, 0 = no
43	CM	Does the informant know Cerebral Malaria? 1 = yes, 0 = no
44	CMACT	What action was taken? 1 = went to traditional healer/used herbs, 0 = used western medicine
45	CREDIT	If the patient can get treatment on credit. 1 = yes, 0 = no
46	CREDITR	If the informant reports that they try to build a good credit record with the private health care provider. 1 = yes, 0 = no

47	CTRL1	What should be done to reduce malaria cases? 1 = keep compound clean, 0 = other
48	CTRL2	What should be done to reduce malaria cases? 1 = take medicine for prophylaxis, 0 = other
49	CTRL3	What should be done to reduce malaria cases? 1 = use net or spray or burn coil, 0 = other
50	CTRL4	What should be done to reduce malaria cases? 1 = nothing can be done, 0 = other
51	DIAG	Diagnosis of illness by the informant. 1 = malaria, 0 = other illness
52	FACTOR1	Is cost a factor influencing whether people use home management or hospital based care? 1 = yes, 0 = no
53	FACTOR2	Is duration of sickness a factor influencing whether people use home management or hospital based care? 1 = yes, 0 = no
54	FACTOR3	Is intensity (severity) a factor influencing whether people use home management or hospital based care? 1 = yes, 0 = no
55	HELP1	Type of support given to informant by family or friends. 1 = buying medicine, 0 = other
56	HELP2	Type of support given to informant by family or friends. 1 = advice on which medicine one might buy, 0 = other
57	HELP3	Type of support given to informant by family or friends. 1 = social support, 0 = other
58	HELP4	Type of support given to informant by family or friends. 1 = no support, 0 = other
59	INDA	If the informant reports knowledge of the different forms of Endwari ya inda. 1 = yes, 0 = no
60	INDAC	If Endwari ya inda is more frequently found in children. 1 = yes, 0 = no
61	INDAS	How serious are the two forms of Endwari ya inda? 1 = if does not know, 0 = other
62	INDASL	How serious is Endwari ya inda that attacks the left side? 1 = if serious, 0 = if not serious
63	INDASR	How serious is Endwari ya inda that attacks the right side? 1 = if serious, 0 = if not serious
64	INDAT1	Treatment of Endwari ya inda. 1 = use of herbs such as Omoarubaine, taken orally, 0 = other
65	INDAT2	Treatment of Endwari ya inda. 1 = use of obosaro on scarifications done on the individual, 0 = other
66	INDAT3	Treatment of Endwari ya inda. 1 = use of Mepacrine and other pills, 0 = other
67	ITCH	If informant reported use of malaria pills causes itching. 1 = yes, 0 = no
68	MOST	Who is most likely to get malaria? 1 = Adults, 0 = Children
69	MRSST1	What informants think about malaria if they take medicine without getting well. 1 = if they think it is drug resistant malaria, 0 = if they think it is not malaria
70	MRSST2	What informants think about malaria if they take medicine without getting well. 1 = if they don't know why a person cannot get well after medication, 0 = other
71	PCUSE1	Did informant say they prefer private health outlets because public health facilities lack drugs? 1= yes, 0 = no
72	PCUSE2	Did informant say they prefer private health outlets because public health care outlets are not easily accessible? 1= yes, 0 = no

73	PCUSE3	Did informant say they prefer private health outlets because there is less waiting there? 1= yes, 0 = no
74	SYM1	If the informant mentions headache as a symptom. 1 = yes, 0 = no
75	SYM10	If the informant mentions loss of appetite as a symptom. 1 = yes, 0 = no
76	SYM11	If the informant mentions feeling cold as a symptom. 1 = yes, 0 = no
77	SYM12	If the informant mentions aching body as symptom. 1 = yes, 0 = no
78	SYM13	If the informant mentions child being dull/withdrawn as a symptom. 1 = yes, 0 = no
79	SYM14	If the informant mentions child has unusual cries as a symptom. 1 = yes, 0 = no
80	SYM15	Other - if not one of SYM1 through SYM14. 1 = yes, 0 = no. (Note - This score will always be 1 to indicate that a different symptom was mentioned but it was not among the first 14 symptoms that have specific codes.)
81	SYM2	If the informant mentions shivering as a symptom. 1 = yes, 0 = no
82	SYM3	If the informant mentions fever as a symptom. 1 = yes, 0 = no
83	SYM4	If the informant mentions vomiting as a symptom. 1 = yes, 0 = no
84	SYM5	If the informant mentions joint pains as a symptom. 1 = yes, 0 = no
85	SYM6	If the informant mentions diarrhea as a symptom. 1 = yes, 0 = no
86	SYM7	If the informant mentions feeling weak as a symptom. 1 = yes, 0 = no
87	SYM8	If the informant mentions stomach pain as a symptom. 1 = yes, 0 = no
88	SYM9	If the informant mentions dizziness as a symptom. 1 = yes, 0 = no
89	TIME2	If the informant mentions that there is an increase in malaria cases compared to the past. 1 = yes, 0 = no
90	TREAT11	Did the informant report using pills bought over the counter as the first treatment resort? 1 = yes, 0 = no
91	TREAT12	Did the informant report using public (govt.) health care facility as the first treatment resort? 1 = yes, 0 = no
92	TREAT13	Did the informant report using private clinic/private hospital as the first treatment resort? 1 = yes, 0 = no
93	TREAT14	Did the informant report using herbal treatment as the first treatment resort? 1 = yes, 0 = no
94	TREAT15	Did the informant report 'no action' as the first treatment resort? 1 = yes, 0 = no
95	TREAT21	Second treatment resort. The values are the same as for TREAT11, COLUMN 91
96	TREAT22	Second treatment resort. The values are the same as for TREAT12, COLUMN 92
97	TREAT23	Second treatment resort. The values are the same as for TREAT13, COLUMN 93
98	TREAT24	Second treatment resort. The values are the same as for TREAT14, COLUMN 94
99	TREAT25	Second treatment resort. The values are the same as for TREAT15, COLUMN 95
100	TREAT31	Third treatment resort. The values are the same as for TREAT11, COLUMN 91

101	TREAT32	Third treatment resort. The values are the same as for TREAT12, COLUMN 92
102	TREAT33	Third treatment resort. The values are the same as for TREAT13, COLUMN 93
103	TREAT34	Third treatment resort. The values are the same as for TREAT14, COLUMN 94
104	TREAT35	Third treatment resort. The values are the same as for TREAT15, COLUMN 95
105	WHEN1	When is malaria most common? 1 = January, 0 = other
106	WHEN10	When is malaria most common? 1 = October, 0 = other
107	WHEN11	When is malaria most common? 1 = November, 0 = other
108	WHEN12	When is malaria most common? 1 = December, 0 = other
109	WHEN13	When is malaria most common? 1 = Throughout, 0 = other
110	WHEN2	When is malaria most common? 1 = February, 0 = other
111	WHEN3	When is malaria most common? 1 = March, 0 = other
112	WHEN4	When is malaria most common? 1 = April, 0 = other
113	WHEN5	When is malaria most common? 1 = May, 0 = other
114	WHEN6	When is malaria most common? 1 = June, 0 = other
115	WHEN7	When is malaria most common? 1 = July, 0 = other
116	WHEN8	When is malaria most common? 1 = August, 0 = other
117	WHEN9	When is malaria most common? 1 = September, 0 = other
118	WITCH	If the informant mentions that witchcraft may be implicated if patient has malaria. 1 = yes, 0 = no
119	YESDIAG	Does the coder think the informant made the right diagnosis based on the informant's stated symptoms? 1 = yes, 0 = no
120	COST	Cost of receiving treatment from private health care provider in Kenya Shillings, from 0001 - 9999, 9999 = information not available

APPENDIX E
QUOTES FROM INFORMANTS

Profiles of individuals from whom I have selected quotations used in the Dissertation. In each case I have given a fictitious name so as to protect my informants' privacy, id_no, age (in years), gender, occupation and then the relevant quotations. These quotations are given in Gusii language to preserve their originality. However, I give the English translation in the dissertation.

7-1: (Ogora–005, 45 years, male, Security guard)
Chitariri chia malaria, echi bono chikogera inchake amariogo aya iga nechi. Nabo ekonyarekana onyore riberera riabeire eringe ase omonto. Atebe nigo aigwete obokendu lakini rende inche ekero inkomokuna, nigo inkonyora riberera rire aroro rinyinge. Nabo ekero bono ere agoteba ing'a n'obokendu riberera rire rinyinge, nanyora ing'a omotwe oteba nore aroro, amagoro inkomwatia are, insa chinde naende oteba ebianda komoria bire. Lakini rende ere nigo agoteba ing'a nobokendu aigwete obonge. Bono inche eginkonyora kere aroro neriberera rinyinge. Namanya gokagera ing'a malaria. Namanya gochakera amariogo ayio natebire.

7-2: (Mogaka–025, 38 years, male, Farmer)
Malaria bono buna okoyerora egocha ase omonto, nabo okonyora omonto okoigwa chidariri kwanyora ng'a okobunekana omobere, chinengo echi, ase omobere bwensi omogima. Kwamanya konyora ng'a egocha yakoa obokendu. Ekero yakoire obokendu obo, nabo okonyora ng'a ogotwara malaria okonyakonyegerigwa gose gwachaka koroka. Okoroka buna oko bono okonyora tokoroka esosera, kwamanya konyora ng'a ngoika ore engaki ekero oborwaire bwasoire omobere. Kwanyora yakoa enchera gwachaka naende goeta enda embe. Enda eyio embe gocha gocha kwamanya konyora naende engaki ngoika ere malaria yaba enyinge. Kwanyora egokoa esiororia, kwanyora naende insa chinde ogwatigwa nonya nase omobere ime, kwamanya konyora naende engaki ngocha ere yaika yakoa okonyora omotwe okogwatia okonyora ng'a amariga agochaka goiteka gose amaiso.

7-3: (Mogaka–025, 38 years, male, Farmer)
Igo okonyora ng'a mbire ororo bigocha gocha ensemo ya malaria, nensemo y'omwana ekengwerere. Omanyete omwana omoke kare omoke, ere nomonto okoigwa. Nomobere ase ebimo biaye ere aigwete bobe. Ochaka korera okorera kwaye. Okorera oko kwaye

nakwo okonyora ing'a omwana kwanyorire ochakire koyia riberera, ochakire koroka, ochakire gosaa. Yagera kwamanya komanya ng'a eye malaria yamosoire.

7-4: (Mogaka–025, 38 years, male, Farmer)
Bono egento gekogera twateba buna malaria yasokire, konya malaria eria igo euganete enda. Bono nabo okonakorwarigwa riberera rire aroro. Lakini bono ekero gwacha kwaroka kabisa nabo oraroke omochununu ogwekaine, insa chinde, omochununu bwe rigena rie engoko, gose nabo oraroke obwekaine obonyansi. Igo bono ekero kwanyeroka kabisa baka bono gwacha koroka amache amarabuse bono igo yasokire yarure omobere. Insa chinde bono gikwanyeroka kabisa orwe aroro onye inguru chiarenge bwesabusie amache amakendu, ekero gwesabusirie orwe aroro omanye koegwa orie kabisa. Igo okoigwa buna chinguru chiachire. Bono rirorio noche omente oiyererie entetere korwa igoro ingoseria ere oborwaire. Igo bogochia boseberekane. Lakini bono nabo oraroke naende onyorekane nekabichi eria eria gose nerikuneni nabo oigwete esiororia tu, goetera bono ng'eni chiria tichigosoa.

7-5: (Nyanchera–018, 54 years, Female, Teacher)
Barabwo omanyete bakoa abanto emete gete baroka. Ekero omonto arokire buna tari gochi gotwara malaria. Usually ebakorokia omonto oria orwarire malaria repeatedly. Nabo inkoigwa buna abande nkogwena bare after barokigwe gose basaire lakini inanyakomanya.

7-6: (Okong'o–024, 50 years, male, Farmer)
Okong'o: Omanyete malaria nabo ere okoroka, nabo orasae igo igo.
Isaac: Okoroka koria toteba nesosera.
O: Okoroka koria naende orware malaria gokoroka nigo ogoutoka. Iroka naende orware ekabira eyio osae kabisa, aba togosaa mono. Nabo orasae kabisa kabisa onyanyoke. Igo gwautokire okonywa chintetere notagenda nyagitari, kwabwenire.

7-7: (Bonareri–019, 57 years, female, Housewife)
Isaac: Timanyeti gose kende inkere oraborie. Eye gwatotebia buna malaria ingosoka ere gokoroka esosera.
Bonareri: Ee gatekire korokire esosera eyio korwa inda gekoba buna motige aroke, motige aroke igo akore momanye komoa chintetere. Kwareterwa chintetere echio chia malaria, twamoa. Nechikonini obo obo ritang'ani nobokonini twabwate.

7-8: (Mogoi–013, 65 years, male, Retired court prosecutor)
Ebio, mbire ororo naende juzi intwarenge nekende kenga buna ekio. Omonto agakwana oyo nomwana okure lakini omwana oyio etokorora nabo asirete ase malaria yamoriete. Lakini rende omonto onde ogosensera gocha agateba inakii, 'ekerogo morarora ritang'ani naende buna morore.' Ekerogo neriroba riria ribariri. Erio mbotuko agotera. Naende amatuko abere atato akoera omwana naende oyonde agakwa. Bono bakamanya gotwara e

'belief' buna omonto okoroga noyo oyo oterete nere, naende ekerogo negiaki are goterera. Basi bono amang'ana ayio agacha. Ekio kerakio nkeroo. Ekio nkere aroro mono mono sana. Mono mono sana. Ebi mbigendererete nonya mbono iga. Mbari kwamini omonto ngokware na malaria. Ebakorengereria omonto nonya malaria yamoita egento kende ngekare ororo. Omonto nakare aroro. Aba rero emogoita abanto mwateba ng'a malaria. …. Ekio nakio egento kegendererete sana. Mono mono ase abanto ba reserve. Mono ase abang'ina baria bakonya kwomana. Bakwoma igoro yechingoko ne chiombe.

7-9: (Kerandi–034, 30 years, Male, Farmer)
Isaac: Ero ninki gekoyereta?
Kerandi: Malaria yo obongo Abagusii bande abagoteba ng'a ekero malaria yabeire chronic in the body bono egochia yaonchora omonto nabo akoba ebarimo.
I: Ero naki dalili chiaye naki chire?
K: Nabo egochaka buna malaria ya kawaida, otatiga bono ero egento gioka etabwati etari gochanda monto. Omonto nabo arabe tabekerwa amache ekiagera omonto tari konyia iberera. Gose nabo oranyore gakoyia riberera lakini tari kominyoka. Tari kogenda yaani achie gosaa. Bono aye okonyora yasoire omotwe kwanyora omonto obasokire. Obeire ebarimo. Otatiga tinyemanyeti mono aro egekoyerenta ninki, otatiga nche manyete ng'a nabo enga malaria eye ya kawaida egokoria. Igo bono ekero yachire yaikire e stage gete, nsa chinde yagoaka enene kabisa yachia yagotabanania. Nabo erache ne ekerundo erio yasoa omobere oo. Yamanya kogotabanania kwabasoka.

7-10: (Bochaberi–011, 30 years, Female, Housewife)
 … Abang'ina abake nabwo bagwanchwa. Bono oyo onde otigara okoinyora inaki bamenyete nomogaka oria, okoinyora inaki esukari yamisirie abana baria nyomba, okoinyora ng'aki bakanyoranire nomogaka oria babanga inaki igoro yomoroberio bwo omochie obo. Omotwe oye malaria yamosoera abwo akili yaye yacharoka.

7-11: (Bisieri–027, 26 years, Female, Housewife)
Isaac: Ero nki gose gekogera akobasoka?
Bisieri: Nere gose nabo oranyore ne ebirengererio. Ee gose onyore okwarwara mono riberera riria riakomeki gwakora ki obongo bwacharoka.

7-12: (Kemunto–032, 26 years, Female, Housewife)
Isaac: Ero inki gekoyereta?
K: Ero nkorora ng'a nsangine ere ase ebirengererio gose eriogi. Ekero mokwoga amo ne ebirengererio.

7-13: (Bochaberi–011, 30 years, female, Housewife)
Ekero ayare inkoranywa rende naigwa buya, gose angwenia, nabo okonyora nkonywa
chintetere nagachakeire, konya igo nagachakeire chintetere chia Chloroquin nagwena.
Nanywa Chloroquin na Aspirin gose Panadol nagwena. Bono Chloroquin togacha
togasinywa. Inkonywa chiasoa gonsuna omobere, naende tinkogwena. Bono rero amatuko
aya echire nkonywa nchiri chiacha bono bakoroka Metakelfin. Echi nabo inkonywa yagera
chiangwenia. Nonya Fansidar nachirochio nchiarachete inkanywa, korende rero Fansidar
echio nonywa okoira nonya namatuko atato omanye gocha kogwena. Korende echi
Metakelfin inkonywa ero chinsa chiagenda inke kwagwena.

7-14: (Bochaberi–011, 30 years, female, Housewife)
…. Korende aro nonya nomwana ekero achinyure nabo agochinywa ogwena rituko erio
erio buna achinywa. Baka agwene rituko erio, korende tagokora motienyi naende igo
ekomoiranera. Naende nachimoa chirachio. Bono timanyeti buna nachirachio echirache
kwanga amanyinga aye ere.

7-15: (Bochaberi–011, 30 years, female, Housewife)
Bono echi chie esirikali buna Iyabe na Riotanchi egekogera totancheti kogenda aroro
mono kenga buna echi chiaito chire ang'e naintwe, echi chinde buna Iyabe na Riotanchi
igo okogenda aroro, ogoika aroro gwatebigwa mariogo taiyo. Bono ochia gopima orora
mbuya oonie engoko yao ominyokie omwana, onye nomwana ogokorwarera, nyagitari
bwango onye ere ang'e ye chibesa arwarigwe. Aria nabo oragende obwatie elaini
orikerwe, kogoika aria otebigwe riogo eri ndiyo, orikerwe otebigwe gachi ogore. Erio
gwaikire aroro kwanachire ekadi ero bakoire, kwarobeire, gwachire kwarorire
omonyagitari ase ogokwana nere buna inaki arwarete. Kwanyora bono omonyagitari onde
ogotebia yaya riogo erio ndiyo. Gachi ogore onye nechintetere chire iga, okorikera
risakara. Insa chinde kwanyora nechi Panadol chioka gose na Aspirin, gwatebigwa echio
ogochi kogora onywererani nechi. K'orora buna chinsa chiria gwasaria aria, nonya
kwaonetie engoko yao gose bono buna ritoke, buna amatoke seito aiga aroo oonie
ominyoke ase enyagitari ye chibesa okonye malaria bwango gose oborwaire botarachi
konenea. Naki gekogera totari gwanchera kogenda gochia aroro mono.

7-16: (Nyang'ate–026, 36 years, female, Housewife)
Ninyemanyete, lakini ase inde teraika aroro. Nigo inkoyeigwa. Eye yokobasoka, nabo
aragende nyagitari arwarigwe, agwene gose tagwena. Korwa aroro agende ase ekienyeji
buna inkoyeigwa. Ekienyeji nigo akoegwa amariogo y'ekegusii rikogwererana nabo
akogwena. Bono nabo ekonakoba igo rende. Nokogwererana.

7-17: (Makori–001, 48 years, Male, Retired railways worker)
… Chintetere nigo okonywa inye rimo, erio after 6 hours kwanyakonywa ibere ibere, maambia buna bogokia kwanywa ibere, basi naende oganye baka mambia ende naende onywe ibere. Okore e'dose. E'dose igo chikoba 12 (4+2+2+2+2).

7-18: (Ogora–005, 45 years, Male, Security guard)
Bono bono ekero ekoba malaria, onye ninche omonto omonene gose no omonto omonene one orwarire ko indoche iga ingotema chi Chloroquin, nareta ekerengo keria getakeire. Onye no omonto bono omonene nabo inkomoa chi Chloroquin echi bagoteba ing'a chintetere inye ochakera aroro. Naende nyuma ye chinsa isan neyemo (6 hours) namomentera ibere. Amatuko aria ande akobwatia ibere, ibere mara gatato chiamanya koba chintetere ikomi na ibere. Nero nanyora ing'a yakeire. Chingaki echi iga namoire chintetere echi inye inkonyora ande Panadol namoererania ibere ase ogochaka. Nabono echio ibere, ibere kogenda naro inkonya komenta inde ibere aroro. Ekero nakorire onye nero nabo okonyora yakanyekire.

7-19: (Bisieri–027, 26 years, female, Housewife)
Gose bakoa chi Metakelfin, lakini rende inkoigwa ng'a ekero ogotumia onye amanyinga ao taisaini omobere, nabo chikogosumbua.

7-20: (Asati–012, 37 years, male, Blacksmith)
Ee ase abaamate barabwo nabo omonto akogotebia. Buna bono omongwana onde, nanyorete atebigwe buna ekero arwarete malaria agatebigwa agachia akagora chintetere tokoroka Panadol, naende akamanya kogora na Hedex. Chikamanya koba chintetere echio buna nachio abwate nyomba ekero agontebia buna abanto bane barwarire. Buna nabo nachiete nkabagorera chintetere buna omongwana gete antebetie buna gora chintetere echi nachio chirakore buya ase omorwaire oyio.
   Bono ekero ingochia goika nyomba, oyio nomoisia one, nkamanya konyora igo abwate Hedex, abwate naende nechi Panadol aire e dose. Chi Panadol agorire korwa chemist. Bono rende nainche ngasoa ase engencho manyete buna Hedex na Panadol ebinto ebio igo bikogenda pamoja. Nyore namaumivu ebikorwaria amaumivu, onye nomotwe noro oyio oyomo, amaumivu narayio.
   Korende ekero namokania, kani omosubati otumiire chintetere echio, bono 'change' tiyachi kororekana. Bono tokanyora naende igo akomenta koumia mono. Inkamotebia buna bono aye, egento ogokora, genda eduka bori orete chi Chloroquin bori korwa aria e chemist. Korwa ase gwachiete okagora Panadol, naende osabe Chloroquin e dose na Panadol e dose, egere omonto oche oe omorwaire oo buna oratebigwe korwa aroro, nabo okonyora okogwena. Bono nari erio achagete gokumia buna yaani chintetere echi igo chire echimo, chikorwaria pamoja. Torochi rende noborwaire obomo. Bono naki ekio nkororera abanto bande mbare barakong'aine. Omonto okagerete yaani chintetere gete arakong'aine, kani chintetere echio ngocha koumisa chire omonto.

7-21: (Onchieku–007, 49 years, male, Farmer)
…. Ekero ekonyarete ake ake igo okonagotwa amate. Ekero ogotwa amate naende kwaigwa buna n'esiororia egokoira. Insa chinde kwaigwa yakobetire, kogochia kobwata enda kwaigwa enga buna nerigena. Ekero kwaigure enga buna rigena kwamanya endwari eye yanyarire. Inaki ingokora? Kwarora tiga ogende ase omonyagitari ekero oigwete buna yakonyarire kwamoeleza buna orwarete. Onye tekonyareti mono nabo togochia twarigia mete ende igo twanyagosunyunta. Twacha twabeka ase omokebe twanyakonywa igo baka yapoa. Igo nigo kwegerera ebesa. Ribaga okoira ebesa ase omonyagitari.

7-22: (Asati–012, 37 years, male, Blacksmith)
Eyio bono malaria n'endwari ya inda. Ekero oigwete nobwatire endwari ya inda okoigwa ore dariri buna inaki egokobwata. Bono nabo ogotumia ekero gwatumiire iga nabo okoigwa e change neroo. Ogenderere gotumia buna amasharti are, nabo okoigwa buna e change nkororekana ere. Nonya namagoro aria okoigwa akorigia ekogera amaene nonya ne endwari eyio, nabo egokoria okoigwa buna malaria pi. Gekogera ngokoa ere riberera, ngokoa ere enda, yaani yasoa gokoroma enchera gete. Korende gotaka gotema korora inki, omote oyio ekero kwayotumiire nabo okoigwa buna bono nagusuire. Ee, naende gwachaka gokora egasi yao ne chinguru.

7-23: (Kembero–003, 68 years, male, clan elder)
Chi private rende torochi nabo bararwarie buya egere omonto oteba nario abarwaire baranyagocha ase e clinic kiane. Buna ng'umbu aria nabo okonyora amariogo agocha amange korwa Bosongo lakini naende nabo okonyora bakoyaruisia naende bayaire ase ebioski biabo bachia koonia.

7-24: (Nyanchera–018, 54 years, Female, Teacher)
Chi private chirachio imbora nokoigwana, buna moraigwane. Chirachio imbora ogosoa ime, kwarwarigwa kwamanya gwakerwa esabu yao buna bamanyete bagwaka. Riogo gete, riogo gete buna riaira, gwatebigwa esabu ching'ana iga. Basi rende kwaba tayare gochirwa. Abe abanto mbakairokire e private sana, lakini ndoche buna rero kera omonto nkogenda are. Ase engecho abanto bairokire oborwaire, akomanya ingocha kogenda Iyabe, inkonyora mariogo taiyo. Igo nasaririe chinsa tiga ing'ende e private imbwenigwe.

7-25: (Kemunto–032, 26 years, Female, Housewife)
Mbuya bakorwaria. Okorora buna mbuya bakorwaria nabo mokogamba rigori torochi rende ochakire korwaria omwana, onye ne rigori riria amorwareria naende rende koragendererie amariogo aria amoete, change etabetie aroro kogocha komotebia ng'a change teraba aroro, nabo akogenda gochencheria omwana amariogo. Naende ekero akomochencheiria tori komoiraneria besa chinde, nachio chiria akomorwareria chioka chioka mbaka atimoke. Naende amariogo agoochogania onsi onsi mbaka torora rende ng'onye ere malaria mbaka abwene.

7-26: (Nyang'ate–026, 36 years, female, Housewife)
Isaac: Aiga rende Riotanchi gwateba bakoboria siringi emerongo ebere (KSh. 20.00) o Nyariki baboria siringi mia sita (Ksh. 600.00). Ninki gekogera otari gochia Riotanchi mono?
Nyang'ate: Nare raisi. Nabo oragende aroro togwena omanye kogenda naende o Nyariki. Orora buna tiga ogende o Nyariki.

7-27: (Mogaka–025, 38 years, male, Farmer)
Mogaka: Ritang'ani ekero malaria yagosoire omobere goika oragora chintetere orabeka mobere orarora naki malaria gose ngopoa ere. Gokoigwa malaria eyio tepoeti, omanye gochaka kogenda nyagetari, nyagetari amanye gokoa amariogo aria atumegete na malaria eyio ere ase omobere oo, omanye gochaka koigwa gose kwabeire buya.

Isaac: Igo ase okogenda nyagetari gokoborigwa kai kwagenda, nabo ogoteba nyagetari kwagenda lakini gokoborigwa gochia ime nabo ogoteba buna yaya, nyagetari nagenda e private gose Iyabe nagenda enyagitari gose General kwagenda igo nyagetari.

M: Mbora ne chinyagitari buna chibekire chi private chinyagitari echi nachirachio omanyete ingokonya chire onye tari ebesa. Ekero chiabeire chigokonya nabo orabe gokogenda abwo onye tonyoreti chi dispensary chi'orosagi rwa ensemo ya General. Igo nachirachio ingokonya chire. Gokorwa oo gokonyora tori konyora nafuu mono, bono enyagitari ogocha kogenda okogenda General. Kogoika General noro bachi komanya ng'a oborwaire obo kwarwa chi dispensary gocha gocha nechinyagitari echi chia private, mariogoki bagokoa. Naende mariogoki bagotumia. Nabarabwo bamanya gochaka kogochencheria amariogo aria oraganie gotumeka ase oborwaire boria bwao gwaeteire ase chinyagitari echio chionsi botaranyarwa. Bakoa amariogo amang'ao naro arachie kobua oborwaire boria.

7-28: (Nyang'ate–026, 36 years, female, Housewife)
Yaya, amariogo nare aroro. Nabo orangende agwo o Nyariki togwena ogende Kisii General ogwene. Nigo okorachakera aiga inka gokoigwa toraba buya kwagenda o Nyariki onye torikoigwa buya kwamanya kogenda Kisii General.

7-29: (Onchieku–007, 49 years, Male, Farmer)
Isaac: Ingaki ki okogenda Mwa Nyariki?

O: Engaki inkogenda mwa Nyariki igo ekororekana oborwaire obwo bore obotindi bwa gafla naende indora ing'a ing'ang'e tinkonyara goika Riotanchi. Ekero ingocha goika Riotanchi natambe. Indora tiga ing'ende ase are ang'e nonya chibesa chire igoro egere indwarigwe.

7-30: (Nyang'au–031, 44 years, male, Farmer)
Isaac: Ndi okogenda mwa Nyariki gose Iyabe?
Nyanga'u: Erio bono ekobwatekana ng'onye ngaki ende yonsi yaani, omanyete abwo nabo orabe riswari erio ne rikong'u.
I: Ee bono.
N: Korende ekero imbwate chibesa nkogenda chi clinic echio chire chibesa.
I: Echi chia abanyene?
N: Mm, mbwango bagokora.

7-31: (Onchieku–007, 49 years, male, Farmer)
Omoerio yarandire lakini bono ingotumeka chintetere nanyora buna nagwenire. Tindi gochia nyagitari. …. Naranyure lakini engaki yaraetire entambe. Mono nechintetere inkogora. Ndora buna chintetere inkogora chia Ksh. 14.00 na Riotanchi chikare Ksh 40.00 bono inyora buna echio Ksh. 14.00 nabo inkoratumia. Inyora buna Nyasae nere ore omuya, nagwenire. Ing'iraneria omonene buna imbuya mono.

7-32: (Bochaberi–011, 30 years, female, Housewife)
Bono aiga seito tokonya kogenda, intori kogenda nyagitari ya General. Aria twanyora abanto nigo bagoichora, onye tokonyora oyogokoraa nabo orasumboke agwo rituko rigima torwarigwa. Bono rende togenda chi clinic bia abanyene baigorete, buna bono Amani Clinic nkere rogoro aa. Amani Clinic neya Nyariki, bono aria nao togochia.

7-33: (Bochaberi–011, 30 years, female, Housewife)
Agwo ekero otabwati chibesa … Ase chi dispensary echi kwaboria egento gekogera totari gochia aroro mono, nigo tokonya koborania. Nabo okoboria onde buna yaya malaria nere mwane, igo intagete kogenda Riotanchi, kwaigwa okogotebia igoro inachiete nkanyora mariogo tarenge aroro. Igo noyanyore rero bori? Yagera kwagenda aria onye omonyagitari ore omuya, buna oyio bono nagotebia okonya gotorwaria korwa igaiga, Nyariki n'omong'ina oye Joyce. Nabo okogenda kwarwa ebirero aroro, 'narwareirwe omwana nkonye ninche ndigie chibesa indete.' Igo rende nabo bagotokabesa kwarwarigwa. Twacha twaira. Igo nabo okogenda orwarigwe omanye konyagwakana ng'ora. Bono rende ase engencho agokorerete amaya kwagwenigwa, nabo ogocha kwarigia chibesa echio gwakoba. Korende ekero kwaboririe buna amariogo narenge Riotanchi kwaigwa buna ee narengeo, rirario nabo okominyoka gochia aroro ataraera. Korende nabo okonyora gwakanigwe buna yaya aria twanchiete aroro mariogo tarenge oo. Onacha ekina buna tiga ng'ende nkobese enyagitari eye rogoro igaiga ndwarigwe.

7-34: (Mogoi–013, 65 years, male, Retired court prosecutor)
Ee, mono mono ngokwana barebo. Mono 'Chloroquin kwamoete?' Chintetere nchire bakoroka Fansidar nkware koratema omoe Fansidar orore gose ngo change are. Chirachio nchiri naacha nesindani. Chirochio ebagoteba moe rioka igo.

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BIOGRAPHICAL SKETCH

Isaac K. Nyamongo is a Research Fellow at the Institute of African Studies, University of Nairobi, Kenya. He was born in Kisii where he lived most of his early life. He attended various schools in Kenya before going, in 1983, to study Anthropology at Panjab University, India, where he obtained his B.Sc. (Hons) and M.Sc. in Anthropology. His master's thesis was later published as *Ecology, Growth and Nutritional Status* (With Dr. S.S. Kaul), Ashish Publishing House, New Delhi. He has also published in *African Anthropology* and in *World Health Forum*. His latest paper on culture change in Kenya will appear in *International Social Science Journal*.

Nyamongo has consulted with UNFPA in Malawi where he helped train researchers qualitative research methods and the use of ANTHROPAC to collect and analyze data. He has also held research grants with the World Health Organization, Geneva, and the International Center for Research on Women, Washington, D.C. In 1996/1997 he was among a multi-disciplinary team assessing the state of health care facilities in Western Kenya. His specific duties were to bring anthropological expertise to the team and to suggest ways of designing facilities that are responsive to the needs of users. Currently, he serves as Treasurer General of the Pan-African Anthropological Association, a professional organization that brings together anthropologists across Africa. He is interested in health care and cross-cultural research.